Time in the "Great Recession":
The Impact of the Great Recession and Being Unemployed on Time Spent in
Healthy Behaviors and with Family Members

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Abstract

The "Great Recession" gripped the global economy beginning in December of 2007 and though the National Bureau of Economic Research (2010) determined that it concluded in June of 2009, for many people across the United States it has not yet receded as of July of 2012. In this study, I examine the impacts of both the overall employment insecurity accompanying the Great Recession and actual job loss on daily time use. Specifically, I examine the effects of being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession on 1) time spent with family members, 2) time spent sleeping, and 3) time spent engaging in healthy behaviors in order to gain a greater understanding of the effects of employment uncertainty on the lives of US Population. Drawing on the American Time Use Survey (ATUS), I use multivariate statistical models to examine differences in time spent sleeping, in healthy behaviors, and with family members for a subsample of respondents in the United States between the ages of 23 and 55.

I find that employment uncertainty is related to poor sleep outcomes while also being related to greater time spent in healthy behaviors and time with family members. Respondents who are unemployed sleep longer and are more likely to report sleeplessness than the employed; living in states with poor economic conditions (i.e. higher unemployment rates) is related to lower odds of having a sleepless episode but increases the odds of a sleep disruption; and those interviewed during the recession are more likely to sleep more than 9 hours, report sleeplessness, and less likely to report a sleep disruption, compared to respondents who were interviewed before the recession

began. Being unemployed is related to exercise, active travel, health-related self-care, and eating breakfast, whereas state economic conditions and historical time period are not as consistently related to healthy behaviors. Poor state economic conditions were related to increased likelihood of spending time in health-related self-care, while being interviewed during the years marked by the recession was related to spending more time in active travel and increased odds of eating breakfast. In regards to family time, being unemployed and living in a state with worse economic conditions (as captured by higher unemployment rates) are related to greater odds of spending time with family members as well as more time spent on average while the recession is related to more time spent with immediate family and less time with extended family members.

Though being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession do not moderate one another in each instance, I find that being unemployed is moderated by other indicators of employment insecurity. In the sleeplessness models becoming unemployed in the 2 to 5 months prior to participating in the ATUS and being interviewed during the recessionary years of 2008 and 2009 were related to lower probabilities of reporting sleeplessness than the employed before the recession. In addition, the declining probability of reporting sleeplessness with increasing state unemployment rates had a smaller slope in 2009 than before the recession. In the health models the long-term unemployed in states with high unemployment tend to spend more time in active travel than the long-term unemployed in low unemployment states and the recently unemployed interviewed during the recessionary years have greater probability of eating breakfast than the employed

interviewed before the recession. In contrast, the recently unemployed spend less time in active travel in high unemployment states compared to low unemployment states. In the family models I find that unemployed parents spend more time with children under 6 when they are living in states with high unemployment rates and are interviewed during the recessionary years. The recently unemployed spend less time with extended family members if they are interviewed during the recession while the longer-term unemployed spend more time with their parents if they were interviewed during this same period.

In addition, socio-demographic characteristics – particularly gender – are important moderators of how employment insecurity is related to time sleeping, in healthy behaviors, and with family members. Unemployed men experienced more sleeplessness as did men living in states with higher unemployment rates. Unemployed men during the recession spent more time in active travel but spent less time in active travel when living in states with high unemployment rates. Men were less likely to eat breakfast when unemployed and spent less time in health-related self care when living in states with high unemployment rates. Unemployed women spend more time with children and extended family members. Life stage also moderates the relationship between the employment uncertainty and sleep outcomes and healthy behaviors. In particular, older respondents without children and parents spend more time in sleeplessness when living in states with higher state unemployment rates than do the younger respondents without children. Parents of children under 18 also spend less time in exercise and are less likely to eat breakfast during the recession. The employment status of spouses/partners moderates the relationships between employment uncertainty and healthy behaviors and

time with family members. Those with employed spouses or partners spend more time in active travel in higher unemployment rate states, while those with spouses or partners who are not employed spend less time in active travel. The long-term unemployed with an employed spouse or partner spend more time with children under 6 and their own parents. Lastly, education moderates the relationships between employment uncertainty and time with family members. During the recession, those with lower levels of education spend more time with parents. In addition, the long-term unemployed with lower levels of education spend more time with extended family members.

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Chapter 1: Introduction

According to the National Bureau of Economic Research (2010), the "Great Recession" gripped the global economy from December of 2007 until June of 2009. However, for many people across the United States, unemployment and experiences of insecurity have not yet receded by July of 2012. One area of major concern is joblessness. Full employment even during the best economic environment excludes the chronically unemployed and discouraged job seekers, and unemployment figures at the peak of the recession were high even excluding those who gave up finding work. The unemployment rate following the onset of the Great Recession peaked in the United States in 2010 at 9.6% (U.S. Bureau of Labor Statistics 2012c) and as of May of 2012 is still 8.2% (U.S. Bureau of Labor Statistics 2012d). In comparison, the national unemployment rate for 2007, prior to the onset of the current recession, was 4.6%. Previously, unemployment had reached its highest point (since 1948 onward) in 1982 at 9.7%[1] (U.S. Bureau of Labor Statistics 2012c).

However, the challenges associated with the Great Recession are more far-reaching than high unemployment rates. Rather, statewide economic conditions and the national economic context have gotten a great deal of attention – both from scholars and popular media sources – due to concerns regarding the long-term implications of this particularly severe economic downturn (e.g. Colman and Dave 2011; Hurd and Rohwedder 2010; Marchione 2010; Mattingly and K. Smith 2010; Morrill and Pabilonia 2011; Pew Social and Demographic Trends 2011; Sell et al. 2010; Vuolo, Staff, and J. T. Mortimer Forthcoming; Xu and Kaestner 2010). As prior research has shown, the challenges of the broader economic climate pose important difficulties for individuals and families (e.g. Charles and DeCicca 2008; Colman and Dave 2011; Elder 1974; Fagin and Little 1984; Jahoda, Lazarsfeld, and Zeisel 1971). There is reason to believe that the Great Recession, with its severity and length as well as the challenges of the new

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[1] Of course, the rates were higher during the Great Depression. The 1981-82 recession, though severe, is not considered to be as difficult as the Great Recession because unemployment rates declined at a faster rate and resulted in a smaller change than did the Great Recession (Borbely 2010).

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economy – such as the changing psychological contract between employee and employer (Burchell, Ladipo, and Wilkinson 2002; Knoke 2001; Moghadam 1999; Perrons et al. 2005; K. V. W. Stone 2000), deindustrialization (Bluestone and Harrison 1982; Burchell et al. 2002), deskilling and downsizing (Burchell et al. 2002; Littler and Innes 2003), and mergers (Burchell et al. 2002; Knoke 2001), will make such factors even more important.

The following three studies that constitute my dissertation extend prior research by investigating the importance of different levels of exposure to employment uncertainty for health and family outcomes including being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession. Though research has begun to investigate what the Great Recession will mean for individuals and families, important questions remain about how exposure to different levels of employment uncertainty influences health and family outcomes as well as how they may overlap. The following research considers how multiple levels of exposure to employment uncertainty work together to shape individuals' lives and their responses to the Great Recession in the areas of health and family outcomes.

Multiple Levels of Employment Uncertainty

Prior research on economic downturns has examined the effects of either being unemployed, living in states with poor economic conditions, or being interviewed during a historical time period marked by a recession, but few studies have investigated how these multiple aspects of economic insecurity work in combination.[2] An exception is the piece by Wheaton (1978) who raised the possibility that being unemployed during a recession would have different effects than being unemployed during a stable economic period. Figure 1-1 illustrates how this may work. As the figure makes clear, being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession overlap – not only with the other single indicators of employment uncertainty, but also with each other to produce some

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[2] Some studies have investigated the effects of being unemployed during a difficult economic period such as the Great Depression (e.g. Fagin and Little 1984; Jahoda, Lazarsfeld, and Zeisel 1971). However, I am not aware of any studies that have compared effects of being unemployed living in states with strong versus weak economic conditions.

Figure 1-1. Life Course Stress Model

Historical Time Period

Being Unemployed

Local Economic Conditions

Socio-demographic Characteristics

Sleep Outcomes, Healthy Behaviors, Time with Family
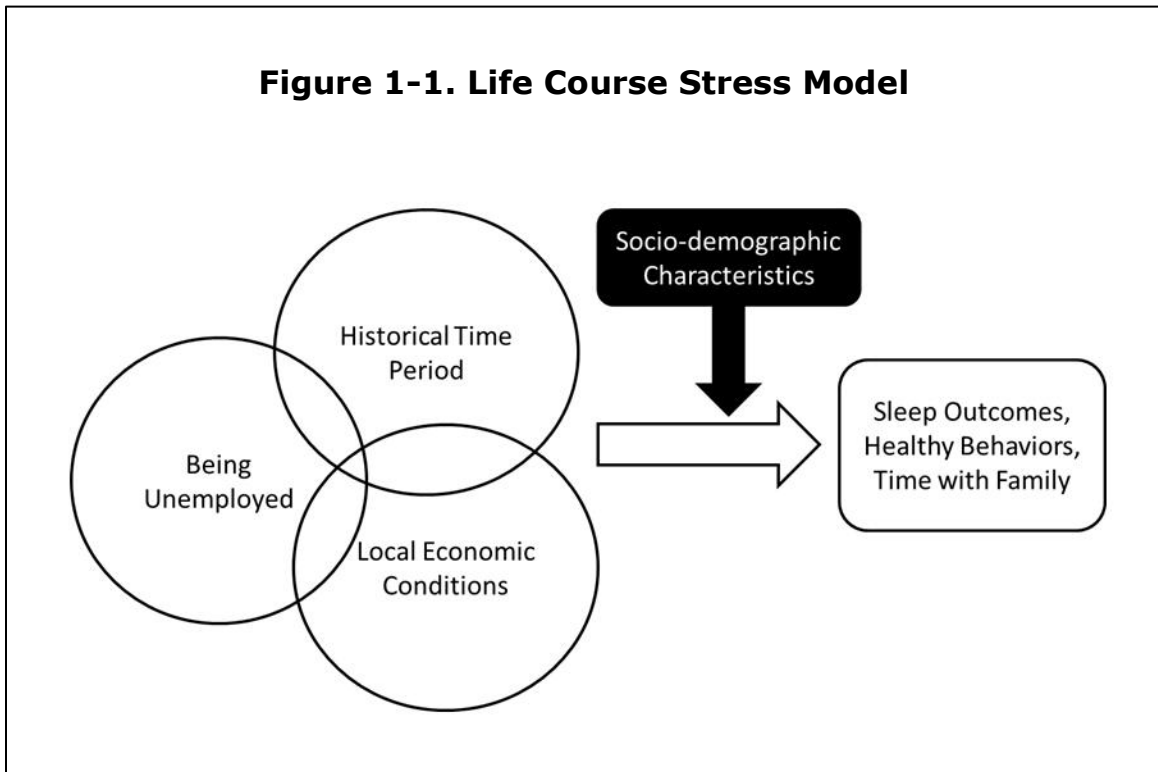
potentially unique effects when these multiple indicators occur together. In essence, being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession are not experienced in isolation from one another. Rather, they overlap and may work in tandem to influence health and family outcomes. In addition, it is not sufficient to simply examine one or two aspects of an economic downturn. Instead, the multiple levels of exposure to employment uncertainty reflect the range of proximal to distal effects on health and family outcomes that should be investigated together in order to better understand the intersecting aspects of economic downturns for individual outcomes.

In this dissertation I theorize that the intersecting aspects of employment uncertainty influence how economic change is experienced. One may expect that being unemployed during a historical period of economic growth or in areas with strong economic conditions—as captured by low unemployment rates—have negative consequences as the unemployed compare themselves with other employed family members, friends, and neighbors and place blame on themselves for their individual

position. In contrast, being unemployed during a period of economic contraction and in areas with poor economic conditions—as captured by high unemployment rates—may have neutral consequences. Instead of comparing themselves to individuals who appear successful in the job market, the unemployed may readily find other unemployed comparisons. Moreover, media attention on low job growth and high unemployment rates may reinforce a sense that their individual employment status is a reflection of the broader economic climate rather than their own personal failings. Similarly, living in states with poor economic conditions (as captured by high unemployment) during an economic recession may magnify individuals' negative assessments of the broader economic climate.

It is worth noting that being unemployed, living in states with poor economic conditions, and being interviewed during a historical period marked by a recession are not independent but not necessarily as predictive of one another as one may expect. Many people become unemployed in areas with weak economic conditions, yet many more maintain their positions or advance in their careers in these same areas. Similarly, though local economic conditions may worsen during historical periods marked by economic downturns, many areas may have stable local economies or, in fact, experience a period of growth.

Being Unemployed

Being unemployed is a personal event that affects not only the economic situation of an individual through reduced financial resources but also has the potential to cause stress through an interrupted social role. Several studies have demonstrated the importance of being unemployed for individual and family outcomes, such as declines in family relationship quality and decreased physical and mental health (e.g. Catalano and Dooley 1983; Elder 1974; Fagin and Little 1984; Jahoda et al. 1971; R. C Kessler and McRae Jr 1982; Linn, Sandifer, and Stein 1985; Pailhe and Solaz 2008; Pearlin et al. 1981; Strully 2009). Though prior research has demonstrated the importance of being unemployed for health and family outcomes, many questions remain. First, it is unclear how these relationships work or why being unemployed has such negative effects.

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Second, it is unknown if being unemployed during the Great Recession will have different implications for individuals and families due to the unique characteristics of the recession – which may have implications for future economic shifts.

The Great Recession has been marked by two unique changes to the characteristics of those who become unemployed during the period – the growing duration of being unemployed and the gendered patterns of who became unemployed. The Great Recession has been characterized by a high percentage of individuals who were unemployed for long durations (Federal Reserve Bank of St. Louis 2012). The lengthening of the amount of time spent unemployed is particularly problematic because unemployment may become self-perpetuating, due to increasing stigma and loss of skills, networks, self-esteem, and so on (e.g. Clark, Georgellis, and Sanfey 2001; Jackman and Layard 1991; Lindsay, McCracken, and McQuaid 2003; Pissarides 1992). Such change in the experience of being unemployed raises important questions about the implications of experiencing such an event. I analyze the effects of the length of time being unemployed by investigating differences between those who are recently unemployed and those who have been unemployed for a longer period of time. Such a comparison extends our current knowledge of being unemployed more generally to include a contemporaneous investigation of the importance of duration for this potentially influential life event.

In addition to the increase in the duration of being unemployed, the gendered pattern of being unemployed shifted during the Great Recession. Researchers have often discussed the disadvantages women face in the job market, including greater unemployment rates during times of economic growth and downturn (e.g. Glass 2008; Moen 1980; Moghadam 1999). Yet, contrary to this long held assumption and pattern, men experienced higher unemployment rates than women during the Great Recession due to declining availability of blue collar work [10.5% for men in 2010 compared to a rate of 8.6% for women (U.S. Bureau of Labor Statistics 2011b)]. Because of gendered assumptions about work and the primacy of the breadwinner role for men (Bernard 1981; Townsend 2002), the greater proportion of unemployed men may have important implications for health and family outcomes.

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Local Economic Conditions

Local economic conditions – often measured with state-level unemployment rates – are commonly used to predict health and family outcomes because of the variation in resources and challenges present at the state level. Though there may be several ways to assess local economic conditions, it could be argued that states with weak economic conditions as reflected in high unemployment rates may struggle to provide basic services to their residents. That is high unemployment rates may be an indication of structural concerns that negatively affect public works, education, or social welfare services, which could result in increased stress, greater time demands to meet the same basic needs, or reduced access to health promoting resources like parks or public health programs. Similarly, states with stronger economic conditions (i.e. low unemployment rates) likely have more resources to respond to community needs and may result in a better quality of life with positive implications for individuals' health and family relationships. Moreover, living in a state where unemployment is high may increase stress by increasing uncertainty surrounding the stability of employment and, subsequently, finding future work. While individuals living in states with stronger economic conditions may not be as concerned about losing their jobs or, in the event that it does happen, finding work.

Prior studies demonstrate such a connection between local economic conditions (as measured by state and metropolitan statistical area unemployment rates) and health and family outcomes but not always in the expected direction. Some research has found a procyclical relationship between local economic conditions and health behaviors. Specifically, scholars have found a positive relationship between unemployment rates and health behaviors or health outcomes (Aguiar, Hurst, and Karabarbounis 2011; Hurd and Rohwedder 2010; Ruhm 2000, 2003, 2005, 2007; Xu and Kaestner 2010). Yet, other research has found a negative relationship (Charles and DeCicca 2008; Colman and Dave 2011). I can find no research that investigates the connections between state or community unemployment rates and family outcomes. Despite the mixed results and dearth of studies investigating family outcomes, the importance of community resources

and conditions demonstrate the importance of extending this research to speak to family and health outcomes (Jahoda et al. 1971).

Historical Time Period

Classical research by Jahoda and colleagues (1971) as well as Elder (1974) has demonstrated the importance of the historical time period for family and health outcomes. The historical time period – particularly one marked by a unique social event like a recession – alters the ways in which individuals and families interpret their experiences and manage their resources such as their time. Such responses have implications for health and family relationships including how individuals prioritize how time is allocated and organize their time. Though it is easy to assume that only more proximal causes of economic insecurity (e.g. being unemployed) could influence health and family relationships, the discussion in the popular media and by politicians regarding the national economic climate are likely to shape individuals' perceptions of the historical time period and therefore what is appropriate or possible during that time.

Possible Link Between Employment Uncertainty and Health and Family Outcomes

Unfortunately, prior studies do not fully examine how employment uncertainty influences health and family outcomes. What are the mechanisms through which becoming unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession impact health and family relationships beyond simply reducing financial resources? While some qualitative studies have considered the importance of work and unemployment for workers' identities and the subsequent distress they may experience when no longer fulfilling expected roles (Fagin and Little 1984; Jahoda et al. 1971; Newman 1988; Uchitelle 2006), few have considered how being unemployed translates into declines in physical health and the nature of family relationships. One exception is the classic study of job loss by Jahoda and colleagues (1971). The authors examined the impact of unemployment by the male breadwinner on the family in the small Austrian community of Marienthal in 1931. Despite limitations of the unique location, time period, and

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methods of data collection, the authors argue that unemployment disrupts the time structures of work which change how individuals engage in healthy behaviors and interact with family. Such findings point to *time use as a key mechanism* between the stress of job loss or an economic downturn on family relationships and health outcomes and lay the foundation for my research.

Time Use and Unemployment

Although a great deal of research from the 1930s to present day has examined and documented the psychological, physical, and economic costs of being unemployed (e.g. Burgess 1945; Catalano and Dooley 1983; Cavan 1959; Fagin and Little 1984; R. C Kessler and McRae Jr 1982; McKee-Ryan et al. 2005; Pearlin et al. 1981; Ström 2003; Strully 2009), few have considered the implications of job loss on time-use patterns. However, Jahoda and colleagues' (1971) study of unemployment in 1930s Austria does draw on time diary data in their analysis of economic deprivation and subsequent stress. The authors use a self-reported time diary that asked participants to list the activities of each of their waking hours of the day in their analysis. They found that unemployed men were particularly impacted by the absence of the structure of time that their jobs had provided, as they lost the form of their workdays and their sense of purpose. Those individuals able to establish structure in their time-use rather than be overwhelmed by the expanse of free time experienced fewer negative outcomes. This was evident in the participants' ambivalence towards the large periods of unspoken for time that they regularly confronted. The stress of being unemployed was related to spending less time caring for family members and for themselves.

A longitudinal study of unemployment in English families in the 1970s by Fagin and Little (1984) also collected time diary data from participants. The researchers interviewed couples where the male breadwinner was unemployed and found significant physical and mental health effects for the entire family, with the stigma of unemployment connected to future health problems. Though the authors collected time diary data similar to that of Jahoda and colleagues (1971), the analyses and results focused on the direct relationship between being unemployed, duration of joblessness, and health outcomes for

the worker and his family, making it unclear what effect being unemployed had on time use patterns. Despite failing to fully utilize these data, the health and family relationship findings support the argument that the stress of being unemployed is related to worse health and family relationships. It is likely that such changes in health and family outcomes were related to behavioral choices that can be captured in time diary data.

In more recent time diary data, Jonas and colleagues (2011) examine time spent in health-related self-care activities using the American Time Use Survey from 2003-2007. The authors find that the unemployed are least likely to spend time in health-related self-care while the employed spend the most time in health-related self-care.[3]

Being unemployed does not always result in individuals' distancing themselves from their health or family relationships. Recent research in France has raised the possibility that being unemployed actually increases time availability and therefore may increase time spent in some highly valued activities like time spent with children. Pailhe and Solaz (2008) examine the time French couples (mothers and fathers) spent with children in 1998 and 1999 when one spouse was unemployed. The authors find that regardless of gender, unemployed parents spend more time in the direct care of children than employed parents. However, their greater time does not fully capture their lost work hours, and unemployed mothers spend more time with children than unemployed fathers.[4]

The Negative Effects of Economic Recessions for Time Use Behaviors

Few studies have considered the impact of living in an economically insecure time or place (i.e. living in an area with high unemployment rates and/or during a historical time period marked by an economic recession) on time use behaviors. As the evidence above demonstrates, individuals and family members respond to the challenges of being unemployed by making alterations in their daily choices. Time-use behaviors, though difficult to track and measure, are an ideal means for understanding peoples'

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3 Those not in the labor force spend more time in health-related self-care than the unemployed and less than the employed.
4 Mothers not in the labor force are examined separately and spend more time with children when compared to unemployed mothers and fathers.

lives, their daily choices, and the social circumstances in which they find themselves. Research has shown that paid work and its inherent time structures are important influences on workers' lives (Bailyn 1993; Epstein and Kalleberg 2004; Jahoda et al. 1971; Moen 2003) and insecurity concomitant with large scale economic recessions is likely to create strain similar to being unemployed for workers, thereby potentially influencing time spent in healthy behaviors and family engagement.

Though I am unable to find any studies that examine the impact of being interviewed during a historical time period marked by a recession on time spent sleeping, in healthy behaviors, and with family, several studies arrive at contradictory results when investigating the relationship between the local economic conditions and each of these outcomes. Ruhm (2005) draws on the Behavioral Risk Factor Surveillance System data from 1987 to 2000 to investigate patterns of relationships between the state-level unemployment rate and several indicators of health behaviors including obesity, exercise, and smoking. The author finds that increases in the state-level unemployment rate were related to decreases in obesity and smoking and to increases in physical activity. Drawing on the Behavioral Risk Factor Surveillance System (from 1984 to 2005) and the National Health Interview Survey (from 1976 to 2001), Xu and Kanster (2010) find similar patterns for exercise. Yet, some recent research has found that living in states with poor economic conditions (i.e. high rates of unemployment) is related to less physical activity overall and higher body mass index (Charles and DeCicca 2008; Colman and Dave 2011). These findings raise questions about how to interpret and understand such findings, particularly what role the broader historical time period may play as well as actually being unemployed for such relationships.

Similarly, research by Morrill and Pabilonia (2011) examine the relationship between state-level economic conditions as captured by the unemployment rate for time spent with children and spouses using the American Time Use Survey from 2003 to 2010. The authors find that there is a u-shaped relationship between the unemployment rate and time spent with family members where individuals living in states with both high and low unemployment rates spend the most time with family members. Though these

scholars investigate the potentially interacting effects of the time period, it is not clear how an individual's employment status may factor into time use choices.

The Importance of Socio-Demographic Characteristics

Though there are expected to be some common patterns of relationships among being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession for health and family relationships, several socio-demographic characteristics like gender, life stage, spouses'/partners' employment status, and education are expected to influence how these relationships play out for individuals. These socio-demographic characteristics will interact with the different levels of exposure to employment uncertainty because they represent different constraints and access to different resources. For example, the gendered expectations regarding work and providing for one's family will likely influence how men and women respond to being unemployed (Bernard 1981; Townsend 2002). That is, men may find being unemployed more stressful due to its incompatibility with their identity as the provider for the family. Similarly, those respondents with a spouse or partner who is employed will be better able to manage the stress of living in states with poor economic conditions because if one of them loses their job, they have a second income to fall back on. Gender, life stage, spouses' or partners' employment status, and education are expected to moderate the effects of the different levels of employment uncertainty for health and family outcomes.

Life Course Approach

This study is grounded in the life course perspective, viewing individuals as embedded in time and space (Elder, M. K. Johnson, and Crosnoe 2003) and strategizing in light of the larger economic context and their own situation (Moen and Wethington 1992). As prior research has shown, these strategic responses have implications for health and relationships with children and spouses (e.g. Elder 1974; Jahoda et al. 1971; Moen 1980; Moen and Wethington 1992). This is most evident in Elder's (1974) study of the Great Depression, where he examined the impact of economic instability on family and generational change. Elder drew on longitudinal survey and interview data from the

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Oakland Growth Study. The study began in 1929, when each of the adolescents in the sample was 8 or 9 years old, and continued until the sample reached adulthood. Though not all of the male breadwinners became unemployed during this time, family income declined on average 40%. Though the level of deprivation varied, many people lost some income between the years of 1929 and 1933. Families adapted to this change by shifting items or services that used to be purchased outside of the home to doing more intensive household labor, drawing on public assistance, sending either the mother or children out into the workforce (often the son worked outside the home while daughters provided household labor), or depending on family and friends for assistance. These changes often altered the division of labor in the home, changed family relationships, and increased family strains. Elder's (1974) work is a prime example of the importance of integrating the life course perspective for understanding social events like job loss and economic recessions and their effects in light of the historical context, linked lives between individuals, and agency as made possible by opportunities and constraints (Elder et al. 2003).

As Elder's research demonstrates, families adapt to their surrounding social context as a unit and employ 'family adaptive strategies'. Moen and Wethington (1992) summarized research on how individuals adapt and respond to their social contexts, explaining that "individuals and families make choices in the face of the resources and constraints confronting them; their choices, in turn, themselves become a causal force shaping future resources and constraints, and thus contribute to trends and patterns of change in society at large" (Moen and Wethington 1992:246). The Great Recession is one example of a challenge to which individuals must respond within the realm of their resources and constraints. Rising unemployment rates, particularly for men in jobs that are assumed to be stable and provide a family wage, has produced a broader climate of insecurity in the nation at large. Research shows that job insecurity by one or both wage earners in a family also shifts priorities and time allocations as families and couples adapt to, and manage the stress of, financial uncertainty (Moen, Sweet, and Hill 2010). Moreover, this line of research also raises questions about the impact of employment

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uncertainty on time-use choices. Feelings of insecurity have important implications for time use by creating the opportunity for men and women to reprioritize time use choices regarding healthy behaviors and family engagement.

Research Questions

The following research aims to investigate not only the independent effects of each of these different levels of exposure to employment uncertainty but also extend prior research by investigating multiple levels employment uncertainty for individuals' health and family relationships and how they may overlap. Specifically, I examine the impacts of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by recession on time spent (1) sleeping, (2) engaging in healthy behaviors, and (3) interacting with family members.

Drawing on the American Time Use Survey (ATUS) and the information in the Current Population Survey (CPS) that can be linked to it, I will draw on a subsample of respondents in the United States between the ages of 23 and 55[5] to address the following questions

1. *Sleep Outcomes (including time spent sleeping, sleeplessness, and sleep disruptions):* How does being unemployed (both recent and longer term) relate to patterns of sleeping, including time spent sleeping, sleeplessness, and sleep disruptions? What is the relationship between living in states with high unemployment rates and patterns of sleeping? What effect does being interviewed during a recessionary time period (i.e. being asked about sleep patterns during the years of the Great Recession as opposed to prior years) have on patterns of sleeping? What are the combined effects of actually being unemployed, living in states with high unemployment, and being interviewed in a recessionary time period for these measures of sleep? Are these

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[5] The sample is limited to this age range in order to identify a subsample of individuals with similar levels of attachment to the labor force. Those under the age of 23 have been excluded because of the unique time use patterns of college students while those over the age of 55 have a greater likelihood of retirement or semi-retirement, which would result in unique time use patterns.

relationships moderated by gender, life stage, spouses'/partners' employment status, or education?

2. *Healthy Behaviors (including physical activity, health-related self-care, and breakfast):* How does being unemployed (both recent and longer term) relate to time spent engaging in healthy behaviors, including time spent exercising, engaging in active travel, engaging in health-related self-care, and the likelihood of eating breakfast? What is the relationship between living in states with poor economic conditions (as captured by state-level unemployment rates) and patterns of healthy behaviors? What effect does being interviewed during a historical time period marked by a recession have on time spent engaging in healthy behaviors? 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? Are these relationships moderated by gender, life stage, spouses' or partners' employment status, or education?

3. *Time with Family (including children, spouses/partners, and extended family members):* How does actually being unemployed (both recent and longer term) relate to time spent with family members, including children, spouses/partners, and extended family members? What is the relationship between living in states with poor economic conditions (e.g. states with high unemployment rates) and time spent with family members? What effect does being interviewed during a recessionary time period have on time spent with family members? What are the combined effects of actually being unemployed, living in states with high unemployment, and being interviewed during a recessionary time period on time spent with family? Are these relationships moderated by gender, life stage, spouses'/partners' employment status, or education?

Significance

Answering the questions above, and thereby contributing to the research on being unemployed, living in states with poor economic conditions, and being interviewed during a recessionary time period, is important from both theoretical and substantive standpoints. Research demonstrates how time use choices may be an important connection between employment uncertainty and health and family outcomes. However, the time-use consequences of being unemployed in good times and bad and the consequences of the Great Recession for health related behaviors and family relationships have not been documented. This should be of key interest to public policy makers given the struggle to reduce negative health outcomes and foster family well-being related to larger economic dislocations. In addition, several unique methodological and conceptual contributions (described below) incorporated into this project will serve to expand our current understanding of employment uncertainty as well as time use behaviors.

Prior scholarship has examined the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession on well-being (Burgess 1945; Catalano and Dooley 1983; Cavan 1959; Charles and DeCicca 2008; Colman and Dave 2011; Elder 1974; Fagin and Little 1984; Jahoda et al. 1971; Jonas et al. 2011; R. C Kessler and McRae Jr 1982; Larson, Wilson, and Beley 1994; Linn et al. 1985; McKee-Ryan et al. 2005; Moen 1979; Morrill and Pabilonia 2011; Newman 1988; Pailhe and Solaz 2008; Ruhm 2005; Ström 2003; Xu and Kaestner 2010) but the mechanisms of these relationships have not been fully identified. Research has identified stress as a possible mechanism for these relationships (Pearlin et al. 1981, 2005) but it remains unclear how this relationship works. Though I am unable to measure stress, the ability to examine the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a recessionary time period as indicators of exposure to different levels of stress is a useful exercise for understanding the relationships and the outcomes of interest. The growing interest in preventative health care policy (as a means to reduce healthcare costs) and policies aimed at developing strong family relationships (in order to improve child outcomes) are evidence for the

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importance of studying and understanding how employment uncertainty is translated into negative outcomes. In particular, time use data and analysis is an important avenue for understanding the effects of employment uncertainty on health behaviors and family relationships and will likely help us understand these relationships.

Time diary data has been underutilized, and it stands to reason that drawing on this nationally representative, rich, and highly unique data source will serve to better inform both research on and policy to address recessions and job loss. In particular, time diary data has primarily been used in descriptive analyses of work and family engagement, but little is understood about the implications of how individuals compose their day. Also, though some prior research has examined the time use patterns of the unemployed during a severe economic downturn in a city in Austria in 1931(Jahoda et al. 1971), the current availability of the American Time Use Survey makes a much more detailed and methodologically extensive analysis possible for developing a greater understanding of the insecurity of recent economic recession and present day job loss.

This research examines the importance of gender, life stage, spouses'/partners' employment status, and education as key socio-demographic characteristics which influence how employment uncertainty plays out. Prior research on the Great Depression and the recession of the mid 1970s assumed men were the breadwinners and women's labor force participation (and potential job loss) was supplementary. Similarly, much of the work on individual and family outcomes of job loss and an insecure economic climate has assumed that all families at all life stages are equipped with comparable resources and face similar demands (see Elder 1974; Moen 1980 for exceptions). However, as much of the work-family interface and gender literature has demonstrated, resources and needs vary by gender, life stage, presence of an employed spouse or partner, and education and it is inappropriate to assume a uniform experience across these demographic divides. In response to these concerns, my research will attempt to incorporate and examine the importance of these individual and family characteristics, as well as the broader economic environment.

Conclusion

  To summarize, I examine the impacts of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by an economic recession on time spent engaging in healthy behaviors and with family members in order to gain a greater understanding of the effect of employment uncertainty on the lives of Americans. Time diary data allows me a unique means for understanding the implications of the Great Recession and job loss for individuals while also extending our current understanding and knowledge of time use behaviors. Time diary data is a complex and methodologically challenging data collection technique that tracks a respondent's time use across the span of a day. By drawing on the unique capabilities of time diary data, I am able to examine employment uncertainty through a life course lens that is appropriate for the current time period and extends our knowledge of what time use choices mean for individuals. Moreover, this study promotes a better understanding of not only employment uncertainty but also of time as a basic building block of social life.

Chapter 2: Sleepless Nights or Sleeping Through It: The Impact of the "Great Recession" and Being Unemployed for US Sleep Patterns

Introduction

The "Great Recession" and its impacts on communities, families, and individuals has become a focal point of popular and academic discussion and many are beginning to consider its effects on individuals, including mental and physical health outcomes (e.g. Aguiar et al. 2011; Condon 2010; Eckholm 2010; Morrill and Pabilonia 2011). Research on prior economic downturns has identified both expected and unexpected relationships between being unemployed, the economic environment, and health (Brenner and Mooney 1983; Catalano and Dooley 1983; Fenwick and Tausig 1994; Grandner et al. 2010; Hyyppä, Kronholm, and Alanen 1997; Jahoda et al. 1971; Pearlin et al. 1981; Ruhm 2003, 2005, 2007; Tausig and Fenwick 1999). However, the unique circumstances of this prolonged and particularly severe recession have made it a fruitful object of investigation and many questions remain. Moreover, new types of data, such as the American Time Use Survey (Abraham et al. 2011), have become widely available, expanding the opportunities to explore the temporal effects of the Great Recession. Given that, adequate sleep (sleeping between 7 and 9 hours) is increasingly being shown as key to health (e.g. Alvarez and Najib T Ayas 2004; Bonnet and Arand 2003; Gallicchio and Kalesan 2009; Taylor, Lichstein, and Durrence 2003). Investigating possible effects of the Great Recession, and the unemployment it spawned, on sleep duration and sleep quality would contribute to the understanding of its broader implications. In light of this, I examine whether sleep patterns are associated with actually being unemployed, living in states with poor economic conditions, and/or being interviewed during a historical time period marked by a recession. Looking at a representative sample of the U.S. population between 23 and 55 years old, I find that those who are unemployed or out of the labor force tend to sleep longer and are more likely to report sleeplessness. Similarly, respondents surveyed in the years after the onset of the recession (2008-2010) are more likely to sleep more than 9 hours on the diary day and to report sleeplessness. Individuals living in states with poor economic conditions as captured by high unemployment rates

are more likely to experience a sleep disruption. However, poor economic conditions are not always associated with worse sleep outcomes. Living in states with high unemployment is also associated with lower odds of reporting sleeplessness and respondents who were interviewed during the recession have lower odds of reporting a sleep disruption.

Background

The consequences of sleep have drawn a great deal of attention in recent years, as scholars have investigated the role of sleep for individuals' health outcomes, finding that sleep deprivation, sleeping longer hours, and poor sleep quality are all important predictors of poor health more generally. Sleep deprivation has been shown to be related to (both future and current) obesity (Gangwisch et al. 2005; S. R. Patel 2009; S. R. Patel and Frank B. Hu 2008; S. R. Patel et al. 2006), diabetes for men (Mallon, J.-E. Broman, and J. Hetta 2005), coronary heart disease for women (Najib T. Ayas et al. 2003), hypertension for men (Gangwisch et al. 2006), and mortality for men (Kojima et al. 2000), women (S. R. Patel et al. 2004) and for both men and women (Heslop et al. 2002; Youngstedt and Kripke 2004; Kripke et al. 1979, 2002). Longer sleep durations (e.g. greater than 8 hours) have been shown to be related to coronary heart disease for women (Najib T. Ayas et al. 2003) and men (Burazeri, Gofin, and Kark 2003), increased risk of strokes for men (Qureshi et al. 1997), and increased mortality for men (Kojima et al. 2000; Kripke et al. 1979), women (S. R. Patel et al. 2004) and for both men and women (Gale and Martyn 1998; Youngstedt and Kripke 2004; Kripke et al. 2002; Akiko Tamakoshi and Yoshiyuki Ohno 2004). Insomnia has been found to be related to heart disease for men (Mallon, J. E. Broman, and J. E. Hetta 2002) and mortality more generally (Pollak et al. 1990) while difficulty maintaining sleep have been found to be related to diabetes for men (Mallon et al. 2005). Sleep problems have also been linked to mental health. Shorter sleep durations have been linked to depression (Chang et al. 1997; Kaneita et al. 2006) as have longer sleep durations (Kaneita et al. 2006), insomnia (Chang et al. 1997; Bixler et al. 1979; Ford and Kamerow 1989; Breslau et al. 1996; Livingston, Blizard, and Mann 1993) and sleep disruptions (Chang et al. 1997). However,

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such indicators of sleep quality are not randomly distributed across the U.S. population. Rather, patterns of sleep are related to many social factors, such as gender (e.g. Maume, Sebastian, and Bardo 2010), age and parental status (e.g. Krueger and E. M. Friedman 2009), spouse's employment status (e.g. Hale 2005), and education (e.g. Kronholm et al. 2006). Yet, it is unclear how sleep is related to employment uncertainty.

Generally, being unemployed and recessions have attracted a great deal of attention because of their potential long-reaching effects for individuals, families, and communities (e.g. Brenner and Mooney 1983; Elder 1974; Fagin and Little 1984; Ruhm 2000; Xu and Kaestner 2010) but there is little research examining employment uncertainty and sleep outcomes. Scholars have raised questions about the importance of being unemployed and recessions for mental and physical health since the Great Depression but have arrived at divergent results. Research has shown that being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession are related to negative impacts on mental health outcomes (e.g. Brenner and Mooney 1983; Pearlin et al. 1981; Ruhm 2003) while being positively related to morbidity and mortality (e.g. Ruhm 2003, 2007; Xu and Kaestner 2010). Yet, few studies have investigated the importance of being unemployed, living in states with poor state economic conditions, and being interviewed during a time period marked by a recession for patterns of sleep (Hale 2005; Kronholm et al. 2006; Krueger and E. M. Friedman 2009; Aguiar et al. 2011; Hurd and Rohwedder 2010; Hyyppä et al. 1997; Grandner et al. 2010) – a health behavior that has been linked to both mental and health outcomes as described above – and none investigate the effects of multiple overlapping levels of employment uncertainty for sleep.

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 patterns of sleeping, including time spent sleeping, sleeplessness, and sleep disruptions? Second, what is the relationship between state economic conditions, as captured by state-level unemployment rates, and patterns of sleeping? Third, what effect does being interviewed during a historical time period marked by a recession (i.e. being asked about sleep

patterns during the years of the Great Recession as opposed to prior years) have on patterns of sleeping? Fourth, what are the combined effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession on these measures of sleep? Lastly, are these relationships moderated by gender, life stage, spouses'/partners' employment status, or education?

This study builds on and extends prior research in three important ways. First, these analyses examine the effect of the *current economic environment* (the Great Recession) on sleeping patterns in the United States population. Though scholars have begun to unpack the immediate and potential long-term effects of the Great Recession for the economic, social, and physical well-being of the population (e.g. Aguiar et al. 2011; Hurd and Rohwedder 2010; Morrill and Pabilonia 2011), health behaviors such as sleep have not been investigated. This study will extend the knowledge of potential health impacts from this historic period, specifically for sleep. Second, I investigate the effects of three separate but intricately linked indicators of employment uncertainty including being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession. The majority of studies examining the effects of being unemployed and recessions use a single measure of employment uncertainty as their independent variable. However, being unemployed and experiencing a recession are often experienced in tandem (Wheaton 1978). I theorize that being unemployed is likely to be experienced differently in states with poor economic conditions than in states with strong economic conditions. Similarly, poor economic conditions are likely to be very different during a recession than before a recession begins. Third, I draw on recent, nationally representative time diary data from the American Time Use Survey (Abraham et al. 2011). This data offers a unique glimpse into the daily time use patterns of the United States population, including time spent sleeping.

Sleep, Unemployment, and Recessions

There are three studies that examine how recessions influence patterns of sleep (Aguiar et al. 2011; Hurd and Rohwedder 2010; Hyyppä et al. 1997) but each have limitations that make drawing conclusions about the effects of the Great Recession on

sleep difficult. The most recent study by Aguiar and colleagues (2011) is a working paper that uses data from the American Time Use Study to examine the reallocation of forgone work hours due to the Great Recession. The authors found that some of the 'free' hours resulting from changing work expectations were reallocated to sleep. Though this study helps us understand broader sleep patterns, it does not clarify how individual time use patterns are related to the wider employment uncertainty because it examines how time is allocated at the *state-level*. More proximate causes like being unemployed are not examined or considered in tandem to the effects of the wider economic climate. Moreover, it is unclear if the recession is related to changes in sleep quality or if this increase in time spent sleeping is found at all levels of sleep time (e.g. does time increase from 6 to 8 hours or from 8 to 10 hours) which may have different implications for future health outcomes.

Another working paper by Hurd and Rohwedder (2010) using data from the American Life Panel surveys arrived at similar results. The authors found a reduction in trouble sleeping from November 2008 to April 2010 as well as a decrease in the percentage reporting trouble sleeping for respondents who became unemployed (and an increase for respondents who were unemployed that become employed). Despite the unique quality of this data (i.e. monthly longitudinal data spanning the recession) this study is unable to examine the prevalence of trouble sleeping before the recession to compare to patterns of sleep during the recession. As such, it is not clear how patterns of sleep are different during the recession or if the improvement in sleep problems for the unemployed is simply a reflection of the unique time period coupled with being unemployed. Also, the results shown are descriptive aggregate level changes rather than individual changes controlling for other factors. Therefore, it is unclear how demographic characteristics or other important predictors of sleep are related to sleep quality.

Hyyppa and colleagues (1997) examine the effects of the 1990's recession on sleep using a Finnish population-level longitudinal dataset. Comparing sleep quality (e.g. insomnia, excessive sleep, and satisfaction with sleep) before the recession with sleep quality after the recession, the authors found that the recession itself did not influence

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sleep quality for the broader sample. However, the authors did find that those respondents who became unemployed between waves were more likely to report insomnia as well as increased fatigue and use of hypnotics across time when compared to the employed. However, this study is limited because of its focus on Finland and timing before and after the recession. Though this is an important study for understanding the effects of recessions for sleep outcomes, it is unclear if different patterns would result in the United States due to national and cultural differences. Also, the data is collected before and after the recessionary time period. As such, it is unclear how sleep differed during the recession itself. Changes in sleep during the recession (in particular during sustained periods of economic downturns) may result in longer-term health concerns even if sleep patterns return to normal following the conclusion of the recession. Finally, Hyyppa and colleauges (1997) draw on self-report survey questionnaires focused on health and employment uncertainty. Time diary data may provide more reliable information regarding time allocation because individuals are not required to make broad generalizations about their sleep patterns but instead are asked to report on their activities for the prior day.

In addition to the above work that examines the effects of recessions for sleep and sleep quality, some studies have examined how work hours or job characteristics influence patterns of sleep (Grandner et al. 2010; Hale 2005; Kronholm et al. 2006; Krueger and E. M. Friedman 2009; Sekine et al. 2006). Population-level examinations of sleep have found that working long hours is related to increased odds of sleeping fewer hours and decreased odds of sleeping more hours (Hale 2005; Kronholm et al. 2006; Krueger and E. M. Friedman 2009) while not working is related to increased odds of sleeping more than 9 hours as well as sleeping less than 5 hours (Krueger and E. M. Friedman 2009). In addition, being employed was related to fewer sleep complaints (such as trouble falling asleep, staying asleep, and sleeping too much) while being unemployed was related to more complaints in the 2006 Behavioral Risk Factor Surveillance System (Grandner et al. 2010). Work characteristics have been found to influence sleeping as well. In a Japanese study of local government employees, psychosocial stress at work,

short or long work hours, and shift work were each related to poor sleep quality (Sekine et al. 2006).

Mental and Physical Health Effects of Recessions and Unemployment

The evidence on the mental and physical health effects of employment uncertainty is largely mixed and counterintuitive. Many scholars have argued and shown that being unemployed and periods of economic downturn result in mental and physical health declines broadly, arguing that reduced resources and increased employment uncertainty increases stress which results in health declines (Brenner and Mooney 1983; Fagin and Little 1984; Fenwick and Tausig 1994; Jahoda et al. 1971; Ronald C. Kessler, Turner, and House 1989; Pearlin et al. 1981; Ruhm 2003; Tausig and Fenwick 1999). Yet, others have found the reverse, arguing that healthy behaviors are time intensive and that with reduced work hours (either through being unemployed or declining demand by employers) comes an increased supply of time to spend on health behaviors (Ruhm 2003, 2005, 2007; Xu and Kaestner 2010).

A potential explanation for these divergent conclusions may be the multiple measures used to capture the single construct of employment uncertainty. Often framed in similar ways (e.g. the effects of recessions and economic change), much of this research draws on different measures of employment uncertainty including being unemployed, living in states or MSAs with poor economic conditions (as captured by high unemployment rates), and being interviewed during a recessionary time period. This prior body of work assumes a singular effect of economic downturns whether it is brought on by a unique time period, the surrounding community, or individual resources. This is problematic because different measures of the employment uncertainty may have different effects and may interact with one another to influence health outcomes. As such, the different effects of the recession may in fact reflect their varied measurement and their intersecting nature rather than qualitatively different outcomes.

Negative Effects of Being Unemployed and Recessionary Time Periods

During the 30's and 40's in the United States and Europe, the economic environment was understood to be an important predictor of mental health. In one of the

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first comprehensive studies of community-wide economic decline, Jahoda and colleagues (1971) examined the impact of job loss (by the male breadwinner) on the family in the small Austrian community of Marienthal in 1931. The authors identified widespread psychological problems. Though the entire community was experiencing severe financial strains, community members with fewer financial resources were the most likely to be described as having a "broken" outlook and motivation. Coupled with the wider depressed economic climate of the community, being unemployed was found to be an important predictor of mental health. One component of their study was a self-reported time diary that asked participants to list the activities of each hour of the day while they were awake (Jahoda et al. 1971). They found that unemployed men were particularly impacted by the absence of the structure of time that work provided as they lost the form of their workdays and their sense of purpose. Those individuals able to establish structure in their time (as measured through activities in their time diaries) rather than be overwhelmed by the expanse of free time experienced fewer negative outcomes. This was evident in the participants' ambivalence towards the large periods of unspoken for time that they regularly confronted.

Research utilizing data collected during the 1970's supported these earlier findings. Tausig and Fenwick (1999) found an increase in distress and dissatisfaction following the 1974-75 recession that they attributed to changing job characteristics (i.e. job restructuring). They point out that this relationship is one way in which employees are influenced by recessions in addition to becoming unemployed (see also Fenwick and Tausig 1994). Respondents who were unemployed between waves also reported increased distress. Similarly, Pearlin and colleagues (1981) examine job transitions (e.g. layoffs) in an effort to develop the theory of the stress process. In data collected in the 1970's the authors find a pathway between negative job transitions (including becoming unemployed) and depression. In the mid 1980's, Kessler and colleagues (1989) investigated this theoretical claim further by examining the change in distress for those transitioning to employment after being unemployed. The authors find that being

unemployed is related to increased levels of distress compared to the employed, but that distress returns to levels similar to the employed after finding new employment.

In light of these findings, I hypothesize the following (all hypotheses are shown in Table 2-1):

> *H1*: Being interviewed during the historical time period marked by a recession (i.e. 2008-2010) will be related to sleeping more than the recommended 7 to 9 hours, more sleeplessness, and more sleep disruptions.

> *H2*: Being unemployed will be related to sleeping more than the recommended 7 to 9 hours, more experiences of sleeplessness, and more sleep disruptions.

Positive Effects of High Unemployment Rates

In contrast to these negative relationships, other scholars have found that living in states with poor economic conditions as captured by high unemployment rates have a positive effect on physical health or, conversely, lower unemployment rates are related to declines in physical health (Ruhm 2003, 2007). Ruhm (2003, 2007) examines several data sources from the 1970's onwards and argues that with reductions in unemployment rates there are declines in physical health. Using data from 1972 to 1981, Ruhm (2003) finds that those living in states with better economic conditions (or lower unemployment rates) report more physical health conditions such as cancer or arthritis. This finding was most consistent for groups that were assumed to be most strongly tied to the labor market such as employed individuals under the age of 65 or men. These findings were supported in subsequent analyses that examined the relationship between state-level unemployment rates and heart disease from 1979 to 1998 (Ruhm 2007). Though it is not clear how this relationship works, it is possible that such positive relationships between unemployment rates and health diagnoses in fact capture increased insurance coverage due to employment which results in increased doctors' visits and diagnoses rather than increases in the actual number of cases of a given disease.

In addition to an association between physical health conditions and state economic conditions, there is also evidence that health behaviors vary by state economic

conditions with healthy behaviors being more prevalent in states with poorer economic

conditions. Ruhm (2005) found that respondents living in states with higher

Table 2-1. Hypotheses

Employment Uncertainty

H1   Being interviewed during the historical time period marked by a recession (i.e. 2008-2010) will be related to sleeping more than the recommended 7 to 9 hours, more sleeplessness, and more sleep disruptions.

H2   Being unemployed will be related to sleeping more than the recommended 7 to 9 hours, more experiences of sleeplessness, and more sleep disruptions.

H3   Living in states with poorer economic conditions as captured by higher state-level unemployment rates will be related to adequate sleep, less sleeplessness, and fewer sleep disruptions.

Moderating Influence of Multiple Experiences of Employment Uncertainty

H4   Living in states with poor economic conditions (i.e. states with high unemployment rates) or during an economic recession moderates the negative effects of actually being unemployed on sleep outcomes. Specifically, being unemployed in conjunction with living in states with higher unemployment rates and/or being interviewed during the recessionary time period (i.e. 2008-2010) will not be related to sleeping more or less than the recommended amount and will be related to lower odds of sleeplessness and lower odds of sleep disruptions compared to the employed living in areas with lower unemployment rates and/or being interviewed before the recession (i.e. 2003-2007).

H5   Living in states with poor economic conditions (i.e. states with high unemployment rates) in conjunction with being interviewed during the Great Recession (i.e. 2008-2010) will operate as a magnifier of sleep outcomes. Specifically, respondents living in states with high unemployment during the recession will be related to sleeping more or less than the recommended amount, greater odds of sleeplessness, and greater odds of sleep disruptions compared to the living in states with lower unemployment rates and being interviewed before the recession (i.e. 2003-2007).

Moderating Influence of Socio-demographic Characteristics

H6a   Women living in states with poor economic conditions or interviewed during the Great Recession will experience worse sleep outcomes than men.

H6b   Men who are not working (unemployed or not in the labor force) will experience worse sleep outcomes than women who are not working.

H7a   Parents who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession will experience worse sleep outcomes compared to younger respondents without children.

H7b   Older respondents who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession who do not have children in the home will experience worse sleep outcomes compared to younger respondents without children.

H8   Respondents who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession who have employed spouses/partners will experience better sleep outcomes compared to respondents with spouses/partners not in the labor force or those who are single.

H9   Respondents with lower levels of education who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession will experience worse sleep outcomes compared to those with a college degree.

unemployment rates were more likely to participate in healthy behaviors. Drawing on data from 1987 to 2000, he found that respondents from states and time periods with higher levels of unemployment reported smoking less (reductions primarily by heavy smokers), lower BMI, and more episodes of exercise (primarily reductions in complete inactivity). Similarly, Xu and Kaestner (2010) find that periods of economic growth as measured by community levels of work hours and wages are associated with more smoking, less physical activity, and fewer visits to physicians. Moreover, community-level estimates of work hours and wages are related to increased consumption of cigarettes and reduced likelihood of exercise.

In light of these findings, I hypothesize the following:

H3: Living in states with poorer economic conditions as captured by higher state-level unemployment rates will be related to adequate sleep, less sleeplessness, and fewer sleep disruptions.

However, not all results are as clear in their implications. During the most recent economic crisis, data has shown that employment uncertainty experienced by families have resulted in mixed changes in mental health outcomes. Drawing on the American Life Panel fielded by RAND Labor and Population, scholars show that more than a third of households have experienced financial strain between November 2008 and April 2010 (39% reported experiencing unemployment, negative equity on their house, or having been behind in their house payments) while also showing an increased proportion reporting feeling happy (Hurd and Rohwedder 2010). In contrast to the findings described above, respondents who became unemployed reported declines in life dissatisfaction and depression compared to when they were employed. However, this data was collected after the recession began and it is unclear how happiness, life satisfaction, and depression changed with the onset of the recession. It is possible that happiness improved following an initial decline that occurred around the time the recession began

rather than improving because the recession made people happier. Similarly, the unemployed may evaluate their position differently during the recession than before. However, this data does not allow such comparisons. In addition, the results are drawn from descriptive comparisons rather than multivariate analyses and as such it is difficult to determine how the sample composition (e.g. gender, age, parental status, etc.) may influence the results as well as how being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession may intersect.

The contradictory effects of the being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession demonstrate the importance of considering the intersecting nature of each. Few studies have considered the effects of being unemployed in a time and place marked by an economic decline and how that may be experienced differently than being unemployed in a time and place with strong economic conditions. Many studies have examined the effects of being unemployed (e.g. Fagin and Little 1984; Pearlin et al. 1981), living in states with poor economic conditions as captured by unemployment rates (e.g. Ruhm 2005, 2007), and even the experience of being unemployed in a time or place with high unemployment rates (e.g. Elder 1974; Jahoda et al. 1971). However, how the effects of being unemployed during economic downturns varies in comparison being unemployed during periods of economic growth is unclear. One may expect that being unemployed during a period of economic growth or in areas with stronger economic conditions may have negative consequences as the unemployed compare themselves with other employed family, friends, and neighbors and place blame on themselves for their individual position. In contrast, being unemployed during a period of economic contraction and in areas with weak economic conditions may have neutral consequences. Instead of comparing themselves to individuals who appear successful in the job market, the unemployed may readily find other unemployed comparisons. Moreover, media attention on low job growth and high unemployment rates may reinforce a sense that their individual employment status is a reflection of the broader economic climate rather than

their own personal failings. Similarly, living in states with poor economic conditions, as captured by high unemployment rates, during an economic recession may magnify individuals' negative assessments of the broader economic climate. As such, I expect the following:

> *H4:* Living in states with poor economic conditions (i.e. states with high unemployment rates) or during an economic recession moderates the negative effects of actually being unemployed on sleep outcomes. Specifically, being unemployed in conjunction with living in states with higher unemployment rates and/or being interviewed during the recessionary time period (i.e. 2008-2010) will not be related to sleeping more or less than the recommended amount and will be related to lower odds of sleeplessness and lower odds of sleep disruptions compared to the employed living in areas with lower unemployment rates and/or being interviewed before the recession (i.e. 2003-2007).

> *H5:* Living in states with poor economic conditions (i.e. states with high unemployment rates) in conjunction with being interviewed during the Great Recession (i.e. 2008-2010) will operate as a magnifier of sleep outcomes. Specifically, respondents living in states with high unemployment during the recession will be related to sleeping more or less than the recommended amount, greater odds of sleeplessness, and greater odds of sleep disruptions compared to the living in states with lower unemployment rates and being interviewed before the recession (i.e. 2003-2007).

Moderating Influence of Socio-Demographic Characteristics

The experiences of employment uncertainty and how they relate to sleep patterns is not uniform across the population. Differential access to resources as well as varying exposure to the effects of being unemployed and economic recessions are likely to result in different sleep patterns. In particular, relationships between employment uncertainty

and sleep are expected to be moderated by gender, life stage, spouses'/partners' employment status, and education.

Sleep is expected to be moderated by respondents' gender in part because the variation reported in time spent sleeping as well as sleep experiences found in prior research (Grandner et al. 2010; Hale 2005; Kronholm et al. 2006; Krueger and E. M. Friedman 2009; Maume et al. 2010). Prior research utilizing the American Time Use Survey has found that women are less likely than men to sleep less than 6.5 hours when compared to sleeping between 6.5 and 8.5 hours on weekdays or weekends (Hale 2005). These results were partially confirmed in two population-level examinations of self-reported sleep patterns (Kronholm et al. 2006; Krueger and E. M. Friedman 2009). Both studies found that men were less likely to sleep longer hours when compared to women. However, one study found that men were less likely to sleep 5 or less hours versus 7 hours in comparison to women (Krueger and E. M. Friedman 2009) while the other found that women were less likely to sleep less than 6 hours (Kronholm et al. 2006). In an examination of sleep complaints (including trouble falling asleep, sleeping too much or trouble staying asleep), Grandner and colleagues (2010) found that gender moderated the relationships between other demographic characteristics such as employment status, income, and education and sleep complaints. Specifically, the authors found that men were more likely to report sleep complaints when they were not participating in the labor force (e.g. being retired, unemployed, or unable to work). Based on the above findings, I hypothesize the following:

> *H6a:* Women living in states with poor economic conditions or interviewed during the Great Recession will experience worse sleep outcomes than men.

> *H6b:* Men who are not working (unemployed or not in the labor force) will experience worse sleep outcomes than women who are not working.

Related to gender, life stage is also expected to moderate the relationships between employment uncertainty and sleep patterns. Prior research from 2004 to 2007 drawing on self-reported estimates of average sleep found that the odds of sleeping 8

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hours or more is greatest early and later in life and is at its lowest point when individuals are 45 years-old (Krueger and E. M. Friedman 2009). The odds of sleeping 6 or fewer hours increases in early adulthood, levels off between 45 and 50, and then increases again at the older ages. The curvilinear pattern for average sleep hours was supported in a Finnish population study from 2000 and 2001 as well (Kronholm et al. 2006). However, not all studies have confirmed this finding. A study drawing on time diary data spanning 1965 to 1999 found that the curvilinear pattern for the odds of long sleep being greatest early and later in the life course was only significant on the weekdays while no pattern for short sleep was found (Hale 2005).

Life stage is not simply a reflection of age. The life course also reflects the process of moving through various life stages like parenthood and retirement. Specific to these analyses of working-aged individuals, parenthood can be expected to influence the amount and quality of respondents' sleep as they may experience the challenges of waking babies and staying up late waiting for adolescents to return home. Krueger and Friedman (2009) found in their population-level examination of average sleep time that having children in the home reduced the odds of sleeping more than 7 hours a night, and that having children under age two increased the odds of sleeping less than 7 hours. In light of these findings, I expect the following:

> *H7a:* Parents who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession will experience worse sleep outcomes compared to younger respondents without children.

> *H7b:* Older respondents who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession who do not have children in the home will experience worse sleep outcomes compared to younger respondents without children.

Having a spouse or partner as well as their employment status may also influence a respondent's sleeping patterns simply by altering the amount of time available to manage the second shift (Hochschild and Machung 1990). Krueger and colleagues (2009)

compared single respondents with those who were married and found that singles were less likely to sleep less than 7 hours and more likely to sleep 8 hours on average. In the Finnish population-level study of sleep patterns, the authors found that there were more divorced and widowed respondents in the group sleeping less than 6 hours while there were more single respondents in the group sleeping 9 hours or more (Kronholm et al. 2006). American time diary data found similar results, finding that those who were separated or divorced, widowed, or single were more likely to sleep less than 6.5 hours and singles were also more likely to sleep more than 8.5 hours (Hale 2005). When considering sleep complaints more generally, Grandner and colleagues (2010) found that singles, respondents who are part of an unmarried couple, divorcees, and those who are separated are more likely to report sleep complaints. Unfortunately, these studies did not consider spouses'/partners' employment status as a factor for sleeping. Knowing that being employed is an important predictor of sleep patterns more generally, spouses'/partners' employment demands is an important addition when examining sleep patterns. Based on these findings, I expect the following:

> *H8:* Respondents who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession who have employed spouses/partners will experience better sleep outcomes compared to respondents with spouses/partners not in the labor force or those who are single.

Lastly, education is expected to be related to sleep patterns similar to other health measures. Increasing levels of education have been found to lower the odds of sleeping more or less than 7 hours on average when compared to respondents with less than a high school degree (Krueger and E. M. Friedman 2009; Stamatakis, Kaplan, and R. E. Roberts 2007). Similar results were replicated with Finnish data (Kronholm et al. 2006). Time diary data found that respondents with a high school degree or less were more likely to sleep less than 6.5 and more than 8.5 hours on the diary day when compared to respondents with a college degree. Sleep complaints were significantly more prevalent for respondents with less than a high school degree, a high school degree, or some

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college when compared to college graduates (Grandner et al. 2010). In light of these findings I expect the following:

> *H9:* Respondents with lower levels of education who are unemployed, living in states with poor economic conditions, and/or are interviewed during the Great Recession will experience worse sleep outcomes compared to those with a college degree.

Based on the limitations of prior research and the potential importance of the largest recession following the Great Depression, I utilize a unique dataset to examine the multiple relationships between sleep and employment uncertainty. Specifically, I use the pooled cross-sectional samples from the ATUS from 2003 to 2010 to examine the differences in the amount of time spent sleeping, the odds of a sleep disruption, and the odds of sleeplessness by employment uncertainty. This study seeks to examine the effects of being unemployed, living in states with poor economic conditions (as captured by unemployment rates), being interviewed during the recessionary time period, and their combined effects on time spent sleeping and sleep quality on an average day.

Data & Methods

Data

The following analyses 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 (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 sleep. The analytic sample is limited to respondents most impacted by employment and the recession – working-aged respondents between 23 and 55 whose diary days are Sunday through Thursday[6] - leaving a sample of 44,218 respondents.

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[6] Nights before weekends are excluded in the following analyses due to the unique time use patterns present on weekend days when compared to weekday diaries. Results from models including only nights before weekdays, only nights before weekends, and all diary days were compared and qualitative differences in the findings made it clear that combining the analyses would mask important differences in sleep patterns across the two types of days. Instead, I

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. Respondents are asked what activity they engaged in, how much time they spent doing this activity (down to the minute), who they were with, if they provided secondary childcare during this activity, and their mode of transport if traveling between locations. Diary days span the four seasons, days of the week, and holidays. These data are extremely rich and capture participation, duration, and 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[7] when attempting to measure time use (Juster and Stafford 1985; Juster, Ono, and Stafford 2003; J. P. Robinson 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). Respondents are eligible for participation in the ATUS two to five months following their last month in the CPS (U.S. Bureau of Labor Statistics 2009). The CPS targets the civilian, non-institutionalized population in the United States and households are selected for participation using the Census Bureau's listing operation (U.S. Bureau of Labor Statistics 2006). The CPS sample is a stratified multi-stage cluster sample. The ATUS sampling strategy maintains these characteristics but eliminates the oversampling within smaller states and makes residents across states equally likely to be selected (U.S. Bureau of Labor Statistics 2009). CPS is a longitudinal design where households are included in the sample for four months, are excluded from the sample for eight months, and complete another four months in the CPS before they are eligible to participate in the ATUS. Due in part to the prior time commitment to participate in the CPS, the ATUS response rate is lower than other nationally representative surveys[8] (U.S. Bureau of Labor Statistics

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focus on nights before weekday diaries in order to understand the changing effects of work for the majority of the population that primarily work Monday through Friday.

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

[8] The response rate ranged between 52.5% in 2007 to 57.8% in 2003 (U.S. Bureau of Labor Statistics 2009).

2009). Sample weights assure the final sample is nationally representative after accounting for oversampling of minority groups, households with children, and the number of adults per household; differing response rates by demographic group; and the oversampling of weekend days in comparison to weekdays. 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).

In addition to nonresponse, missing values on household and demographic variables are imputed in the same manner as the CPS in order to maintain consistency between the two datasets (U.S. Bureau of Labor Statistics 2009).[9] Labor force participation edits are based on relational imputation and hot-deck. Demographic characteristics like age, sex, and household relationships are edited to ensure consistency and hot-deck allocations are used in the editing process. Race, marital status, Hispanic origin, and educational attainment are not updated during the ATUS to reduce respondent burden and as such are missing in the ATUS if they are missing in the CPS. Missing values on ATUS specific variables like records with fewer than 5 activities in a 24 hour period or activities that cover fewer than 21 hours in the 24 hour period are dropped from the public dataset.[10] "Who" and "where" codes that are inappropriately linked to activities (such as sleeping) are stripped from cases. "Where" codes that are missing are imputed using a set of rules defined by the survey administrators. Spouses'/partners' employment status is allocated based on prior longitudinal information or through imputation based on the age of the spouse when unavailable.

Missing data on the sleep outcomes 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

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[9] All cases of imputation or data editing are performed by the U.S. Bureau of Labor Statistics before the data is released publically.

[10] This is a small percentage of the full ATUS dataset (2.8%) but it is not clear how many of these individuals would have been included in my analytic sample because age is stripped from these non-respondents. Though there may be concerns that the most engaged would be most likely to be excluded from the dataset due to difficulty contacting them, prior research instead finds that those individuals who are weakly connected to their communities are least likely to be included because they are less likely to be contacted (Abraham, Maitland, and Bianchi 2006).

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 occurred and is answered by the survey interviewer. Data on time spent sleeping, sleep disruptions, and sleeplessness are potentially more problematic because they are self-reported. However because the survey is not framed as a sleep survey and the time allocated in the survey must sum to 24 hours, it is less likely that respondents will systematically bias their responses. It is possible that respondents may forget a sleep disruption or episode of sleeplessness – particularly if the period of sleeplessness was short – and omit it from their time diary. 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 my results but not bias them. In light of this, any significant findings related to sleep disruptions should be interpreted as a conservative estimate.

Variables

Measuring Sleep

The four dependent variables in the analyses are total time spent sleeping, reporting a disruption between sleep episodes, reporting sleeplessness, and the amount of time spent in sleeplessness. The total time spent sleeping is summed to a single measure of sleep time across the diary day beginning *after* the first episode of the day and ending after the last episode is complete including mid-day sleep episodes or naps. Because the diary day starts at 4:00 AM, many respondents report a partial sleep episode as their first activity episode (i.e. the first activity is truncated by the 4:00 AM diary start time). In light of this, I exclude the first sleep episode if it is the first activity of the diary day. In contrast, the full duration of the last sleep episode of the diary day is included regardless of whether or not it is complete by 3:59 AM (i.e. it is not truncated at 3:59 AM). As such, I am able to measure a complete sleep cycle over a 24-hour period even though the diary

day begins and ends in the middle of many respondents' sleep episodes. Once the total time spent sleeping is calculated, time spent sleeping is divided into three categories based on the recommended amount of sleep (7 to 9 hours each day) as suggested by the National Sleep Foundation and the Centers for Disease Control and Prevention. Respondents are coded as either sleeping less than, more than, or the recommended 7 to 9 hours each day.

Sleep disruptions are identified based on the sleep episodes described above in the total sleep measure. Each transition from sleep to another activity and (eventually) back to sleep during the night hours (between 10pm and 6:00am) is counted as a sleep disruption. Daytime sleep disruptions are included for those respondents who report working during night hours (between 10:00pm and 6:00am). A disruption can capture insomnia (waking for some period during which a respondent intends to be sleeping) as well as sleep disruptions that are caused by others such as caring for a child. Despite the potential qualitative differences in sleep disruptions (Maume et al. 2010), the end result is similar – a broken sleep pattern. Respondents who experienced a sleep disruption were coded as 1 while those who did not were coded as 0.[11]

Sleeplessness is a separate time use category that captures difficulty sleeping. The coding lexicon from the ATUS provides examples such as "counting sheep," "insomnia," "lying awake," and "tossing and turning" in their description of sleeplessness (U.S. Bureau of Labor Statistics 2011a). Respondents who report an episode (or more) of sleeplessness are coded as 1 for sleeplessness and all others are coded as 0. The duration of all sleeplessness episodes are summed across the diary day to get the total time spent in sleeplessness.

Measures of Employment Uncertainty

Though much of the prior scholarly work has focused primarily on either a particular time period or state economic conditions, these approaches seem limited in the

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[11] A total count of all sleep disruptions was examined as well but is not included in the final results and tables because there were no significant findings. This measure is calculated by summing all of the eligible sleep disruptions on the diary day.

more complex economic environment of the Great Recession. Figure 2-1 illustrates the diversity of unemployment rates across time and space. The x-axis represents months and years during which time diary data from the ATUS is available whereas the y-axis represents the unemployment rate as estimated by the U.S. Bureau of Labor Statistics. The first vertical line marks the beginning of the recession as determined by the National Bureau of Economic Research (2010) while the second vertical line marks its conclusion. As you can see the unemployment rate by state increased during the recession and continued to stay high following its conclusion. Moreover, the variation across states within each particular month appears to increase during the recession as compared to the years before the recession. Lastly, the duration of this recession is notably longer than recent recessions leading to comparisons between the current economic environment and the Great Depression. In light of these unique characteristics, it is more fitting to examine the effect of both the recessionary time period and the state-level unemployment rates for time spent sleeping as well as to extend the investigation to include all of 2009 and 2010.

The state economic conditions are captured by including state-level

Figure 2-1. Monthly State-level Unemployment Rate
from January 2003 to December 2010

Source: Figure created by author using data from U.S. Bureau of Labor Statistics (2011)
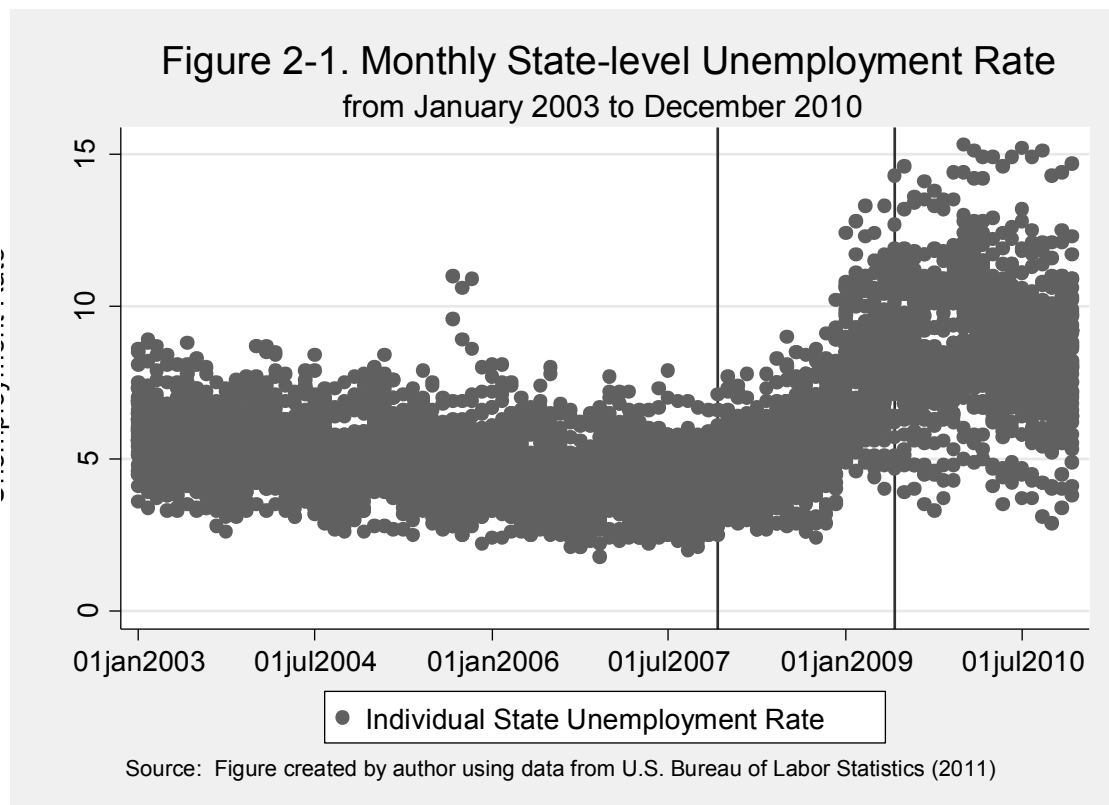
unemployment rates. Unfortunately, states are the smallest geographic identifier available in the ATUS. The measure is constructed by merging the monthly state-level unemployment rates from the U.S. Bureau of Labor Statistics to the ATUS dataset. In order to capture both the recent conditions and the immediate projections that would concurrently influence time use choices, I construct a three-month rolling average of the state-level unemployment rate for each respondent that includes the month prior, during, and following the date of ATUS participation.[12]

The historical time period marked by a recession captures both the broader economic climate characterizing the Great Recession and the duration of exposure. The effect of the 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 in 2008, 2009, or 2010. The recessionary years (2008-2010) are separated to identify how the initial experience of the recession may vary from prolonged exposure (e.g. 2008 versus 2010) as well as the varying levels of severity experienced during that time period. The time period prior to the recession (2003 to 2007) is the comparison group.

Being 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, the majority of respondents' households have participated in eight waves of the CPS approximately two to five months before being invited to participate in the ATUS.[13] Participants of the CPS are asked about their current employment status throughout their participation in the survey as well as the rest of the individuals in their household. Upon entry into the ATUS, respondents are asked if their employment situation has changed since their prior CPS participation. These data allow me examine differences across

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[12] 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 final models including all of the controls. Because it was only significant in the initial models (those without socio-demographic characteristics and controls) predicting sleep disruptions, I excluded these terms from the analyses and the results described below.

[13] Because the sampling unit is based on location rather than the individual or household group, individuals and household members may move between waves of the CPS or before the ATUS begins. In this case, the new residents are included in the survey. This occurs for about 2.7% of the household members captured by the ATUS. However, the majority of such individuals are usually children born between the CPS and the ATUS and would not affect these results.

respondents who are unemployed (both recently and longer-term), employed, and out of the labor force. Detailed employment status is captured by identifying the recently unemployed (employed at CPS and unemployed at ATUS), the longer-term unemployed (unemployed at CPS and ATUS), and those not in the labor force (out of the labor force at ATUS). Respondents who are employed at the time of the ATUS are the comparison group.

Measures of Socio-Demographic Characteristics

Socio-demographic characteristics are important predictors of physical and mental health and as such are expected to predict sleep outcomes. Socio-demographic measures included in this analysis are gender, life stage, spouses'/partners' employment status, and education. Gender is measured as a dichotomous variable where 1 = women and 0 = men. Life stage captures both age and parental status. Respondents are categorized into three groups including those who are 45 or younger without children, parents of children under the age of 18, and respondents older than 45 without children in the home. Spouses'/partners' employment status captures both the presence of a spouse or partner in the household and their participation in the labor force. Respondents are grouped into four categories including respondents without spouses or partners in the home, respondents whose spouses/partners are employed full-time, respondents whose spouses/partners are employed part-time, and respondents whose spouses/partners are not working (reference group). Education is divided into three groups including respondents with a high school degree or less, respondents with some college or an associate's degree, and respondents with a college degree or more. Respondents with a college degree or more are the reference group.

Analytic Strategy

Time spent sleeping is analyzed using multinomial logistic regression to compare those who sleep less than 7 hours or more than 9 hours with those who sleep the recommended 7 to 9 hours on the diary day. Logistic regression is used to analyze the odds of experiencing sleep disruptions and sleeplessness. Because time in sleeplessness is

not normally distributed, the values are logged prior to model estimation.[14] Once logged, time in sleeplessness is estimated using ordinary least squares regression.[15]

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 results changed in a notable manner, I excluded the cases from the analysis.[16] The model predicting the logged time spent in sleeplessness had an influential case that was eventually dropped from the analysis.[17]

In order to investigate the variation in sleep patterns, I begin by examining the bivariate differences in sleep outcomes by respondent's employment status, state economic conditions as captured by unemployment rates, and time period during which they were interviewed. Next, I use multivariate methods to examine associations across detailed employment status, state economic conditions, historical time period, and socio-demographic characteristics with sleep patterns. Each of the multivariate models is first estimated with only the employment uncertainty variables – a standard measure of employment status (employed, unemployed, and out of the labor force), state unemployment rate, and historical time period. Next, I investigate the effects of the timing of becoming unemployed by replacing the standard measure of employment status with the more detailed measure that includes the recent (in the last 2 to 5 months) versus longer-term unemployed (longer than 2 to 5 months) as well as being out of the labor force. Next, I add the socio-demographic characteristics (i.e. gender, life stage, spouses'/partners' employment status, and education) and other controls to the model with the measures of employment uncertainty to determine how the main effects may

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[14]The number of sleep disruptions is also not normally distributed and is logged in models shown in Appendix C.

[15] Selection into being unemployed is expected to differ before the recession when compared to during the recession. Unfortunately, I am unable to account for the selection in these models. Future analysis will need to account for this selection process.

[16] 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.

[17] One case were dropped from the model predicting the logged time spent in sleeplessness.

change with additional controls. Controls include race, immigrant status, metropolitan status, region, season, and holiday. Next, interactions between detailed employment status, state-level unemployment rates, and historical time period are 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). Lastly, interactions between each measure of employment uncertainty (i.e. being unemployed, living in states with poor economic conditions, and being interviewed during a recessionary time period) and the socio-demographic measures (i.e. gender, life stage, spouses'/partners' employment status, and education) are tested in each model first as two-way interactions and then as three-way interactions including each of the main and interaction effects. Only significant interactions are described in the results.

Results

Table 2-2 includes descriptive statistics for the analytic sample, including time spent sleeping, sleep disruptions, and sleeplessness. In the ATUS sample, the majority of the respondents spend between 7 and 9 hours sleeping each diary day (47.5%). Approximately a quarter of the sample spends less than 7 hours sleeping (25.8%) and approximately a quarter of the sample spends more than 9 hours sleeping on the diary day (26.8%). Despite the prominence that sleeplessness and difficulty sleeping plays in the American popular media, sleeplessness is only reported on 4.3% of the diary days. However, the average number of minutes experiencing sleeplessness is substantial – 68 minutes – for those who do report difficulty sleeping. Similarly, few respondents report disrupted sleep patterns. Only 2.3% of working-aged respondents report multiple episodes of sleep during the evening hours.[18] Moreover, those respondents that do experience broken sleep rarely report more than one disruption while sleeping with the average number of sleep disruptions per night being 1.2 for those who report a sleep disruption.

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[18] Or during day time sleep hours if the respondent reports working during the night hours.

Table 2-2. Descriptive statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Dependent Variables				
Sleep Hours				
Short Sleep (less than 7 hours)	25.75%	0.003	11,167	73,662,171,274
Optimal Sleep (7-9 hours)	47.48%	0.003	21,209	135,813,202,717
Long Sleep (more than 9 hours)	26.77%	0.003	11,842	76,569,761,031
Sleeplessness				
Percent Reporting Sleeplessness	4.31%	0.001	1,816	12,318,769,685
Time in Sleeplessness (minutes)	67.72	1.867	1,816	12,318,769,685
Breaks in Sleep				
Percent Reporting Breaks	2.27%	0.001	1,066	6,504,405,925
Number of Breaks per Day	1.17	0.018	1,066	6,504,405,925
Independent Variables				
Employment Uncertainty				
Detailed Employment Status				
Employed	80.32%	0.003	35,266	229,761,775,851
Unemployment - 2 to 5 months	1.94%	0.001	764	5,547,542,552
Unemployed - at ATUS & CPS	2.97%	0.001	1,253	8,505,352,493
Out of Labor Force	14.76%	0.002	6,935	42,230,464,126
State-Level Unemployment Rate	6.34	0.015	44,218	286,045,135,023
Year Interviewed				
2003-2007	61.73%	0.003	28,924	176,572,116,335
2008	12.75%	0.002	4,982	36,484,664,700
2009	12.65%	0.002	5,122	36,171,577,847
2010	12.87%	0.002	5,190	36,816,776,140

Note: Estimates are weighted using the wt06 variable.

Table 2-2 cont. Descriptive statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Socio-Demographic Characteristics				
Female	50.73%	0.003	24,730	145,107,366,690
Life Stage				
45 or Younger without Children	28.96%	0.003	9,088	82,842,855,139
Parent of Child under 18	49.27%	0.003	26,782	140,937,590,130
Older than 45 without Children	21.77%	0.003	8,348	62,264,689,753
Gendered Life Stage				
Men under 45 without Children	16.63%	0.003	4,930	47,572,362,150
Father of Child under 18	22.74%	0.003	10,969	65,039,242,417
Men over 45 without Children	9.90%	0.002	3,589	28,326,163,764
Women under 45 without Children	12.33%	0.002	4,158	35,270,492,989
Mother of Child under 18	26.53%	0.003	15,813	75,898,347,712
Women over 45 without Children	11.86%	0.002	4,759	33,938,525,988
Marital or Partner Status/Spouses' Employment Status				
Spouse/Partner is Not Employed	14.69%	0.002	5,808	41,058,166,863
Spouse/Partner Employed Part-Time	7.15%	0.002	3,047	19,976,830,800
Spouse/Partner Employed Full-Time	45.17%	0.003	19,069	126,270,909,858
No Spouse or Partner	33.00%	0.003	15,303	92,257,069,776
Education				
College Degree or More	32.34%	0.003	16,013	92,494,059,139
Some College or Associate's Degree	26.66%	0.003	12,871	76,245,379,092
High School Diploma or Less	41.01%	0.003	15,334	117,305,696,790
Additional Controls				
Race				
White	67.74%	0.003	30,590	193,776,605,517
African American	11.68%	0.002	5,293	33,420,132,174
Hispanic	15.11%	0.002	6,063	43,224,246,043
Other	5.46%	0.002	2,272	15,624,151,290

Note: Estimates are weighted using the wt06 variable.

Table 2-2 cont. Descriptive statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Immigrant	15.97%	0.002	6,415	45,684,239,912
Region				
Northeast	17.87%	0.003	7,996	51,126,937,988
Midwest	24.54%	0.003	11,193	70,188,728,154
South	35.10%	0.003	15,315	100,411,048,029
West	22.49%	0.003	9,714	64,318,420,852
Metropolitan Area				
Suburban	57.80%	0.003	25,598	164,265,104,172
Urban	25.06%	0.003	10,775	71,223,907,637
Rural	17.13%	0.002	7,587	48,686,940,959
Season				
Summer	25.10%	0.003	10,952	71,798,759,047
Fall	24.81%	0.003	10,665	70,961,055,201
Winter	24.61%	0.003	11,429	70,403,014,383
Spring	25.48%	0.003	11,172	72,882,306,391
Holiday Diary Day	2.03%	0.001	990	5,807,774,379

Note: Estimates are weighted using the wt06 variable.

Prior research has shown that particular characteristics like age, gender, and parental status are linked with certain sleep patterns (e.g. Kronholm et al. 2006; Krueger and E. M. Friedman 2009; Maume et al. 2010). For example, parents, and mothers in particular, experience more sleep disruptions while older individuals experience more sleeplessness.[19] Figures 2-2 through 2-9 examine the distribution of sleep patterns by gender, parental status, and age. Figure 2-2 shows the time spent sleeping by the age of the respondent. Here we see that across age groups the proportion sleeping less than 7 hours is highest for the oldest age group while sleeping more than 9 hours is highest for the youngest age group (statistically significant at $p<.001$). There is also a statistically significant difference across the age groups for sleeplessness (shown in Figures 2-3 and 2-4). Respondents between 46 and 55 were more likely to report experiencing sleeplessness ($p<.01$) and to spend more time in sleeplessness ($p<.05$) than younger respondents[20].

Differences in the amount of time spent sleeping across gender and parental status are shown in Figure 2-6. Here we see that fathers are more likely to report sleeping less than 7 hours than are mothers and those without children and mothers are less likely to report sleeping less than 7 hours than those without children ($p<.05$). At the other end of the spectrum, mothers are more likely to sleep more than 9 hours than are both groups of men (women without children are more likely than fathers) whereas fathers are least likely to report sleeping more than 9 hours ($p<.05$). Figure 2-7 shows the differences in both the proportion of respondents reporting sleep disruptions and sleeplessness. As expected, women, in particular mothers, are more likely to report a sleep disruption ($p<.01$) and women are more likely to report sleeplessness than are fathers ($p<.01$). Women without children spend more time in sleeplessness than fathers but no other differences are statistically significant (Figure 2-8). There are no statistically significant differences across the number of sleep disruptions by gender and parental status.

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[19] Figures examining differences across the remaining socio-demographic characteristics (spouses'/partners' employment status and education) are available in the Appendix E.

[20] No significant differences were found for the proportion of respondents reporting a sleep disruption and the sum total.

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Figure 2-2. Time Spent Sleeping
by Age of Respondent

| | Less than 7 Hours | Between 7 and 9 Hours | More than 9 Hours |
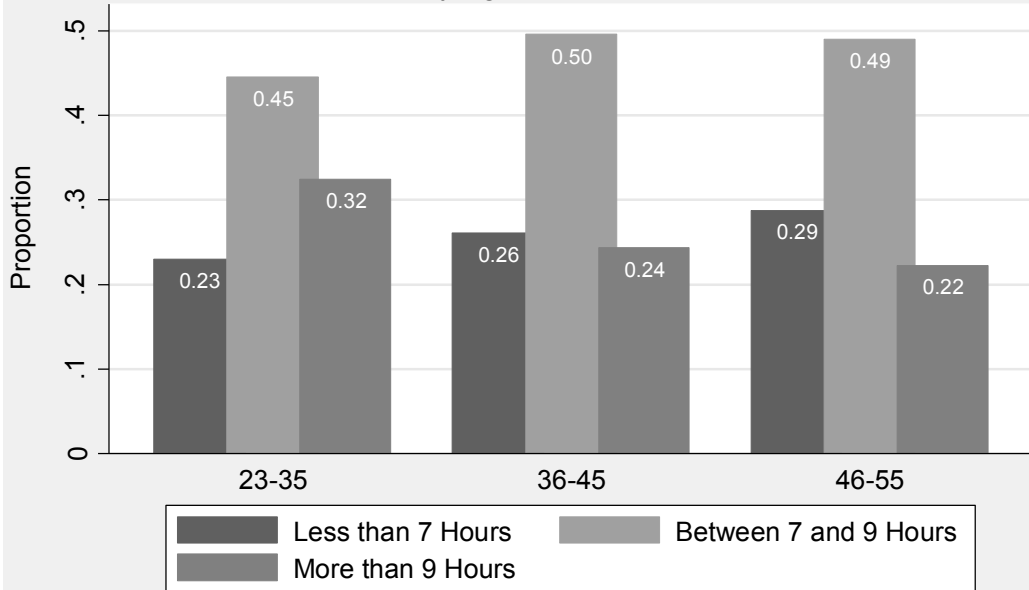
Source: American Time Use Survey 2003-2010

Figure 2-3. Sleep Issues
by Age of Respondent

| | Experiencing a Sleep Disruption | Experiencing Sleeplessness |
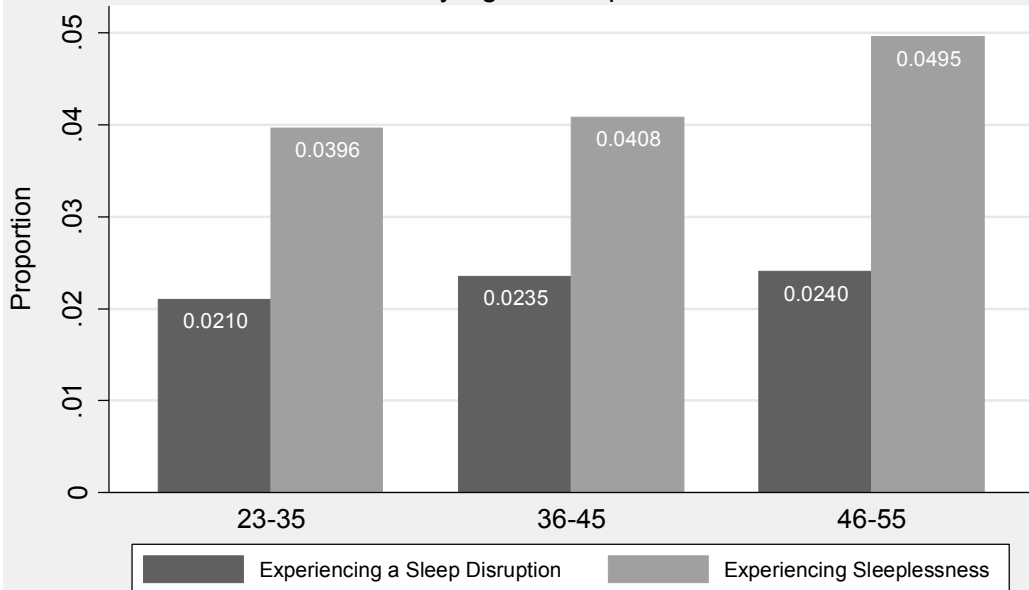
Source: American Time Use Survey 2003-2010

Figure 2-4. Time Spent in Sleeplessness
by Age of Respondent

Minutes

Age	Value
23-35	59.4869
36-45	66.7698
46-55	76.5415

Source: American Time Use Survey 2003-2010
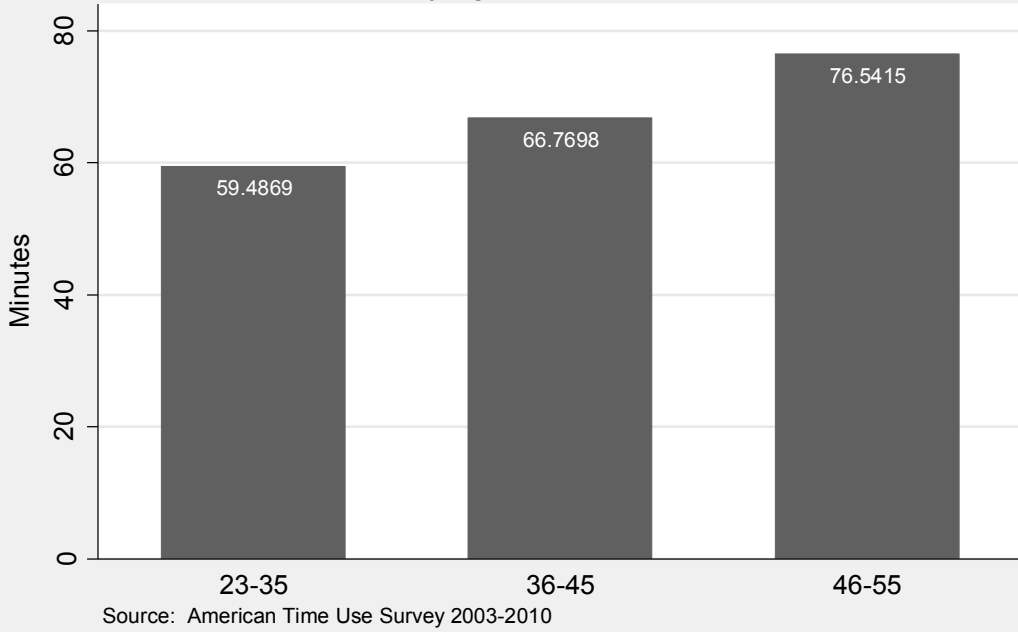
Figure 2-5. Number of Sleep Disruptions
by Age of Respondent

Age	Value
23-35	1.1991
36-45	1.1468
46-55	1.1664

Source: American Time Use Survey 2003-2010
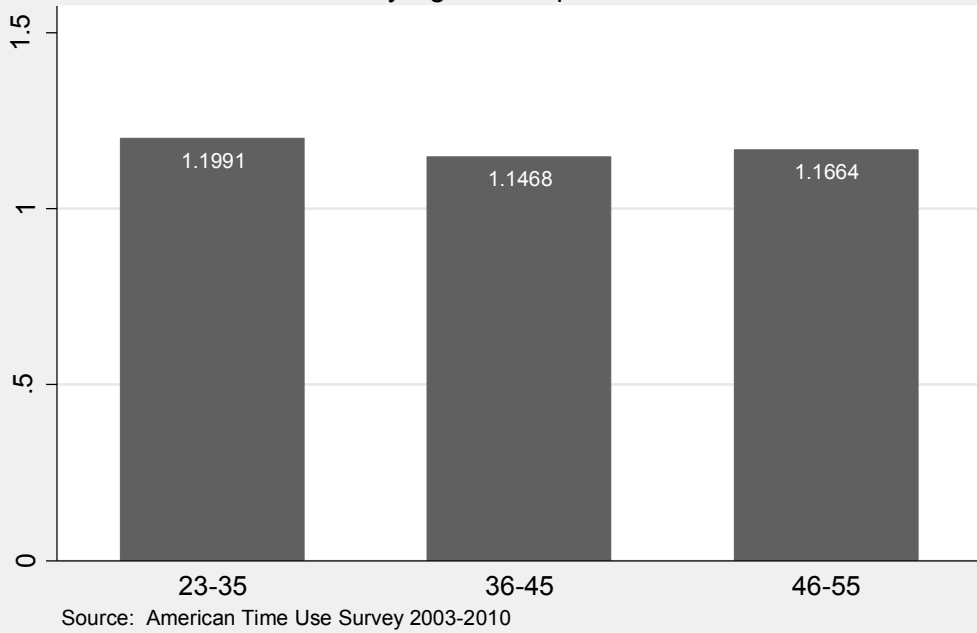
Figure 2-6. Time Spent Sleeping
by Parenthood
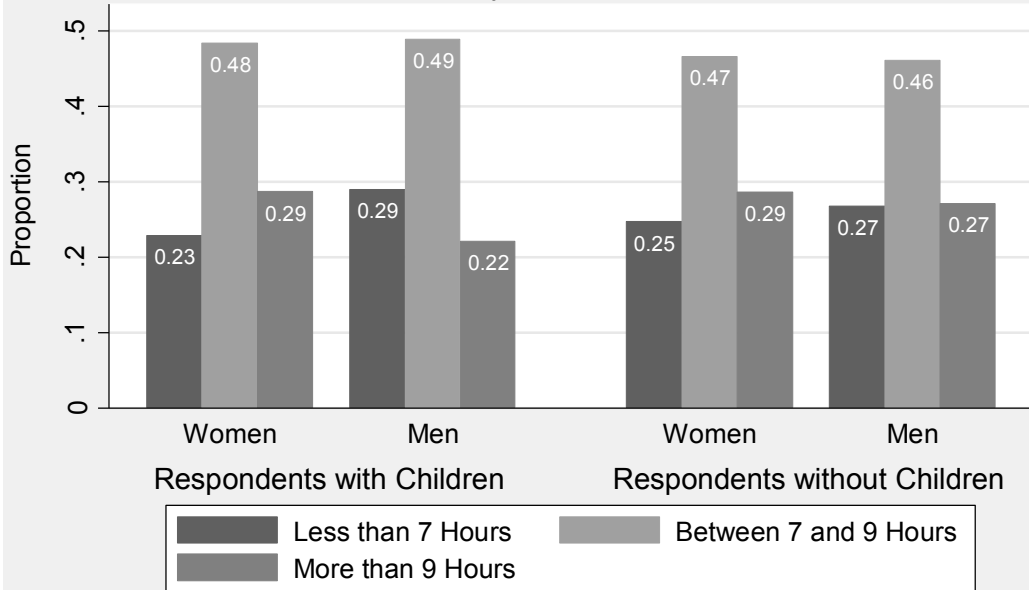
Source: American Time Use Survey 2003-2010

Figure 2-7. Sleep Issues
by Parenthood
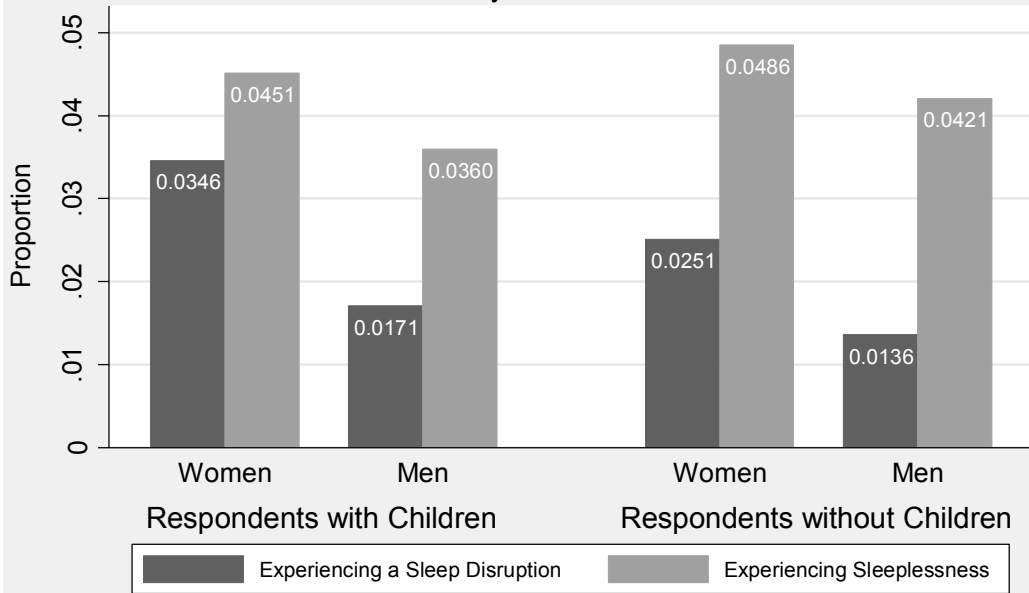
Source: American Time Use Survey 2003-2010

Figure 2-8. Time Spent in Sleeplessness
by Parenthood

Minutes

65.9121	64.5951
Women	Men
Respondents with Children	

75.2625	63.9984
Women	Men
Respondents without Children	

Source: American Time Use Survey 2003-2010
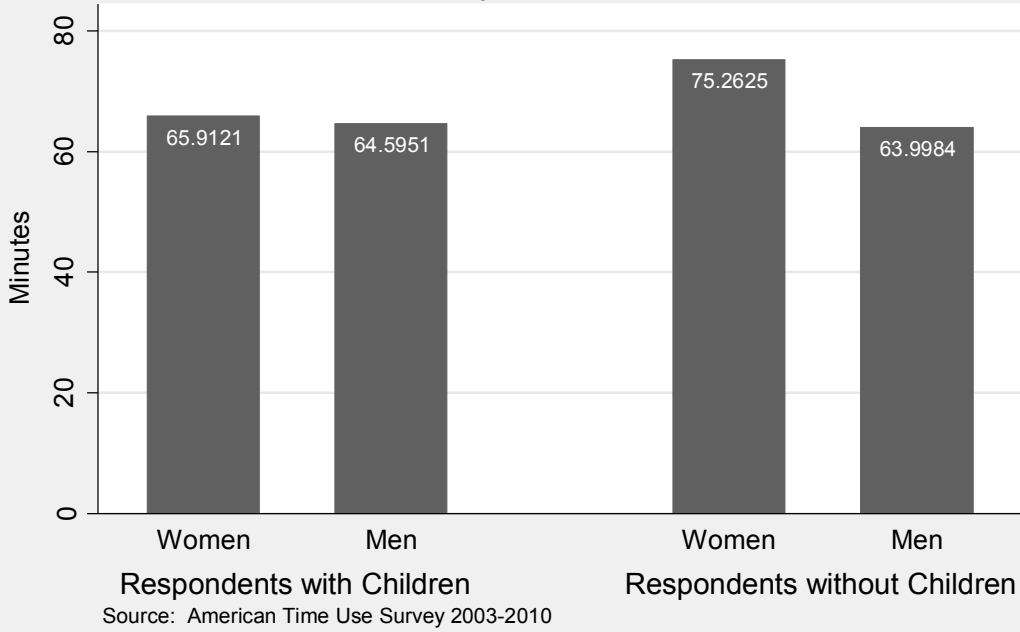
Figure 2-9. Number of Sleep Disruptions
by Parenthood

1.1681	1.2317
Women	Men
Respondents with Children	

1.1445	1.1609
Women	Men
Respondents without Children	

Source: American Time Use Survey 2003-2010
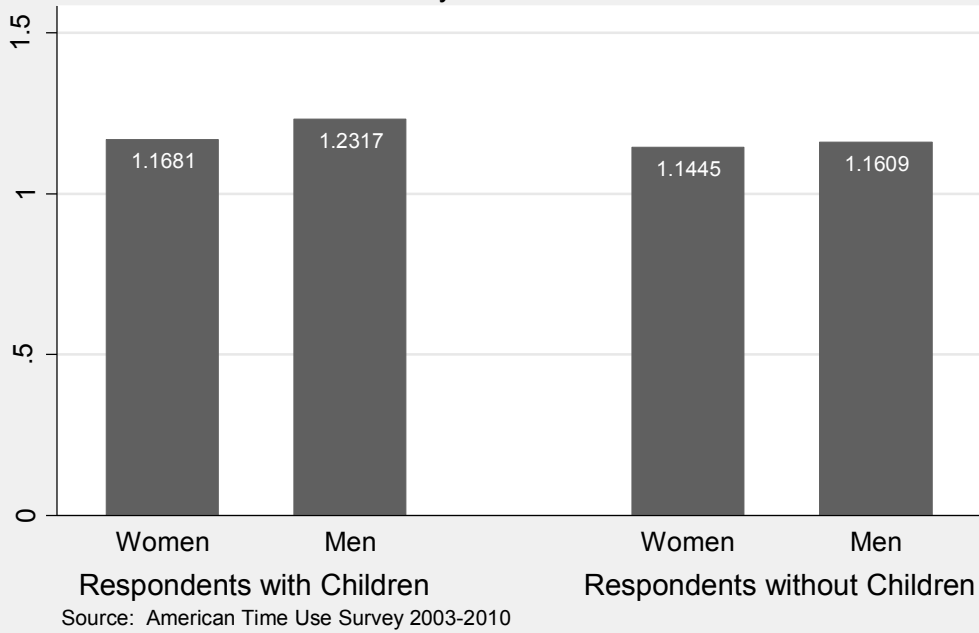
Bivariate Results

Respondents' own employment status is also a key determinant in working-aged respondents' sleep patterns and is shown in Table 2-3. A greater percentage of employed respondents report sleeping less than 7 hours on the diary day than the unemployed or those not in the labor force. More than a quarter of employed respondents (27.4%) report sleeping fewer than 7 hours while the proportion of recently unemployed, the long-term unemployed, and those not in the labor force range from 17.6% to 19.3%. Though a greater percentage of employed respondents sleep fewer than the recommended hours each night, a greater percentage of employed respondents report sleeping the recommended 7 to 9 hours on the diary day as well (49.7% compared to 39.9%, 38.5%, and 38.2%). In contrast, a larger proportion of the unemployed and those not in the labor force sleep more than 9 hours on the diary day than do the employed (42.6% of the recently unemployed, 42.3% of the long-term unemployed, and 42.5% of those not in the labor force in comparison to 22.9% of the employed). Experiencing sleeplessness varies significantly across employment status. A lower percentage of the employed report sleeplessness (3.9%) when compared to the long-term unemployed (6.4%) and those not in the labor force (6%). However, average time spent in sleeplessness is smallest for the recently unemployed. A greater proportion of those not in the labor force and a smaller proportion of the recently unemployed report a sleep disruption. Overall, Table 2-3 demonstrates that though the employed may be more likely to sleep less than 7 hours they are also least likely to sleep more than 9 hours and experience sleeplessness. In contrast, the long-term unemployed are more likely to report sleeping longer and to report sleeplessness and/or a sleep disruption.

Differences in the distributions of sleep patterns across state economic conditions captured by the state-level unemployment rates are shown in Table 2-4. In order to assess these differences, I constructed three groups of respondents based on unemployment rates: (1) respondents whose state-level unemployment rate is more than one standard deviation below the average unemployment rate are referred to as living in low unemployment states, (2) respondents whose state-level unemployment rate is within one

Table 2-3. Bivariate Relationships between Sleep Behaviors and Employment Status, ATUS 2003-2010.

	Employed[a]			Recently Unemployed[b]			Long-Term Unemployed[c]			Out of the Labor Force[d]		
	Rate	SE		Rate	SE		Rate	SE		Rate	SE	
Sleep Hours												
Short Sleep (Less than 7 hours)	27.38%	0.00	bcd	17.59%	0.02	a	19.18%	0.01	a	19.28%	0.01	a
Optimal Sleep (7-9 hours)	49.70%	0.00	bcd	39.85%	0.02	a	38.48%	0.02	a	38.22%	0.01	a
Long Sleep (More than 9 hours)	22.92%	0.00	bcd	42.57%	0.02	a	42.34%	0.02	a	42.50%	0.01	a
Sleeplessness												
% Reporting	3.88%	0.00	cd	6.15%	0.01		6.39%	0.01	a	5.98%	0.00	a
Total Time (minutes)	64.20	1.99	cd	50.90	7.62	d	51.35	4.70	ad	85.91	5.48	abc
Breaks in Sleep												
% Reporting	2.03%	0.00	bd	0.96%	0.00	ad	1.90%	0.00	d	3.83%	0.00	abc
Number of Breaks per Day	1.14	0.02	d	1.43	0.27		1.15	0.09		1.25	0.04	a

Note: Superscript denotes significance of P≤.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table 2-4. Bivariate Relationships between Sleep Behaviors and Rolling Average of Unemployment Rate, ATUS 2003-2010.

	Low Unemployment (More than One Standard Deviation Smaller than the Mean Unemployment Rate)[a]			Average Unemployment (Within One Standard Deviation of the Mean Unemployment Rate)[b]			High Unemployment (More than One Standard Deviation Greater than the Mean the Unemployment Rate)[c]		
	Rate	SE		Rate	SE		Rate	SE	
Sleep Hours									
Short Sleep (Less than 7 hours)	23.66%	0.01	[bc]	25.98%	0.00	[a]	27.72%	0.01	[a]
Optimal Sleep (7-9 hours)	46.00%	0.01	[b]	47.87%	0.00	[a]	47.12%	0.01	
Long Sleep (More than 9 hours)	30.34%	0.01	[bc]	26.14%	0.00	[a]	25.16%	0.01	[a]
Sleeplessness									
% Reporting	4.88%	0.00		4.16%	0.00		4.43%	0.00	
Total Time (minutes)	64.80	3.26		67.29	2.29		76.48	6.64	
Breaks in Sleep									
% Reporting	1.60%	0.00	[b]	2.44%	0.00	[a]	2.24%	0.00	
Number of Breaks per Day	1.08	0.03	[b]	1.18	0.02	[a]	1.18	0.07	

Note: Superscript denotes significance of P≤.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

average unemployment states, and (3) respondents whose state-level unemployment rate is more than one standard deviation above the mean are referred to as living in high unemployment states. The percentage of respondents sleeping less than 7 hours on the diary day was statistically significantly different across the three groups. A smaller proportion of respondents living in low unemployment states (23.7%) sleep less than 7 hours in comparison to those living in average (26%) or high unemployment states (27.7%). A reverse pattern was evident for respondents sleeping more than 9 hours (30.3% versus 26.1% and 25.2%). In other words, individuals living in low unemployment states were more likely to sleep more than 9 hours on the diary day when compared to the high and average unemployment rate states. The percentage of respondents reporting a sleep disruption was significantly higher in areas with average unemployment (2.4%) when compared to states with low unemployment (1.6%). A similar pattern was evident for the number of sleep disruptions. In sum, respondents living in states with low unemployment are more likely to sleep more than 9 hours than the other groups and less likely to reporting a sleep disruption. No significant differences were evident by unemployment rates and the proportion of respondents reporting sleeplessness or time in sleeplessness.

Differences in the distributions of sleep patterns across the years before and during the Great Recession are shown in Table 2-5. Significantly more respondents slept less than 7 hours before the recession when compared to 2010. Fewer respondents slept the recommended number of hours (7-9 hours) in 2009 than when compared to before the recession or 2008. Sleeping more than 9 hours was significantly different early (2003-2007 and 2008) compared to later in time (2009 and 2010). A smaller percentage of respondents interviewed prior to the recession (26%) and in 2008 (25.7%) slept more than 9 hours in comparison to 2009 (29.8%) and 2010 (28.5%). Sleeplessness was significantly different across the years before and during the recession. The percentage of working-aged respondents reporting sleeplessness was greater in 2008 (5%) and 2009 (5.6%) than before the recession (3.9%). Moreover, the percentage of respondents reporting sleeplessness was significantly lower in 2010 (4.4%) than in 2009 (5.6%).

Table 2-5. Bivariate Relationships between Sleep Behaviors and Year of the Recession, ATUS 2003-2010.

	Before the Recession[a]			2008[b]			2009[c]			2010[d]		
	Rate	SE		Rate	SE		Rate	SE		Rate	SE	
Sleep Hours												
Short Sleep (Less than 7 hours)	26.28%	0.00	d	26.05%	0.01		24.72%	0.01		23.93%	0.01	a
Optimal Sleep (7-9 hours)	47.69%	0.00	c	48.24%	0.01	c	45.53%	0.01	ab	47.62%	0.01	
Long Sleep (More than 9 hours)	26.03%	0.00	cd	25.70%	0.01	cd	29.75%	0.01	ab	28.45%	0.01	ab
Sleeplessness												
% Reporting	3.87%	0.00	bc	5.00%	0.00	a	5.64%	0.00	ad	4.39%	0.00	c
Total Time (minutes)	69.79	2.83	d	63.95	3.49		70.18	4.52		60.09	3.27	a
Breaks in Sleep												
% Reporting	2.70%	0.00	bcd	1.77%	0.00	a	1.45%	0.00	a	1.56%	0.00	a
Number of Breaks per Day	1.18	0.02		1.20	0.07		1.09	0.04		1.14	0.06	

Note: Superscript denotes significance of P≤.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

However, those respondents that did report sleeplessness before the recession, spent more time in sleeplessness on average than did respondents in 2010 (70 minutes versus 60 minutes). Sleep disruptions were also distributed differently across time periods. The percentage of working-aged respondents who reported a sleep disruption before the recession (2.7%) was statistically significantly greater than the percentage reporting them in 2008 (1.8%), 2009 (1.5%) or 2010 (1.6%). The number of sleep disruptions was not significantly different across the time period. Taken together, the recessionary years, in particular 2009, are consistently different than the years prior.

Overall these results illustrate the contrasting implications of being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession have for sleep. The employed are more likely to sleep less than 7 hours and to report a sleep disruption (when compared to the recently unemployed) whereas the unemployed are more likely to sleep more than 9 hours and to report sleeplessness (specifically the long-term unemployed compared to the employed). The recessionary years are related to sleeping more than 9 hours, increased likelihood of sleeplessness, and a decreased likelihood of a sleep disruption in the bivariate results. In contrast, unemployment rates appear to have opposite effects. Respondents living in low unemployment states are more likely to sleep more than 9 hours while being less likely to report a sleep disruption.

Multivariate Models Predicting Time Spent Sleeping

The findings from the multinomial logistic regression predicting time spent sleeping are shown in Table 2-6 and compare sleeping less than 7 hours or more than 9 hours with sleeping the recommended number of hours (7 to 9 hours). The coefficients have been transformed into relative risk ratios to aid in interpretation. Relative risk ratios are similar to odds ratios in that values below one reduce the risk of being in the group of interest while values above one increase that risk. Also, relative risk ratios are multiplicative. Model 1 in Table 2-6 includes the respondent's standard employment status, state economic conditions as captured by unemployment rates, and historical time period. Neither being unemployed nor the recessionary years are significant predictors of

Table 2-6. Multinomial Logistic Regression Models Predicting Time Spent Sleeping, ATUS 2003-2010.

	Model 1			
	Sleeping Less than 7 Hours		Sleeping More than 9 Hours	
	RRR	SE	RRR	SE
Employment uncertainty				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 Months				
Unemployed - at ATUS & CPS				
Out of Labor Force				
State Economic Conditions				
Unemployment Rate	0.97 *	0.01	1.02	0.01
Time Period				
2003-2007 (ref.)				
2008	1.00	0.05	0.98	0.05
2009	1.11	0.08	1.09	0.07
2010	1.04	0.08	0.98	0.07
Employment Status				
Employed (ref.)				
Unemployed	0.876	0.075	2.310 ***	0.161
Out of Labor Force	0.918	0.044	2.409 ***	0.095
Constant	0.652 ***	0.043	0.407 ***	0.027

Notes: Model 1 N=44,218, Model 2 N=44,218, Model3 N=42,978. * p<.05, ** p <.01, *** p<.001. Reference group are those who sleep between 7 and 9 hours on the diary day. Controls are added in Model 2. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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.

sleeping less than the recommended 7 hours a night. However, the state economic conditions (i.e. state-level unemployment rates) are significantly related to sleeping less than 7 hours a night. Each percentage point increase in state-level unemployment rates are related to a 3% decrease in the risk of sleeping less than 7 hours. That is, in states with an unemployment rate of 9%, the risk of sleeping less than 7 hours 6% lower than respondents living in states with 4% unemployment. State economic conditions and historical time period are not related to sleeping more than 9 hours on the diary day. In contrast, being unemployed or out of the labor force are significantly related to sleeping

Table 2-6 cont. Multinomial Logistic Regression Models Predicting Time Spent Sleeping, ATUS 2003-2010.

	Model 2				
	Sleeping Less than 7 Hours			Sleeping More than 9 Hours	
	RRR	SE		RRR		SE
Employment uncertainty						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 Months	0.81	0.12	2.29	***	0.25
Unemployed - at ATUS & CPS	0.92	0.10	2.32	***	0.20
Out of Labor Force	0.92	0.04	2.41	***	0.10
State Economic Conditions						
Unemployment Rate	0.97	*	0.01	1.02	0.01
Time Period						
2003-2007 (ref.)						
2008	1.00	0.05	0.98	0.05
2009	1.11	0.08	1.09	0.07
2010	1.04	0.08	0.98	0.07
Employment Status						
Employed (ref.)						
Unemployed						
Out of Labor Force						
Constant	0.652	***	0.043	0.407	***	0.027

Notes: Model 1 N=44,218, Model 2 N=44,218, Model3 N=42,978. * p<.05, ** p <.01, *** p<.001. Reference group are those who sleep between 7 and 9 hours on the diary day. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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.

more than 9 hours. The unemployed have 131% greater relative risk of sleeping more than 9 hours while those not in the labor force have 141% greater relative risk. Model 2 in Table 2-6 includes a more detailed employment status measure that captures the length of time being unemployed. Here we see that both the recently unemployed (unemployed in the last two to five months) and longer-term unemployed (unemployed at ATUS and CPS) are significantly more likely to sleep more than 9 hours. The recently unemployed have 129% greater relative risk, the long-term unemployed have 132% greater relative risk, and those not in the labor force have 141% greater relative risk of sleeping more than 9 hours on the diary day when compared to the employed. Though the results are

Table 2-6 cont. Multinomial Logistic Regression Models Predicting Time Spent Sleeping, ATUS 2003-2010.

	Model 3					
	Sleeping Less than 7 Hours			Sleeping More than 9 Hours		
	RRR		SE	RRR		SE
Employment uncertainty						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 Months	0.79		0.12	2.01	***	0.24
Unemployed - at ATUS & CPS	0.84		0.09	2.01	***	0.18
Out of Labor Force	0.94		0.05	2.26	***	0.10
State Economic Conditions						
Unemployment Rate	0.98		0.01	1.01		0.01
Time Period						
2003-2007 (ref.)						
2008	0.99		0.05	0.97		0.05
2009	1.08		0.08	1.16	*	0.08
2010	0.98		0.07	1.02		0.08
Employment Status						
Employed (ref.)						
Unemployed						
Out of Labor Force						
Constant	0.599	***	0.061	0.359	***	0.036

Notes: Model 1 N=44,218, Model 2 N=44,218, Model3 N=42,978. * p<.05, ** p <.01, *** p<.001. Reference group are those who sleep between 7 and 9 hours on the diary day. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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.

similar for Models 1 and 2, I include the more detailed measure of employment status as a means of integrating the duration of becoming unemployed.

Model 3 in Table 2-6 includes the socio-demographic characteristics with the employment uncertainty variables. Here we see that sleeping less than 7 hours on the diary day is no longer related to the state-level unemployment rate. Instead controlling for gender, life stage, spouses'/partners' employment status, and education mediates that relationship. Sleeping more than 9 hours on the diary day remains significantly more likely for the recently unemployed (101% greater relative risk), the long-term unemployed (101% greater relative risk), and those not in the labor force (126% greater

relative risk) even after controlling for an individual's socio-demographic characteristics. Living in states with poor economic conditions are not significantly related to sleeping more than 9 hours while being interviewed during the historical time period marked by the recession becomes significant once I control for the socio-demographic characteristics. Respondents participating in the survey in 2009 have 16% greater relative risk of sleeping more than 9 hours. 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 time period marked by a recession were not statistically significant predictors of time spent sleeping.

Multivariate Models Predicting Sleep Disruptions

The associations between employment uncertainty and sleep disruptions are shown in the logistic regression models reported in Table 2-7. Again the coefficients are shown in the exponentiated form as odds ratios to aid in their interpretation. Model 1 includes the standard employment status measure, state economic conditions as captured by state-level unemployment rates, and historical time period. Here we see that being interviewed during the recessionary time period and being out of the labor force are significantly related to the odds of experiencing a sleep disruption. The odds of experiencing a sleep disruption is 36% lower in 2008, 57% lower in 2009, and 54% lower in 2010 than before the recession. Though being unemployed is not related to sleep disruptions, respondents who are out of the labor force have 91% greater odds of reporting a sleep disruption on the diary day than do the employed. Model 2 of Table 2-7 includes the more detailed measure of employment status. Being unemployed, regardless of the timing, remains insignificant. I include the more detailed measure of employment status in Model 3 as a means of integrating the duration of being unemployed and for increased comparability between models estimating sleep outcomes.

Model 3 in Table 2-7 includes the socio-demographic characteristics when estimating the odds of experiencing a sleep disruption in addition to employment uncertainty. After controlling for an individual's socio-demographic characteristics the effect of state economic conditions becomes significant at the .05 level. Each percentage

Table 2-7. Logistic Regression Models Predicting Experiencing a Sleep Disruption, ATUS 2003-2010.

	Model 1			Model 2			Model 3		
	OR		SE	OR		SE	OR		SE
Employment uncertainty									
Detailed Employment Status									
Employed (ref.)									
Unemployed - 2 to 5 months				0.49		0.25	0.54		0.28
Unemployed - at ATUS & CPS				1.00		0.27	0.99		0.27
Out of Labor Force				1.91	***	0.18	1.64	***	0.17
State Economic Conditions									
Unemployment Rate	1.05		0.03	1.05		0.03	1.07	*	0.03
Time Period									
2003-2007 (ref.)									
2008	0.64	**	0.09	0.64	**	0.09	0.67	**	0.10
2009	0.43	***	0.08	0.43	***	0.08	0.42	***	0.08
2010	0.46	***	0.09	0.46	***	0.09	0.45	***	0.09
Employment Status									
Employed (ref.)									
Unemployed	0.79		0.19						
Out of Labor Force	1.91	***	0.18						
Constant	0.02	***	0.00	0.02	***	0.00	0.00	***	0.00

Notes: Model 1 N=44,218, Model 2 N=44,218, Model 3 N=42,978. * p<.05, ** p <.01, *** p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are living with a child under 2, race, immigrant status, 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.

point increase in the unemployment rate increases the odds of experiencing a sleep disruption by 7%. The effects of the time period change only slightly (33%, in 2008, 58% in 2009, and 55% in 2010). The effect of being out of the labor force declines in this larger model but continues to be related to increased odds of reporting a sleep disruption (by 64%). Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession did not converge and are therefore not included. Models predicting the logged number of sleep disruptions are also not shown due to their lack of significant findings (shown in Appendix B).

Table 2-8. Logistic Regression Models Predicting Experiencing Sleeplessness, ATUS 2003-2010.

	Model 1			Model 2			Model 3		
	OR		SE	OR		SE	OR		SE
Employment uncertainty									
Detailed Employment Status									
Employed (ref.)									
Unemployed - 2 to 5 months				1.62	*	0.39	1.55		0.39
Unemployed - at ATUS & CPS				1.70	**	0.31	1.60	*	0.31
Out of Labor Force				1.60	***	0.13	1.54	***	0.14
State Economic Conditions									
Unemployment Rate	0.90	***	0.02	0.90	***	0.02	0.91	***	0.02
Time Period									
2003-2007 (ref.)									
2008	1.40	***	0.13	1.40	***	0.13	1.37	**	0.14
2009	2.19	***	0.26	2.19	***	0.26	2.10	***	0.26
2010	1.74	***	0.22	1.74	***	0.22	1.66	***	0.22
Employment Status									
Employed (ref.)									
Unemployed	1.67	***	0.25						
Out of Labor Force	1.60	***	0.13						
Constant	0.06	***	0.01	0.06	***	0.01	0.05	***	0.01

Notes: Model 1 N=42,218, Model 2 N=42,218, Model 3 N=42,978. * p<.05, ** p <.01, *** p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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.

Multivariate Models Predicting Sleeplessness

The associations between employment uncertainty and respondents' reports of sleeplessness are shown in Table 2-8. Model 1 includes the relationships between the standard employment status, state economic conditions as captured by unemployment rates, and historical time period for the odds of reporting sleeplessness. In contrast to the model predicting sleep disruptions, living in states with poor economic conditions (i.e. state-level unemployment rates) is related to lower odds of sleeplessness while being interviewed during a historical time period marked by a recession is related to greater odds. Each additional percentage point of the state-level unemployment rate is related to 10% lower odds of experiencing sleeplessness. The odds of experiencing sleeplessness is greater in 2008, 2009, and 2010 (40%, 118%, 74% respectively) than prior to the Great

Recession. Being unemployed is related to 67% greater odds of sleeplessness while those not in the labor force have 60% greater odds. Model 2 in Table 2-8 includes the more detailed measure of employment status. Being unemployed longer-term (at the CPS and the ATUS) is related to 70% greater odds of reporting sleeplessness the recently unemployed has 62% greater odds.

Model 3 in Table 2-8 includes the socio-demographic characteristics in addition to employment uncertainty. Being unemployed at the CPS and the ATUS, being out of the labor force, living in states with poor economic conditions (i.e. higher state-level unemployment rates), and being interviewed during the recessionary time period continue to be related to reporting sleeplessness while the recently unemployed is no longer significant. Each additional percentage point of the unemployment rate is related to 9% lower odds of sleeplessness while being interviewed in 2008 is related to 37% greater odds of sleeplessness, 110% in 2009, and 66% in 2010. Being unemployed longer-term is related to 60% greater odds of reporting sleeplessness.

Interaction models testing two- and three-way interactions showed significant interactions between being unemployed and being interviewed during the recessionary time period, as well as between living in states with poor economic conditions (i.e. high state-level unemployment rates) and being interviewed during the recession for sleeplessness (full models are available in Appendix C)[21]. Predicted probabilities are calculated for each significant interaction effect to aid in the interpretation of the results (for explanation see Buis 2010). Each of the variables not shown in the figures are held at the mean to calculate the predicted probabilities shown in Figures 2-10 and 2-11. Figure 2-10 illustrates the statistically significant interaction relationships between being unemployed and interviewed during the recession (statistically insignificant relationships are not shown). In general, the recently unemployed (less than 5 months) have a lower probability of reporting sleeplessness in 2008 and 2009 when compared to the employed before the recession. In contrast, the longer-term unemployed before the recession and

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[21] Three-way interactions were not sufficiently informative to be included in this model as only one three-way interaction coefficient was statistically significant.

Figure 2-10. Moderating Effect of Being Unemployed and Year Interviewed on Sleeplessness
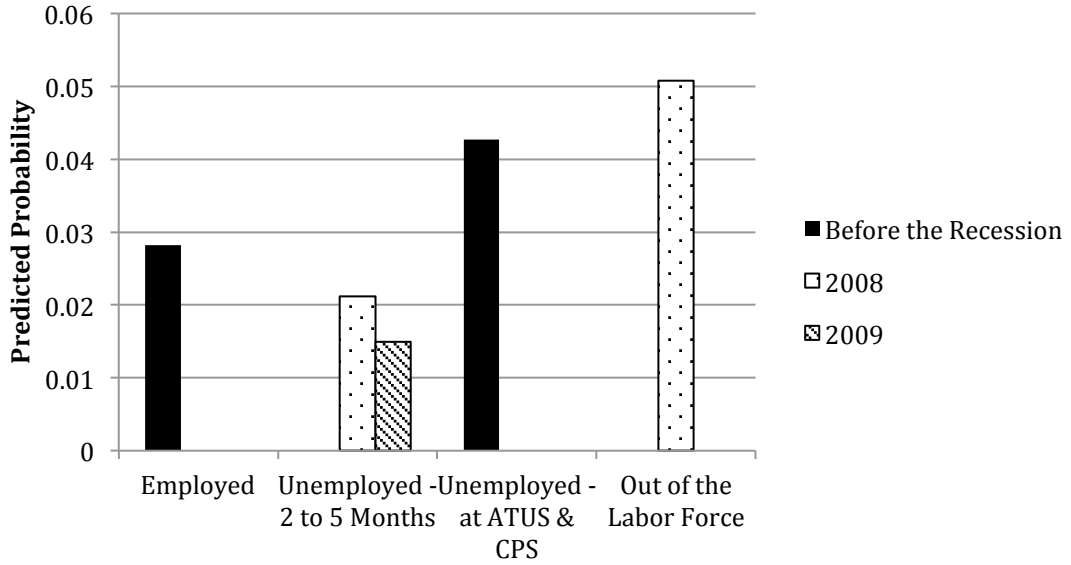
Figure 2-11. Moderating Effect of Unemployment Rate and Year Interviewed on Sleeplessness
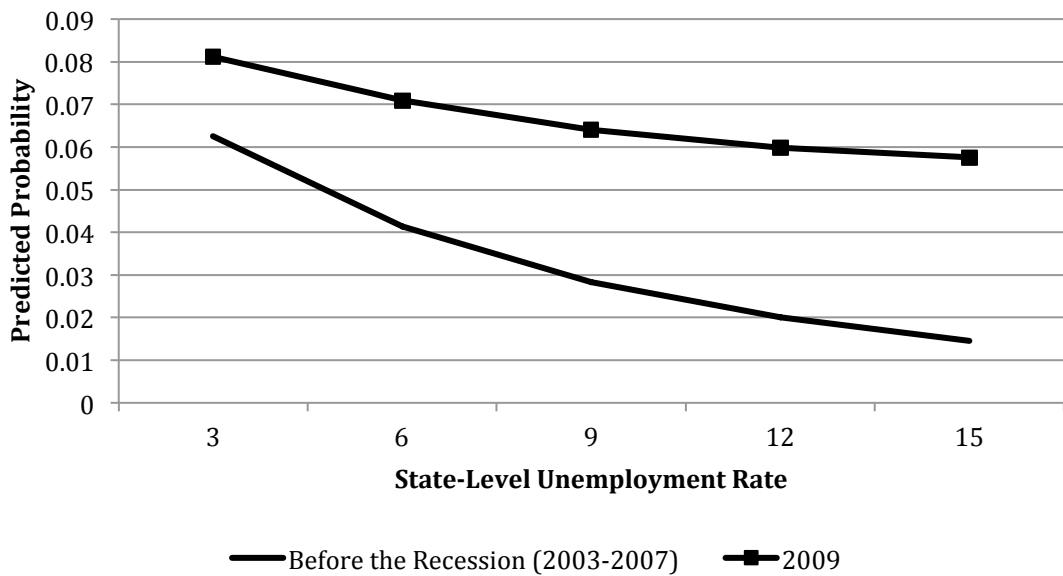
those not in the labor force in 2008 have a greater probability of sleeplessness than the employed before the recession. Figure 2-11 shows the interacting relationships between state economic conditions and the time period. Here we see that before the recession, the probability of reporting sleeplessness is lower in states with high unemployment rates. Though there is a similar pattern in 2009, the downward trend is not as steep and is higher throughout. Such interacting effects show the importance of timing for the effects of recently becoming unemployed and living in states with poor economic conditions.

Multivariate Models Predicting Time Experiencing Sleeplessness

The associations between the logged time spent in sleeplessness and employment uncertainty are shown in Table 2-9. Model 1 in Table 2-9 includes the relationships for standard employment status, state economic conditions (i.e. state-level unemployment rate), and historical time period. Here we see that in states with high unemployment rates, the average time spent in sleeplessness is lower. Though being unemployed is not statistically significantly related to the number of minutes in sleeplessness, being out of the labor force is and is related to greater time in sleeplessness. The historical time period is also related to spending more time in sleeplessness with the effect being largest effect for those interviewed in 2009. Model 2 in Table 2-9 includes the detailed employment status capturing length of time being unemployed. Neither being unemployed in the last 2 to 5 months nor being unemployed longer-term are statistically significant predictors of time in sleeplessness. Again, I include the more detailed measure of employment status in Model 3 to integrate the duration of being unemployed and to maintain comparability between models estimating sleep outcomes.

Model 3 in Table 2-9 includes the socio-demographic characteristics in addition to measures of employment uncertainty. When controlling for the socio-demographic characteristics, the effects of being out of the labor force, living in states with high unemployment rates, and being interviewed during the recession decrease slightly but remain significant. Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession are not informative and are

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Table 2-9. OLS Regression Models Predicting the Logged Time in Sleeplessness, ATUS 2003-2010.

	Model 1			Model 2			Model 3		
	Coef.		SE	Coef.		SE	Coef.		SE
Employment uncertainty									
Detailed Employment Status									
Employed (ref.)									
Unemployed - 2 to 5 Months				0.46		0.30	0.10		0.19
Unemployed - at ATUS & CPS				0.58		0.32	0.11		0.18
Out of Labor Force				0.83	**	0.25	0.43	**	0.15
State Economic Conditions									
Unemployment Rate	-0.15	**	0.06	-0.16	**	0.06	-0.09	**	0.03
Recessionary Time Period									
2003-2007 (ref.)									
2008	0.45	*	0.18	0.47	**	0.18	0.28	*	0.11
2009	1.19	**	0.42	1.22	**	0.42	0.70	**	0.24
2010	0.73	*	0.30	0.75	*	0.30	0.40	*	0.18
Employment Status									
Employed (ref.)									
Unemployed	0.51		0.31						
Out of Labor Force	0.81	**	0.26						
Constant	5.41	***	0.67	5.46	***	0.66	4.32	***	0.35

Notes: Model 1 N=1,816, Model 2 N=1,816, Model 3 N=1,754. * p<.05, ** p <.01, *** p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, region, metropolitan area, season, and predicted probability of Sleeplessness calculated from the models shown in Table 8. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

therefore not shown.

Moderating Effects of Socio-Demographic Characteristics

     As hypothesized, socio-demographic characteristics, including gender, life stage, spouses'/partners' employment status, and education, are expected to influence the effect of the Great Recession and respondents' employment status due to the varying access to resources and the disparate effects of the Great Recession more generally. In order to test for moderating effects of socio-demographic characteristics, each set of models was predicted twice. First, the models included each of the direct effects and two-way interactions between the socio-demographic variable of interest and each of the

employment uncertainty variables[22]. Second, the models included each of the direct effects, two-way interactions, and three-way interactions. A summary table of statistically significant socio-demographic interaction effects is included in Tables 2-10.

Looking at the moderating effects of the socio-demographic characteristics (Table 2-10), there are a few patterns worth exploring including the effects of gender and life stage.[23] Figures 2-12 through 2-14 illustrated the estimated means for the statistically significant effects (tables are included in Appendix D)[24]. Similar to the patterns evident in Table 2-10, gender and life stage moderate the effects of employment uncertainty in interesting ways.

Similar to the patterns found in prior research and as expected in H6a and H6b, gender is an important moderator of the employment uncertainty for sleep outcomes – specifically time in sleeplessness. Figures 2-12 and 2-13 illustrate the moderating effect of gender for the effects of being unemployed and living in states with poor economic conditions. Figure 2-12 shows that women (the striped bars) spend more time in sleeplessness than men who are employed with the greatest amount of time being for women who are recently unemployed (i.e. in the last 2 to 5 months). However, men who are unemployed longer-term (i.e. at ATUS & CPS) or not in the labor force men spend nearly approximately 80 minutes in sleeplessness. This is evidence that the unique social position of being unemployed long-term or out of the labor force for men and is particularly difficult as expected in H6b. Contrary to H6a, Figure 2-13 shows that poor state economic conditions as captured through high unemployment rates may not be more detrimental for women than for men. At the lowest rates of unemployment, women spend more time in sleeplessness than do men on average (67 minutes for women and 41 minutes for men). However, at the highest unemployment rates men spend more time in sleeplessness than do women (12 minutes for men and 8 minutes for women).

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[22] Due to the varying effects of gender by life stage, gender and life stage were both run separately in interaction models as well as together in a gendered life stage model. All models are included in the Appendices.

[23] Few models including three-way interactions converged and those that did were not informative. As such, the three-way interactions are not included in Table 2-10.

[24] Because the effect may simply be an artifact, I do not discuss those models where a small number of variables are significant (depending on the number of variables in a particular model).

Table 2-10. Summary Table of Moderating Effects of Employment Uncertainty on Sleep Outcomes

	Sleeping Less than 7 Hours	Sleeping More than 9 Hours	Sleep Disruption	Logged Number of Sleep Disruptions	Sleepless-ness	Logged Time in Sleepless-ness
Employment uncertainty						
Recent Unemployment*Unemployment Rate						
Unemployed at ATUS & CPS*Unemployment Rate						
Out of Labor Force*Unemployment Rate						
Recent Unemployment*2008					-	
Unemployed at ATUS & CPS*2008						
Out of Labor Force*2008					-	-
Recent Unemployment*2009					-	
Unemployed at ATUS & CPS*2009						
Out of Labor Force*2009						
Recent Unemployment*2010						
Unemployed at ATUS & CPS*2010						
Out of Labor Force*2010						
2008*Unemployment Rate				-		
2009*Unemployment Rate		+			+	
2010*Unemployment Rate						
Gender						
Recent Unemployment*Female				-		+
Unemployed at ATUS & CPS*Female					-	-
Out of the Labor Force*Female			-			-
Unemployment Rate*Female						-
2008*Female			-			

Table 2-10 cont. Summary Table of Moderating Effects

2009*Female					
2010*Female					
Life Stage					
Recent Unemployment*Parent of Child Under 18					-
Recent Unemployment*Over 40 without Children					-
Unemployed at ATUS & CPS*Parent of Child Under 18					
Unemployed at ATUS & CPS*Over 40 without Children					
Out of Labor Force*Parent of Child Under 18	-	-		-	
Out of Labor Force*Over 40 without Children					
Unemployment Rate*Parent of Child Under 18				+	
Unemployment Rate*Over 40 without Children				+	
2008*Parent of Child Under 18					
2008*Over 40 without Children					
2009*Parent of Child Under 18					
2009*Over 40 without Children			+		
2010*Parent of Child Under 18					
2010*Over 40 without Children					
Gendered Life Stage					
Unemployment Rate * Father of Child Under 18					
Unemployment Rate * Men over 40 without Children					
Unemployment Rate * Women under 40 without Children					
Unemployment Rate * Mother of Child Under 18					
Unemployment Rate * Women over 40 without Children					
2008 * Father of Child Under 18					
2008 * Men over 40 without Children					
2008 * Women under 40 without Children					

Table 2-10 cont. Summary Table of Moderating Effects

2008 * Mother of Child Under 18					-
2008 * Women over 40 without Children					
2009 * Father of Child Under 18					
2009 * Men over 40 without Children					
2009 * Women under 40 without Children				+	
2009 * Mother of Child Under 18					
2009 * Women over 40 without Children					
2010 * Father of Child Under 18				+	
2010 * Men over 40 without Children					
2010 * Women under 40 without Children				+	
2010* Mother of Child Under 18					
2010 * Women over 40 without Children					
Recent Unemployment * Father of Child Under 18					
Recent Unemployment * Men over 40 without Children	-				
Recent Unemployment * Women under 40 without Children					+
Recent Unemployment * Mother of Child Under 18					-
Recent Unemployment * Women over 40 without Children					
Unemployed at ATUS & CPS * Father of Child Under 18					
Unemployed at ATUS & CPS * Men over 40 without Children	-				
Unemployed at ATUS & CPS * Women under 40 without Children					-
Unemployed at ATUS & CPS * Mother of Child Under 18			-		
Unemployed at ATUS & CPS * Women over 40 without Children					-
Out of Labor Force * Father of Child Under 18			-		
Out of Labor Force * Men over 40 without Children					+
Out of Labor Force * Women under 40 without Children					
Out of Labor Force * Mother of Child Under 18	-	-			-	-

Table 2-10 cont. Summary Table of Moderating Effects

Out of Labor Force * Women over 40 without Children					
Spouse's Employment Status					
Recent Unemployment*Single					-
Unemployed at ATUS & CPS*Single					
Out of Labor Force*Single					+
Recent Unemployment*Spouse/Partner Employed FTE					
Unemployed at ATUS & CPS*Spouse/Partner Employed FTE					
Out of Labor Force*Spouse/Partner Employed FTE					
Recent Unemployment*Spouse/Partner Employed PTE		+			
Unemployed at ATUS & CPS*Spouse/Partner Employed PTE					-
Out of Labor Force*Spouse/Partner Employed PTE	-	-		-	-
Unemployment Rate*Single					
Unemployment Rate*Spouse/Partner Employed FTE					
Unemployment Rate*Spouse/Partner Employed PTE					
2008*Single		+			
2008*Spouse/Partner Employed FTE			-		+
2008*Spouse/Partner Employed PTE					
2009*Single					
2009*Spouse/Partner Employed FTE				+	
2009*Spouse/Partner Employed PTE					
2010*Single					
2010*Spouse/Partner Employed FTE					
2010*Spouse/Partner Employed PTE					
Education					
Unemployment Rate*High School Degree or Les	-				
Unemployment Rate*Associates Degree					

Table 2-10 cont. Summary Table of Moderating Effects

2008*High School Degree or Less	
2008*Associates Degree	
2009*High School Degree or Less	+
2009*Associates Degree	
2010*High School Degree or Less	
2010*Associates Degree	
Recent Unemployed*High School Degree or Less	
Unemployed at ATUS & CPS*High School Degree or Less	
Out of the Labor Force*High School Degree or Less	+
Recent Unemployed*Associates Degree	+
Unemployed at ATUS & CPS*Associates Degree	
Out of the Labor Force*Associates Degree	

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Figure 2-12. Moderating Effects of Being Unemployed and Gender on Time in Sleeplessness
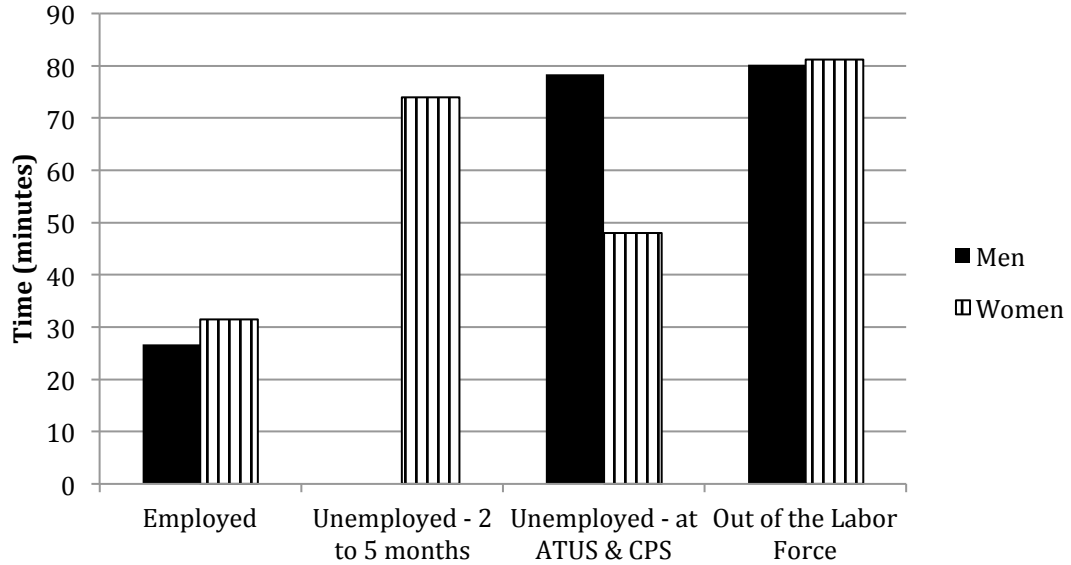
Figure 2-13. Moderating Effects of Unemployment Rate and Gender on Time in Sleeplessness
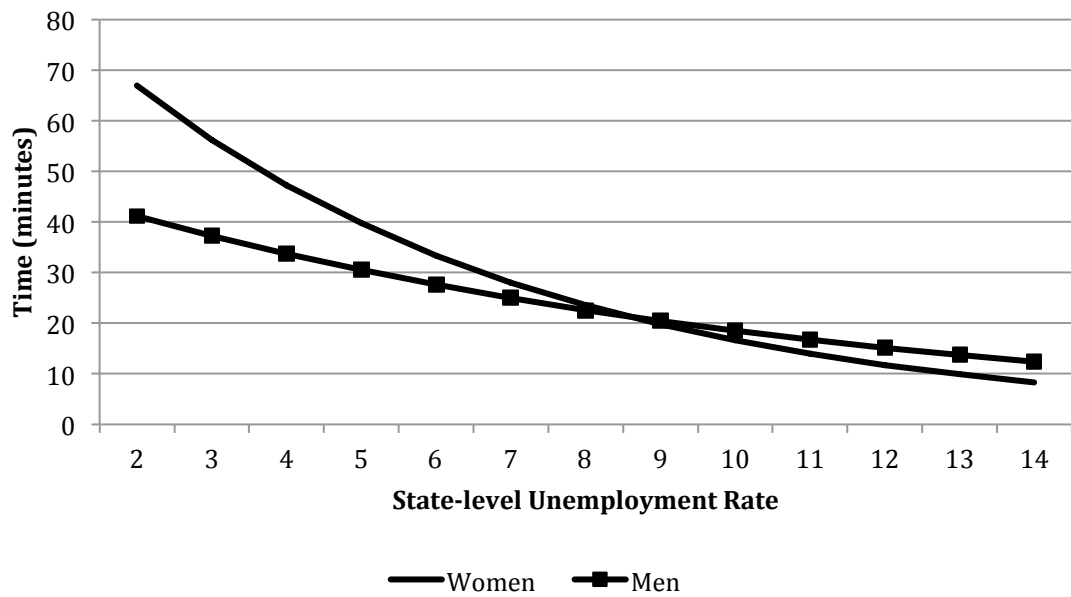
Figure 2-14. Moderating Effect of Life Stage and Unemployment Rate on Time in Sleeplessness
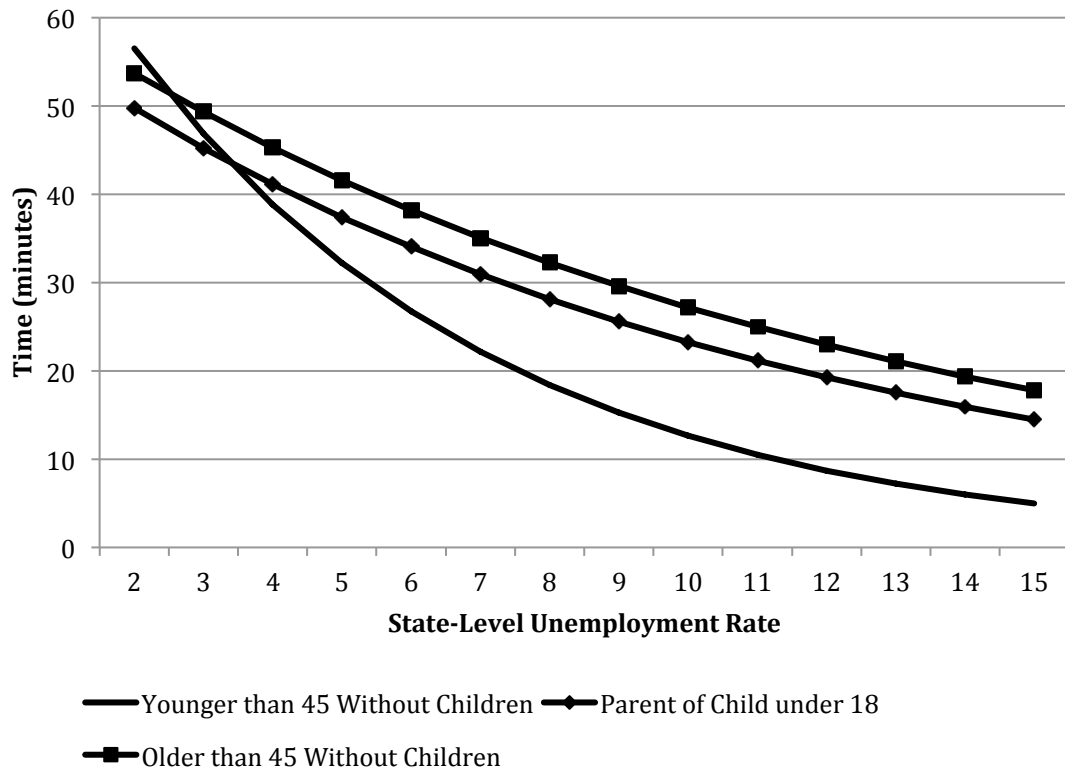
Life stage also moderates the effects of employment uncertainty for time spent in sleeplessness and is illustrated by Figure 2-14. Here we see that though younger respondents without children spend more time in sleeplessness at the lowest rates of unemployment, parents and older respondents without children spend more time in sleeplessness when the unemployment rate is above 4%. These results partially support H7a and H7b as later life stages are related to negative sleep outcomes.

Discussion

Investigating the sleeping patterns of working-aged respondents during the Great Recession, I find that being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession are important

predictors for many if not all of my indicators of sleep. Specifically, I find that state economic conditions as captured by state-level unemployment rates are related to time spent sleeping, odds and time spent in sleeplessness, and odds of a sleep disruption. The state economic conditions do not maintain significance in the models predicting time spent sleeping once the socio-demographic characteristics and controls are included but remains (or becomes, as is the case in the sleep disruption model) significant once these same controls are included in the sleeplessness and sleep disruption models. Contrary to my hypotheses, the direction of the relationships between state economic conditions captured by state-level unemployment rate and sleep outcomes are not consistent and therefore only partially support H1. Higher rates of unemployment are related to increased odds of a sleep disruption as I hypothesized. In contrast, higher rates of unemployment are related to lower odds and less time in sleeplessness as well as a lower risk of sleeping less than 7 hours. These results point to the possibility that sleep disruptions and sleeplessness reflect different indicators of health.

The historical time period is less consistently related to sleep patterns in the United States. Each year of the historical time period marked by Great Recession is related to an increase in the odds of and time spent in sleeplessness but is related to a decrease in the odds of reporting a sleep disruption[25]. Only the coefficient for 2009 was significant in the model predicting sleep time after each of the socio-demographic characteristics and controls were included. Across the sleep models, the largest effect was evident for 2009 in comparison to the other recessionary years potentially demonstrating the "peak" of the health effects related to the Great Recession. Similar to the relationships between state economic conditions and sleep outcomes mentioned above, the direction of the relationships between the historical time period and my sleep outcomes was not consistent and, therefore, my results only partially support H2. Being interviewed during the Great Recession was related to increased odds and time spent in sleeplessness as well as increased risk of sleeping more than 9 hours while being interviewed during these

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[25] Time spent sleeping is not related to the recessionary time period even in the models limited to that variable. However, time spent sleeping is significantly different across years in the bivariate analyses shown in Table 2-3.

same years were related to decreased odds of a sleep disruption. Again, these results raise the possibility that sleep disruptions represent an alternative aspect of sleep behaviors than sleeplessness and time spent sleeping, which may be differentially related to changes in employment uncertainty.

Being unemployed (both recently and longer-term) and out of the labor force increases the relative risk of sleeping more than 9 hours and increases the odds of sleeplessness while being unemployed is not related to the odds of a sleep disruption or the time spent in sleeplessness. These relationships hold even after I include the socio-demographic characteristics and the other control variables (with the exception of being unemployed between 2 and 5 months for the predicted odds of sleeplessness). These results partially support H3.

Next, I investigate the interacting effects of employment uncertainty. Overall, I found few significant relationships. Becoming unemployed in the 2 to 5 months prior to participating in the ATUS and being interviewed during the recessionary years of 2008 and 2009 were related to lower probabilities of reporting sleeplessness than the employed before the recession. In contrast, the declining probability of reporting sleeplessness had a smaller slope in 2009 than did the probability before the recession. These results are partial evidence for H5 and H6. However, these relationships were not found in the models predicting a sleep disruption or time spent sleeping. Moreover, only two-way interactions were evident in my models, potentially due to the relatively small number of cases reporting sleeplessness and sleep disruptions.

Finally, I examined the moderating effects of gender, life stage, spouses'/partners' employment status, and education for the relationships between the employment uncertainty and sleep behaviors. Again, I found only partial support for my hypotheses proposing moderating relationships between the socio-demographic characteristics and employment uncertainty for sleep outcomes. I find some evidence supporting H6b showing that men who are not working spend more time in sleeplessness than women who are unemployed and men who are employed. However, I found contradictory evidence to H6a. That is, women in states with the poorest economic conditions (i.e.

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highest unemployment rates) spend less time in sleeplessness than do men. I find evidence partially supporting H7a and H7b. Parents of children under 18 and respondents who are older than 45 without children and recently unemployed spend more time in sleeplessness while living in states with poor economic conditions. Lastly, I find no evidence in this analysis for H8 and H9 which predict that the relationships between employment uncertainty and sleep will be moderated by spouses'/partners' employment status or education. Even though I find some evidence to support my hypotheses, these relationships were only evident in some of the interaction models and were not found in the models predicting the amount of time spent sleeping, the odds of reporting sleeplessness, or the odds of reporting a sleep disruption.

Conclusion

In some respects the sleeping patterns of the U.S. working-age population during the Great Recession or living in states with poor economic conditions are better than in stronger economies before the recession or in other states. The odds of reporting a sleep disruption was lower during the recession and each percentage point increase in the state-level unemployment rate was associated with a reduction in the odds and time spent in sleeplessness. These results are in line with some of the more recent literature on the economy and physical health (Ruhm 2003, 2007), which finds that with high unemployment rates and recessions come improvements in the physical health of the population. Yet, in contrast to these findings, unemployed working-aged respondents and those not in the labor force are more likely to sleep more than the recommended 7 to 9 hours and more likely to report sleeplessness. Those interviewed during the recession are more likely to sleep more than 9 hours and report sleeplessness as well as spend more time in sleeplessness than those interviewed before the recession. Lastly, living in states with poor economic conditions (i.e. greater unemployment rates) is related to increased odds of reporting a sleep disruption. Overall, a struggling economic environment appears to be related to more negative sleep outcomes for the U.S. population.

The combined effect of being unemployed, living in states with poor economic conditions, and being interviewed during a time period marked by a recession illustrates

how the experience of an economic recession varies based on multiple aspects of employment uncertainty. In particular, the lower probability of sleeplessness for the unemployed during the recession is evidence that individuals assess their position in the job market based on the broader economic climate (as shown by Wheaton 1978). If the broader economic climate is poor, someone who is unemployed is less likely to lose sleep over his/her situation. However, the relationship between state economic conditions as captured by the unemployment rate and historical time period is different. Though, living in states with poor economic conditions reduces the probability of sleeplessness generally, the effect is not as strong for those interviewed in 2009 as it is for those interviewed before the recession. This pattern may instead reflect the difficulty of living in a state with high unemployment during a year in which it is uncertain when or how things may improve.

Finally, socio-demographic characteristics moderated these relationships, including gender and life stage. Gender appears to moderate the effect of employment status in ways consistent with the prior literature regarding gender and norms about working. Yet, women's sleep patterns are not influenced during the Great Recession as expected. Women fare better than men despite their disadvantaged position in the labor market. Life stage moderates the relationship between the employment uncertainty and sleep outcomes partially in line with prior research. That is, older respondents without children and parents spend more time in sleeplessness as state economic conditions worsen than do the younger respondents without children.

These results highlight the importance of understanding and integrating the examination of multiple levels of exposure to employment uncertainty. The Great Recession is more than simply a reflection of unemployment rates tied to a particular location or time period. Instead it is reflected in the various levels of exposure from the proximal experience of being unemployed to the distal assessment of the national economic environment discussed in media and social networks. Media and modes of social networking distribute information regarding the current economic climate regardless of local boundaries and, as such, influence individuals more widely. As people

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are continually reminded of the stagnant (or declining) economy their assessment of their own priorities and subsequent decisions will likely change. For example, the odds of reporting sleeplessness increased in 2008 and again in 2009 but declined in 2010. This trend may show that stress due to the recession peaked in 2009 and began to recede when the general populace realized that it would continue to move forward even with a weaker than expected economy. Moreover, how people experience the recession and being unemployed are related. Becoming unemployed is experienced differently when media coverage and general conversations highlight the stagnant versus growing economy. Studies examining the effects of one or the other fail to consider this nuance and simplify a complex interaction. For example, being unemployed when unemployment is commonplace is less stressful than being unemployed when everyone around you is employed. As such, it is problematic to generalize research that focuses on the effects of unemployment rates during a period of relative prosperity or on the unemployed during a recession to circumstances that are not similarly situated. Instead, research must consider the constellation of characteristics that reflect employment uncertainty.

This study is an important contribution to the understanding of the effects of being unemployed, the state economic conditions, and historical time period. Few studies are able to examine the impact of economic changes on sleep patterns. The availability and timing of the American Time Use Survey makes such analyses possible. However, these analyses have limitations. First and most importantly, it is not possible to ascertain change using these data. The continual fielding of the ATUS allows for pooled cross-sectional analyses but it is impossible to know how individuals change their behaviors across time or economic context. Despite this limitation, I am not aware of any longitudinal studies that can look at health behaviors across time with such detail and with time diary data. Second, these analyses do not account for selection into different employment statuses, which may be particularly important during an economic downturn like the Great Recession. That is, it is possible that the selection process to become unemployed changes during the recession and influence my results. Future research will need to examine this before results can be generalized to the larger unemployed

population. Third, though time diary data has been found to be a more accurate measure than typical stylized time use measures, the ATUS is a self-reported diary and it is therefore possible that individuals' are subject to bias or inaccurate recall. In particular, some measures, such as sleep disruptions, maybe more easily omitted from a diary if respondents believe it to be inconsequential or short-lived. Lastly, time spent sleeping, sleeplessness, and sleep disruptions can only be captured on a single diary day. It is impossible to determine from these data how such measures of sleep are related to health outcomes concretely or how these behaviors vary across a respondent's week, month, or year.

Despite such limitations, these findings demonstrate the importance of the employment uncertainty and being unemployed for the health of the US population as well as illustrate the importance of extending the knowledge on this topic. It is intriguing that declines in the national economy are related to some negative indications of physical health as well as some positive indications. However, future research should investigate why this is the case and what long-term implications sleep patterns may have. For example, what role does the workplace have in recreating these sleep patterns if any? That is, does the uncertainty of one's current employment potentially caused by economic declines more generally lead to poor sleep behaviors? Or is it peripheral behavioral changes (e.g. changing commuting patterns, decreased eating outside the home, etc.) that play an important role in sleep patterns during recessions and after becoming unemployed? Moreover, long-term longitudinal analyses will need to examine the persistence of such findings. Does being unemployed, living in states with poor economic conditions, or being interviewed during the historical time period marked by the Great Recession have long-term health implications that policy makers and scholars have yet to identify? Armed with such knowledge, scholars and policy makers may be better able to address changes in health during periods of economic bust as well as boom.

Chapter 3: More Time for My Self? The Impact of the "Great Recession" and Unemployment for Time Spent in Healthy Behaviors

Introduction

The "Great Recession" (beginning in 2008 and lasting through June of 2009 as well as the continued stalled economy through to the present [July of 2012]) and its potential impacts on communities, families, and individuals have garnered a great deal of attention in the popular and scholarly media (Aguiar et al. 2011; Eckholm 2010; Hurd and Rohwedder 2010; Morrill and Pabilonia 2011; Rampell 2010). 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 (e.g. 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[26] from the American Time Use Survey (ATUS) from 2003 to 2010 who completed weekday time diaries. In the following investigation of time

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[26] 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.

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, 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 et al. 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 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; Charles and DeCicca 2008; Colman and

Dave 2011; Edwards 2011; Fagin and Little 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 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; Charles and DeCicca 2008; Colman and Dave 2011; Fagin and Little 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? Lastly, are these relationships moderated by gender, life stage, spouses' or partners' employment status, or education?

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 effort 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.

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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; Charles and DeCicca 2008; Colman and Dave 2011; Edwards 2011; Fagin and Little 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

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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 (Hurd and Rohwedder 2010; Aguiar et al. 2011). 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 (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 because care is provided in emergency rooms rather than being preventative care) 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 (see Table 3-1 for full list of hypotheses):

> *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 (Charles and DeCicca 2008; 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

Table 3-1. Hypotheses

Employment uncertainty

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.

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.

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 Influence of Multiple Experiences of Employment uncertainty

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).

Moderating Influence of Socio-demographic Characteristics

H5a   Women during the Great Recession (i.e. high rates of unemployment and the recessionary time period) will report worse health behaviors than men (less exercise, active travel, health-related self-care, and breakfast).

H5b   Men who are not working (unemployed or not in the labor force) will report worse health behaviors than women who are not working (less exercise, active travel, health-related self-care, and breakfast).

H6a   Parents who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession will report worse health behaviors compared to similarly situated younger respondents without children.

H6b   Older respondents who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession who do not have children in the home will report better health behaviors compared to similarly situated younger respondents without children.

Table 3-1 cont. Hypotheses

H7	Respondents who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession who have employed spouses will report better health behaviors compared to similarly situated respondents with spouses not in the labor force or those who are single.
H8	Respondents with lower levels of education who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession will report worse health behaviors compared to similarly situated respondents with a college degree.

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. Charles and DeCicca 2008; 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, several scholars have investigated the effects of actually being unemployed for health and healthy behaviors (Catalano and Dooley 1983; Fagin and Little 1984; Linn et al. 1985; McKee-Ryan et al. 2005; Strully 2009). Despite the similar research questions, findings are mixed. Research from the 1970's and 1980's primarily finds that the unemployed experience worse health outcomes (e.g. Catalano and Dooley 1983; Fagin and Little 1984; Linn et al. 1985) while more recent research is more mixed (e.g. McKee-Ryan et al. 2005; Strully 2009).

Fagin and Little (1984) investigated the effects of being unemployed for the male breadwinner in a longitudinal study of unemployment in English families in the 1970s. The authors interviewed 22 couples where the male breadwinner was unemployed and found significant physical and mental health effects for the entire family, with the stigma of unemployment connected to future health problems. Drawing on longitudinal data from the late 1970s, Catalano and Dooley (1983) arrived at similar conclusions in their investigation of the relationships between economic instability and health outcomes. The authors found that negative job and financial events (such as losing one's job or having a home foreclosed) were related to increased odds of illness or injury. While much of this earlier research does not examine specific health behaviors, 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. Though the authors found that the unemployed increased visits with a physician, it is unclear if this is due to the unique population studied – veterans using Veterans Administration health services – or if this is a reflection of the effects of being unemployed for the broader population.

More recent research has continued to investigate the effects of being unemployed for health and health behaviors. Examining the 1999, 2001, and 2003 waves of the Panel Study of Income Dynamics, Strully (2009) investigates the effects of becoming

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unemployed for health outcomes, specifically self-reported health and health conditions. After controlling for prior health, the authors find that being unemployed is related to increased odds of being in only fair or poor health. Similarly, McKee-Ryan and colleagues (2005) performed a meta-analysis of prior studies 1887 to 2002 (from primarily psychology journals) comparing the effects of being unemployed, becoming reemployed, and becoming unemployed and find a statistically significant negative relationship between self-reported health and being unemployed in cross-sectional studies. However, this was not confirmed in longitudinal studies of those who lost their jobs during the study period.

One study investigating the effects of being unemployed on engaging in health behaviors 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).

Moderating Effects of Socio-Demographic Characteristics

The challenges associated with the Great Recession and being unemployed are not uniformly distributed across the population. Rather, experiences of employment uncertainty are influenced by access to resources and supports. In particular, gender, life stage, spouses' or partners' employment status, and education are expected to moderate the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession.

Gender

Gender is an important moderator of how individuals allocate their time due to the gendered expectations surrounding work, family, and home (Hays 1996; Moen and Roehling 2005; Townsend 2002; Williams 2000), and research on exercise and active travel support assumptions about gendered time use. Specifically, research drawing on time diary data and other national surveys have shown that women are less likely to engage and spend less time in leisure time physical activity (Caspersen, Pereira, and Curran 2000; Le Masurier et al. 2008; Nomaguchi and Bianchi 2004; Russell, Ibuka, and Abraham 2007; Saffer, Dave, and Grossman 2011; T. Stephens, Jacobs Jr, and C. C. White 1985; Trost et al. 2002) and active travel (Kruger et al. 2008; Saffer et al. 2011). Though there is some evidence that women spend more time in walking for leisure (Kruger et al. 2008), there is a clear gender difference in physical activity that does not appear to be easily explained by competing work and family demands experienced by women and mothers (Nomaguchi and Bianchi 2004).

In contrast to the negative relationship between gender and physical activity, health-related self-care activities and breakfast is not as clearly related to gender. Though, women are more likely to engage in self-care health activities (Jonas et al. 2011; Russell et al. 2007) and to receive medical care (Russell et al. 2007), men spend more time in care than do women (Russell et al. 2007). In addition, eating breakfast does not appear to be related to gender (Haines, Guilkey, and Popkin 1996; Schone and Weinick 1998).

Though it could be argued that the greater normative pressure for men to be the primary breadwinner (Hays 1996; Townsend 2002) would result in differing health

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behaviors for men and women who are exposed to economic downturns, the results have been mixed. Some studies have found that women with higher insecurity use more medical services (Ferrie 2001) or don't reduce their time spent in exercise (Edwards 2011) while others have found that men spend more time in medical care as work hours decrease with the Great Recession (Aguiar et al. 2011) and women are less likely to be active as unemployment rates increase (Ruhm 2005). However, it is possible that the mixed results are a product of the vast differences in methods and measurements of such studies. In light of such inconsistencies, I rely on gendered assumptions regarding work and family life and expect the following:

> *H5a:* Women during the Great Recession (i.e. high rates of unemployment and the recessionary time period) will report worse health behaviors than men (less exercise, active travel, health-related self-care, and breakfast).

> *H5b:* Men who are not working (unemployed or not in the labor force) will report worse health behaviors than women who are not working (less exercise, active travel, health-related self-care, and breakfast).

Life Stage

Life stage moderates how individuals are able to spend their time in part due to the responsibilities of family, different roles for younger versus older adults, and changing health that comes with age. In particular, caring for children is a key determinant of time for parents while older adults may be caring for aging parents or grandchildren. Prior research on the importance of life stage for healthy behaviors has found that parents spend less time in exercise (or those in the middle ages who are more likely to be parents) (Caspersen et al. 2000; Nomaguchi and Bianchi 2004; Schone and Weinick 1998; Trost et al. 2002) while parents are more likely to spend time in active travel than non-parents (Saffer et al. 2011). Similarly, younger individuals spend more time in exercise (Nomaguchi and Bianchi 2004; Russell et al. 2007; Saffer et al. 2011; T. Stephens et al. 1985; Trost et al. 2002) and more time in active travel (Kruger et al. 2008; Le Masurier et al. 2008; Saffer et al. 2011) while older men are more likely to walk for

leisure (Kruger et al. 2008; Le Masurier et al. 2008). Older individuals have also been shown to be more likely to engage in health care activities (Jonas et al. 2011; Russell et al. 2007) though those in the middle ages actually spend more time in health care activities (Russell et al. 2007). Older individuals have been shown to be more likely to eat breakfast (Haines et al. 1996). Breakfast may be more difficult when getting children ready for the daily activities and, as such, those with larger families (i.e. children) are less likely to eat breakfast (Schone and Weinick 1998).

Much less is known about how life stage may moderate the effects of employment uncertainty for time spent in healthy behaviors. Contrary to the findings mentioned above, research investigating the effects of employment uncertainty show that older individuals report better health than younger individuals. Strully (2009) finds that those under the age of 50 report worse health compared to older individuals while Catalano and Dooley (1983) found that older individuals are less likely to report illness or injury. It is possible that after controlling for the effects of employment uncertainty, older individuals who are still employed have better health behaviors. In light of these findings I expect the following:

> *H6a:* Parents who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession will report worse health behaviors compared to similarly situated younger respondents without children.

> *H6b:* Older respondents who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession who do not have children in the home will report better health behaviors compared to similarly situated younger respondents without children.

Spouses'/partners' Employment Status

A spouses'/partners' employment status is a potentially important moderator of the relationship between employment uncertainty and health behaviors because of the availability (or lack) of additional family resources to draw upon. Having a spouse or

partner who is employed may ease the stress of losing ones' job or fear of it and therefore result in fewer negative health behaviors. Prior research investigating health behaviors regardless of employment uncertainty finds mixed results. Some research shows that it is not marital status but rather it is gender that is important for time spent in physical activity (Nomaguchi and Bianchi 2004). Others find that married individuals engage in less exercise (Saffer et al. 2011; Trost et al. 2002) as well as less active travel (Saffer et al. 2011). There is some evidence that married individuals may be more likely to eat breakfast (Schone and Weinick 1998) while no difference was found in a study of health-related self-care by marital status (Jonas et al. 2011). Unfortunately, prior research has not considered the employment status of the spouse or partner or how access to other household members' resources may moderate the effect of employment uncertainty for time spent in healthy behaviors. However, it is reasonable to argue that those with access to greater resources (i.e. those with employed spouses) will fare better in terms of health behaviors even though married individuals in general may be less likely to exercise. Based on this, I expect the following:

> *H7:* Respondents who are unemployed, living in states with poor economic conditions, and/or being interviewed during the Great Recession who have employed spouses will report better health behaviors compared to similarly situated respondents with spouses not in the labor force or those who are single.

Education

Finally, education is expected to moderate the effects of employment uncertainty for time spent in healthy behaviors because of the disproportional disadvantage experienced by those with lower levels of education. Prior research investigating patterns of health behaviors support the hypothesized educational gradient. In particular, those with higher levels of education engage in more physical activity (Mullahy and Robert 2008; Nomaguchi and Bianchi 2004; Plotnikoff et al. 2004; Saffer et al. 2011; T. Stephens et al. 1985; Trost et al. 2002) including walking for leisure (Kruger et al. 2008; Le Masurier et al. 2008) and those with lower levels of education are more likely to stop

exercising over time. Some scholars find that those with less education are more likely to walk for transportation potentially due to reduced financial resources for other means of transportation (Le Masurier et al. 2008) while others find that those with higher levels of education are more likely to walk for transportation (Ball et al. 2007; Droomers, Schrijvers, and Mackenbach 2001; Saffer et al. 2011). Individuals with more education are also less likely to engage in health-related self-care (Jonas et al. 2011), which may reflect a lower prevalence of chronic disease rather than a lack of health management. There are some mixed results as well. Some scholars find that there is no difference in the likelihood of eating breakfast (Haines et al. 1996) while others find that those with higher levels of education are more likely to eat breakfast (Schone and Weinick 1998).

Though there are some contradictory findings, research that investigates the effects of employment uncertainty for healthy behaviors also finds that those with lower levels of education engage in healthy behaviors less often. Specifically, Strully (2009) finds that those with more education are less likely to have poor health in her investigation of the effects of job loss on health. Ruhm (2005) finds that those with less education are less likely to be physically active in his investigation of unemployment rates for being physically active. Lastly, Colman and Dave (2011) find that men with less than a college degree spend less time in exercise as the unemployment rate increases. In contrast, Charles and DeCicca (2008) find no significant effect of education in the likelihood of engaging in exercise. Despite this last contradictory finding, I argue that education moderates the effects of employment uncertainty for healthy behaviors. Specifically, I expect the following:

> *H8:* Respondents with lower levels of education who are unemployed, living in
> states with poor economic conditions, and/or being interviewed during the
> Great Recession will report worse health behaviors compared to similarly
> situated respondents with a college degree.

In light of the limitations of prior research and the unique characteristics of the Great Recession, I draw on the American Time Use Survey (ATUS) to investigate the effects of being unemployed, living in states with poor economic conditions, being

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interviewed during a historical time period marked by a recession, and their combined effects on the amount of time spent in healthy behaviors. By drawing on the unique data available in the ATUS, I am able to extend prior research on healthy behaviors as well as investigate the effects of a unique but potentially important indicator of future economic conditions for healthy behaviors. Specifically, I use pooled cross-sectional analyses of the ATUS data from 2003 to 2010 to compare the time spent in healthy behaviors by actually being unemployed, living in states with poor economic conditions (as captured by the unemployment rate), and being interviewed during a historical time period marked by an economic recession.

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[27] whose diary days are Monday through Friday. Diary days are limited to weekdays in order to focus on the impact of the meaning of work, which for most people occurs on weekdays (U.S. Bureau of Labor Statistics 2012b), for time spent in healthy behaviors. In addition, the availability of businesses and services differ between weekdays and weekends and as such complicate combining analyses between weekend and weekday diaries.[28]

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[27] 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.

[28] Exploratory analyses of healthy behaviors on weekend days confirm different patterns that should be investigated in future research.

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. Respondents are asked what activity they engaged in, how long they spent doing this activity (down to the minute), who they were with, if they provided secondary childcare during this activity, 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[29] when attempting to measure time use (Juster and Stafford 1985; Juster et al. 2003; J. P. Robinson 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). 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 and households are selected for participation using the Census Bureau's listing operation (U.S. Bureau of Labor Statistics 2006). The CPS sample is a stratified multi-stage cluster sample. The ATUS sampling strategy maintains these characteristics but eliminates the oversampling within smaller states and makes residents across states equally likely to be selected (U.S. Bureau of Labor Statistics 2009). CPS is a longitudinal design where households are included in the sample for four months, are excluded from the sample for eight months, and complete another four months in the CPS before they are eligible to participate in the ATUS. Due in part to the prior time commitment to participate in the CPS, the ATUS response rate is lower than other nationally representative surveys[30] (U.S. Bureau of Labor Statistics 2009). Sample weights assure the final sample is nationally representative after accounting for oversampling of

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[29] Survey questions that ask respondents the total time spent engaged in an activity during a set time period.
[30] The response rate ranged between 52.5% in 2007 to 56.6% in 2005 (U.S. Bureau of Labor Statistics 2009).

minority groups, households with children, and the number of adults per household; differing response rates by demographic group; and the oversampling of weekend days in comparison to weekdays. 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).

In addition to nonresponse, missing values on household and demographic variables are imputed in the same manner as the CPS in order to maintain consistency between the two datasets (U.S. Bureau of Labor Statistics 2009).[31] Labor force participation edits are based on relational imputation and hot-deck. Demographic characteristics like age, sex, and household relationships are edited to ensure consistency and hot-deck allocations are used in the editing process. Race, marital status, Hispanic origin, and educational attainment are not updated during the ATUS to reduce respondent burden and as such are missing in the ATUS if they are missing in the CPS. Missing values on ATUS specific variables like records with fewer than 5 activities in a 24 hour period or activities that cover fewer than 21 hours in the 24 hour period are dropped from the public dataset.[32] "Who" and "where" codes that are inappropriately linked to activities (such as sleeping) are stripped from cases. "Where" codes that are missing are imputed using a set of rules defined by the survey administrators. Spouses'/partners' employment status is allocated based on prior longitudinal information or imputation based on the age of the spouse when unavailable.

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

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[31] All cases of imputation or data editing are performed by the U.S. Bureau of Labor Statistics before the data is released publically.

[32] This is a small percentage of the full ATUS dataset (2.8%) but it is not clear how many of these individuals would have been included in my analytic sample because age is stripped from these non-respondents. Though there may be concerns that the most engaged would be most likely to be excluded from the dataset due to difficulty contacting them, prior research instead finds that those individuals who are weakly connected to their communities are least likely to be included because they are less likely to be contacted (Abraham et al. 2006).

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 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.[33] 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 Appendix F.) Regardless of the type of exercise, the duration of all

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[33] 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.

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. Transportation is captured as the primary activity while the means of transport is captured in place of where an activity occurred. 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 Appendix F. 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 2-1 (see page 39) 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

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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.[34]

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 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.

Measures of Socio-Demographic Characteristics

As was described above, socio-demographic characteristics are expected to moderate the relationships between being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession for time spent in healthy behaviors. Measures of socio-demographic characteristics in this analysis include gender, life stage, spouses'/partners' employment status, and education. Gender is measured as a dichotomous variable where men are the reference group. Life stage captures both age and parental status. Respondents are categorized into three groups including those who are 45 or younger without children,

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[34] 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.

parents of children under the age of 18, and respondents older than 45 without children in the home. Respondents who are younger than 45 without children are the reference group. Spouses'/partners' employment status captures both the presence of a spouse or partner in the household and their participation in the labor force. This measure aims to investigate the additional resources another adult with earning potential may provide for the household. Respondents are grouped into four categories including respondents without spouses or partners in the home, respondents whose spouses are employed full-time, respondents whose spouses are employed part-time, and respondents whose spouses are not working (reference group). Education is divided into three groups including respondents with a high school degree or less, respondents with some college or an associate's degree, and respondents with a college degree or higher. Respondents with a college degree or higher 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. Comparisons of rare events (see Appendix G on time spent with family members) demonstrate the importance of adequately accounting for the large number of respondents that spend no time in the activity of interest as well as the different reasons for reporting no time on a given day. In light of this prior work, 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"[35] 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

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[35] This is the opposite of the more traditionally used logistic regression.

marginal effects to predict the amount of time spent in a given activity in minutes for the second part of the equation[36].

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 where the results changed in a notable manner, I excluded the cases from the analysis.[37] The models predicting time spent in exercise and active travel had influential cases that were eventually dropped from the analysis.[38]

In order to investigate differences in healthy behaviors, I begin by examining the bivariate differences in health behaviors by measures of employment uncertainty including detailed employment status, state-level unemployment rates, and historical time period when the survey was collected. Next, I use multivariate methods to examine associations across the traditional measure of employment status with state economic conditions captured by the unemployment rate and historical time period. Next, I add the detailed employment status with state economic conditions and historical time period to see if the detailed measure adds or detracts from the analysis. Then, I include each of the measures of employment uncertainty with the socio-demographic characteristics (i.e. gender, life stage, spouses'/partners' employment status, and education) to predict healthy behaviors. Controls included in this model that are not shown in the tables or the discussion are race, immigrant status, metropolitan status, region, season, and holiday. Next, interactions between being unemployed, state economic conditions (as captured by

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[36] 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.
[37] 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.
[38] Four cases were dropped from the exercise model and nine cases were dropped from the active travel model.

unemployment rates), and historical time period when the survey was collected are 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). Lastly, interactions between each measure of employment uncertainty (i.e. being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession) and the socio-demographic measures (i.e. gender, life stage, spouses'/partners' employment status, and education) are tested in each model first as two-way interactions and then as three-way interactions including each of the main and interaction effects. Only significant interactions are described in the results.

Results

Table 3-2 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-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.

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Table 3-2. 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

Note: Estimates are weighted using the wt06 variable.

Table 3-2 cont. Descriptive Statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
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
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

Note: Estimates are weighted using the wt06 variable.

Table 3-2 cont. Descriptive Statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
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.

Bivariate Results

  Bivariate distributions of exercise, active travel, health-related self-care, and eating breakfast across the indicators of employment uncertainty are shown in Tables 3-3, 3-4 and 3-5. Differences in health behaviors for the unemployed compared to the employed are shown in Table 3-3. Time spent in active travel varies for the employed in comparison to the unemployed. Employed respondents are least likely to engage in engage in active travel whereas a larger percentage of recently unemployed (in the last two to five months), long-term unemployed, and those not in the labor force travel on foot or by bike on the diary day (13% in comparison to 18%, 23%, and 18% respectively). Respondents who are recently or longer-term unemployed spend more time in active travel than the employed (8 and 10 minutes respectively versus 3 minutes for the employed). Estimating the weekly average helps illustrate this difference as the unemployed spend 39 minutes and 49 minutes in active travel while the employed spend approximately 15 minutes across the weekdays. Those respondents who are not in the labor force spend more time in active travel than the employed (6 minutes versus 3 minutes) but less than the long-term unemployed. Health-related self-care is most common and occupies the most time for those not in the labor force (17% of those not in the labor force engage in health-related self-care and they spend 18 minutes on average) compared to the employed (5% and 5 minutes) and the unemployed (5% and 4 minutes for the recently unemployed; 8% and 6 minutes for the long-term unemployed). Eating breakfast is also more common for those not in the labor force than it is for the employed (47% versus 44%). Exercise is similarly reported across the detailed employment status measure and is not statistically significantly different.

  Table 3-4 shows the distribution of healthy behaviors across state economic conditions. In order to assess these differences, I constructed three groups of respondents based on unemployment rates: (1) respondents whose state-level unemployment rates are more than one standard deviation below the average unemployment rate are referred to as living in low unemployment states, (2) respondents whose state-level unemployment rates are within one standard deviation of the average unemployment rate are referred to

Table 3-3. Bivariate Relationships between Health Behaviors and Employment Status, ATUS 2003-2010.

	Employed[a]			Unemployed - 2 to 5 months[b]			Unemployed - at ATUS & CPS[c]			Out of the Labor Force[d]		
	Rate	SE		Rate	SE		Rate	SE		Rate	SE	
Exercising												
% Spending Time Exercising	15.94%	0.003		15.95%	0.018		16.30%	0.016		16.45%	0.006	
Time Spent Exercising (min)	11.64	0.282		14.48	2.085		14.54	1.782		13.13	0.754	
Time Spent in Active Travel												
% Spending Time in Active Travel	12.67%	0.003	bcd	17.71%	0.020	ac	23.02%	0.018	abd	17.51%	0.007	ac
Time Spent in Active Travel (min)	3.08	0.116	bcd	7.80	1.605	a	9.87	1.390	ad	5.97	0.435	ac
Time Spent in Health-Related Self-Care												
% Spending in Health-Related Care	5.31%	0.002	cd	5.48%	0.010	d	7.66%	0.010	ad	16.93%	0.006	abc
Time Spent in Health-Related Care (min)	4.63	0.315	d	3.98	1.157	d	6.47	1.208	d	18.35	1.399	abc
Eating Breakfast	43.64%	0.004	d	44.89%	0.026		45.16%	0.020		46.73%	0.009	a

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table 3-4. Bivariate Relationships between Health Behaviors and Rolling Average of Unemployment Rate, ATUS 2003-2010.

	Low Unemployment (> 1 St. Dev. below than the Mean)[a]			Average Unemployment (Within One St. Dev. of the Mean)[b]			High Unemployment (> 1 St. Dev. above than the Mean)[c]		
	Rate	SE		Rate	SE		Rate	SE	
Exercising									
% Spending Time Exercising	16.3%	0.006		15.9%	0.003		16.7%	0.008	
Time Spent Exercising (min)	12.73	0.720		11.77	0.294		12.46	0.844	
Time Spent in Active Travel									
% Spending Time in Active Travel	14.9%	0.006	[c]	13.8%	0.003	[c]	11.8%	0.007	[ab]
Time Spent in Active Travel (min)	4.34	0.331	[c]	3.85	0.148	[c]	2.45	0.241	[ab]
Time Spent in Health-Related Self-Care									
% Spending in Health-Related Self-Care	7.7%	0.005		6.9%	0.002		7.1%	0.006	
Time Spent in Health-Related Self-Care (min)	6.17	0.708		6.86	0.398		6.08	0.980	
Eating Breakfast	44.9%	0.009		44.2%	0.004		42.6%	0.011	

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table 3-5. Bivariate Relationships between Health Behaviors and the Recession, ATUS 2003-2010.

	Before the Recession (2003-2007)[a]		2008[b]		2009[c]		2010[c]	
	Rate	SE	Rate	SE	Rate	SE	Rate	SE
Exercising								
% Spending Time Exercising	15.74%	0.003	16.13%	0.008	16.69%	0.007	16.68%	0.008
Time Spent Exercising (min)	11.50	0.312	12.08	0.771	13.14	0.798	13.21	0.824
Time Spent in Active Travel								
% Spending Time in Active Travel	13.18%	0.003 [d]	14.22%	0.007	14.69%	0.007	15.38%	0.007 [a]
Time Spent in Active Travel (min)	3.43	0.145 [bcd]	4.44	0.445 [a]	4.42	0.374 [a]	4.31	0.354 [a]
Time Spent in Health-Related Self-Care								
% Spending in Health-Related Self-Care	6.96%	0.002	7.76%	0.005	7.17%	0.005	6.85%	0.005
Time Spent in Health-Related Self-Care (min)	6.80	0.415	8.16	1.266	5.61	0.655	5.61	0.789
Eating Breakfast	43.61%	0.004	45.70%	0.010	44.09%	0.010	45.38%	0.010

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

as living in average unemployment states, and (3) respondents whose state-level unemployment rates are more than one standard deviation above the mean are referred to as living in high unemployment states. Here we see that there are no statistically significant patterns for exercise, health-related self-care, and eating breakfast. In contrast, respondents in states with high unemployment are less likely to engage in and spend less time in active travel than respondents living in states with average or low unemployment.

The distribution of healthy behaviors across the historical time period is shown in Table 3-5 and few patterns are evident in the distribution with the exception of active travel. Exercise, health-related self-care, and eating breakfast are not statistically different across the years before and during the Great Recession. However, in contrast to the decrease in the proportion and time spent in active travel found for respondents living in high unemployment states, a greater proportion of respondents interviewed in 2010 engage in active travel when compared to those interviewed before the recession began (2003-1007) and the average time spent in active travel is greater in 2008, 2009, and 2010 (4, 4 and 4 minutes respectively in comparison to 3 minutes before the recession).

Multivariate Models Predicting Time Spent in Exercising

Table 3-6 shows the Zero-Inflated Poisson regression models predicting the odds of being "always zero" and the rate of spending time in exercise. Model 1 in Table 3-6 includes the traditional employment status measure, state-level unemployment rates, and historical time period. The traditional employment status measure, state economic conditions, and historic time period are not statistically significant predictors of spending no time in exercise (shown in the binary portion of the equation). In contrast, we see that being unemployed is a statistically significant predictor of time spent exercising. Respondents who are unemployed and those not in the labor force spend more time (approximately 3 minutes and 1 minute respectively per weekday day) in exercise when compared to the employed.

In Model 2 of Table 3-6 the traditional employment status measure is replaced with the detailed employment status measure and there are similar results. Again, respondents who are not in the labor force spend approximately 1 minute more in

Table 3-6. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Exercising, ATUS 2003-2010.

	Model 1						Model 2					
	Binary[1]			Count[2]			Binary[1]			Count[2]		
	OR	Coef.	SE	Marginals	Coef.	SE	OR	Coef.	SE	Marginals	Coef.	SE
Employment uncertainty												
Detailed Employment Status												
Employed (ref.)												
Unemployed - 2 to 5 months							1.01	0.01	0.13	2.77	0.22 *	0.09
Unemployed - at ATUS & CPS							1.00	-0.01	0.12	2.53	0.19 **	0.06
Out of the Labor Force							0.96	-0.04	0.05	1.41	0.08 *	0.04
State Economic Conditions												
Unemployment Rate	0.99	-0.01	0.01	-0.04	-0.01	0.01	0.99	-0.01	0.01	-0.04	-0.01	0.01
Time Period												
2003-2007 (ref.)												
2008	0.97	-0.03	0.06	0.75	0.04	0.05	0.97	-0.03	0.06	0.75	0.04	0.05
2009	0.95	-0.05	0.08	1.82	0.11	0.06	0.95	-0.05	0.08	1.82	0.11	0.06
2010	0.96	-0.04	0.08	1.67	0.10	0.06	0.96	-0.04	0.08	1.68	0.10	0.06
Employment Status												
Employed (ref.)												
Unemployed	1.00	0.00	0.09	2.63	0.20 ***	0.05						
Out of Labor Force	0.96	-0.04	0.05	1.41	0.08 *	0.04						
Constant		1.71 ***	0.08		4.31 ***	0.06		1.71 ***	0.08		4.31 ***	0.06

Notes: Model 1 N=33,525, Model 2 N=33,525, Model 3 N=32,607.*p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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 3-6 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Exercising, ATUS 2003-2010.

	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: Model 1 N=33,525, Model 2 N=33,525, Model 3 N=32,607.*p<.05. **p<.01. ***p<.001.
Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix G. Additional controls included in Model 3 are race, immigrant status, 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.

exercise than do the employed. The recently unemployed (in the last two to five months) and the long-term unemployed spend approximately 3 minutes more in exercise than the employed.

Model 3 of Table 3-6 includes each of the measures of employment uncertainty and controls for socio-demographic characteristics and additional measures.[39] Though the results change very little, there are notable differences. First, 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

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[39] Controls included the socio-demographic characteristics (gender, life stage, spouse/partners' employment status, and education) as well as race, immigrant status, region, metropolitan area, and season.

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 work week, 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.

Multivariate Models Predicting Time Spent in Active Travel

Models predicting the rate and odds of spending time in active travel are shown in Table 3-7. Model 1 includes state economic conditions and historical time period as well as the traditional measure of employment status. Employment status and the historical time period are related to the odds of being "always zero." The unemployed have 44% lower odds of being in the always zero group, those out of the labor force have 32% lower odds, and those interviewed in 2010 have 15% lower odds. Therefore the unemployed and out of the labor force as well as those interviewed in 2010 are more likely to spend time in active travel when compared the employed or those respondents interviewed before the recession began. The unemployed and respondents interviewed during the recession also spend more time in active travel. The unemployed spend an average of 6 minutes more in active travel than the employed (approximately 29 minutes more per work week). Respondents who are not in the labor force spend approximately 3 minutes more in active travel on the diary day than do the employed. The historical time period when respondents were interviewed also predicts time spent in active travel though the amount is small. Respondents interviewed in 2008 spend 1 minute more in active travel than those respondents interviewed before the recession began.

The traditional employment status measure is replaced by the detailed employment status measure in Model 2 of Table 3-7. In the binary portion of the equation, Model 2 looks fairly similar to Model 1. Again, the recently unemployed and

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Table 7. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Active Travel, ATUS 2003-2010.

	Model 1						Model 2					
	Binary[1]			Count[2]			Binary[1]			Count[2]		
	OR	Coef	SE	Marginals	Coef	SE	OR	Coef	SE	Marginals	Coef	SE
Employment uncertainty												
Detailed Employment Status												
Employed (ref.)												
Unemployed - 2 to 5 months							0.68	-0.39 **	0.14	4.65	0.61 ***	0.17
Unemployed - at ATUS & CPS							0.49	-0.71 ***	0.10	6.66	0.59 ***	0.11
Out of the Labor Force							0.68	-0.38 ***	0.05	2.98	0.36 ***	0.07
State Economic Conditions												
Unemployment Rate	1.00	0.00	0.01	-0.01	0.00	0.02	1.00	0.00	0.01	-0.01	0.00	0.02
Time Period												
2003-2007 (ref.)												
2008	0.91	-0.10	0.07	1.14	0.19 *	0.09	0.91	-0.10	0.07	1.14	0.19 *	0.09
2009	0.89	-0.11	0.08	0.94	0.14	0.10	0.89	-0.11	0.08	0.93	0.14	0.10
2010	0.85	-0.17 *	0.08	0.77	0.05	0.11	0.85	-0.17 *	0.08	0.76	0.05	0.11
Employment Status												
Employed (ref.)												
Unemployed	0.56	-0.59 ***	0.08	5.85	0.60 ***	0.10						
Out of Labor Force	0.68	-0.38 ***	0.05	2.98	0.36 ***	0.07						
Constant		1.98 ***	0.08		3.13 ***	0.10		1.97 ***	0.08		3.13 ***	0.10

Notes: Model 1 N=33,523, Model 2 N=33,523, Model 3 N=32,605.*p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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 7 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Active Travel, ATUS 2003-2010.

	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. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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.

those not in the labor force have 32% lower odds of spending no time in active travel while the long-term unemployed have 51% lower odds of spending no time in active travel. In addition respondents interviewed in 2010 have 15% lower odds of spending no time in active travel. In the count portion of the equation we see that the long-term unemployed spend the most time in active travel compared to the employed at nearly 7 minutes per diary day (or approximately 33 minutes per work week). The recently unemployed (in the last two to five months) spend approximately 5 minutes per diary day

and those not in the labor force spend approximately 3 minutes per diary day in active travel. There is little difference in the amount of time spent in active travel by the historical time period. Those interviewed in 2008 continue to spend approximately 1 minute more in active travel than those interviewed before the recession.

Model 3 of Table 3-7 includes measures of employment uncertainty, socio-demographic characteristics, and the additional controls. After including the controls, more significant findings emerge. Similar to Model 2, 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 (full interaction models are available in Appendix C)[40]. Figure 3-1 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

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

Figure 3-1. Moderating Effects of Being Unemployed and State Economic Conditions on Time Spent in Active Travel
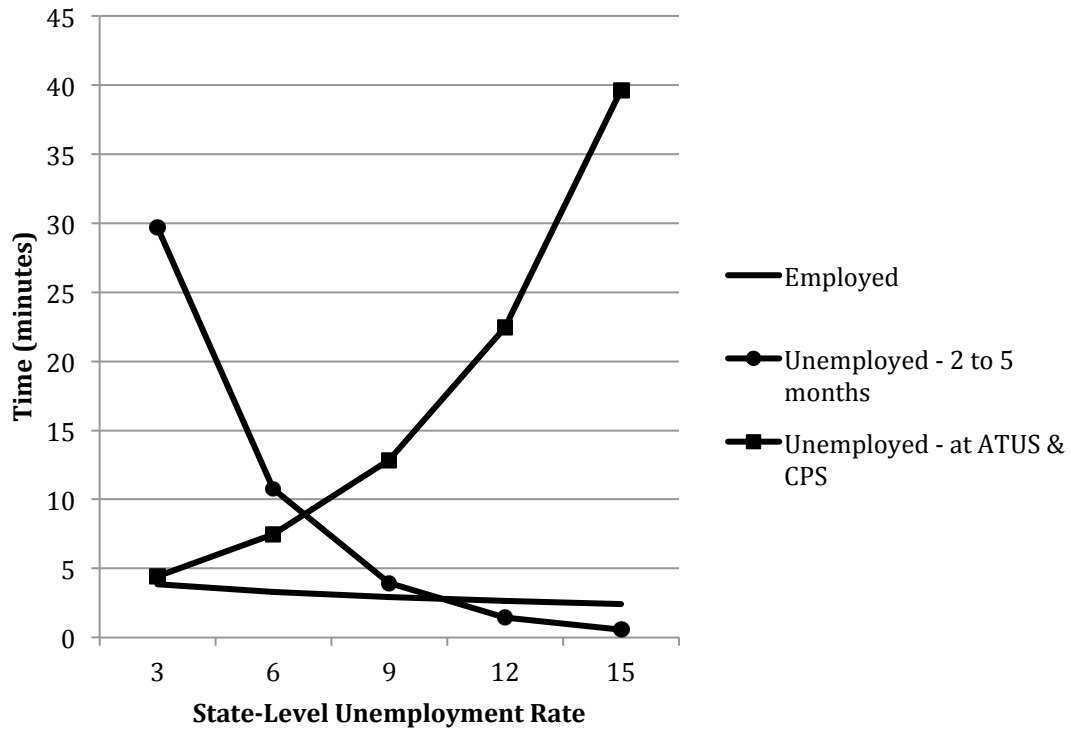
active travel in states with the lowest unemployment rates but, in states with the highest rates of unemployment, respondents spend nearly 40 minutes in active travel. In sum, we see that the recently and long-term unemployed are differentially affected by differences in state economic conditions.

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 3-8. Model 1 in Table 3-8 includes the traditional measure of employment status, state economic conditions, and historical time period where we see few statistically significant effects. Respondents who are not in the labor force spend approximately 14 more minutes per diary day in health-related self-care than the employed. In addition, the unemployed and those not in the labor force have lower odds

Table 3-8. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Self Care, ATUS 2003-2010.

	Model 1						Model 2					
	Binary[1]			Count[2]			Binary[1]			Count[2]		
	OR	Coef.	SE	Marginals	Coef.	SE	OR	Coef.	SE	Marginals	Coef.	SE
Employment uncertainty												
Detailed Employment Status												
Employed (ref.)												
Unemployed - 2 to 5 months							0.98	-0.03		0.20	-0.64	-0.18	0.24
Unemployed - at ATUS & CPS							0.68	-0.39 **	0.14	2.04	0.01	0.17
Out of the Labor Force							0.27	-1.29 ***	0.06	13.73	0.23 *	0.09
State Economic Conditions												
Unemployment Rate	0.97	-0.03	0.02	0.14	-0.01	0.03	0.97	-0.03	0.02	0.14	-0.01	0.03
Time Period												
2003-2007 (ref.)												
2008	0.87	-0.13	0.08	1.77	0.09	0.15	0.87	-0.14	0.08	1.78	0.09	0.15
2009	1.09	0.09	0.11	-1.76	-0.19	0.16	1.09	0.09	0.11	-1.78	-0.19	0.16
2010	1.16	0.15	0.12	-1.86	-0.15	0.19	1.17	0.15	0.12	-1.88	-0.15	0.19
Employment Status												
Employed (ref.)												
Unemployed	0.78	-0.25 *	0.12	0.94	-0.05	0.14						
Out of Labor Force	0.28	-1.29 ***	0.06	13.73	0.23 *	0.09						
Constant		3.06 ***	0.11		4.54 ***	0.18		3.06 ***	0.11		4.54 ***	0.18

Notes: Model 1 N=33,528, Model 2 N=33,528, Model 3 N=32,610.*p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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 3-8 cont. 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.
Socio-demographic characteristics (gender, life stage, spouses' employment status, and education)
are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race,
immigrant status, 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.

of being in the "always zero" group by 22% and 72% respectively. That is, those not in the labor force spend more time in health-related self-care and they are more likely to spend any time at all when compared to the employed.

Model 2 in Table 3-8 includes the detailed employment status measure in place of the traditional employment status measure and there are few differences. Again those not in the labor force spend approximately 14 more minutes in health-related self-care than do the employed. In the binary portion of the equation, the long-term unemployed and

those not in the labor force have lower odds of being in the "always zero" group. The long-term unemployed have 32% lower odds and those not in the labor force have 73% lower odds.

Model 3 in Table 3-8 includes the measures of employment uncertainty as well as the socio-demographic characteristics. 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 3-9. Model 1 of Table 3-9 includes the traditional employment status measure in addition to state economic conditions and historical time period. Little predicts the odds of eating breakfast with the exception of being out of the labor force. Those who are out of the labor force have 13% greater odds of eating breakfast on weekday diary days.

Model 2 in Table 3-9 replaces the traditional employment status measure with the more detailed measure. Again, only being out of the labor force is statistically significantly predictive of the odds of eating breakfast – with 13% greater odds.

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Table 3-9. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Model 1			Model 2			Model 3		
	OR	Coef.	SE	OR	Coef.	SE	OR	Coef.	SE
Employment uncertainty									
Detailed Employment Status									
Employed (ref.)									
Unemployed - 2 to 5 months				1.05	0.05	0.11	1.12	0.11	0.11
Unemployed - at ATUS & CPS				1.06	0.05	0.08	1.22	0.20 *	0.09
Out of the Labor Force				1.13	0.13 ***	0.04	1.21	0.19 ***	0.04
State Economic Conditions									
Unemployment Rate	1.01	0.01	0.01	1.01	0.01	0.01	1.00	0.00	0.01
Time Period									
2003-2007 (ref.)									
2008	1.09	0.08	0.05	1.09	0.08	0.05	1.10	0.10 *	0.05
2009	0.99	-0.01	0.06	0.99	-0.01	0.06	1.01	0.01	0.06
2010	1.04	0.04	0.06	1.04	0.04	0.06	1.08	0.08	0.07
Employment Status									
Employed (ref.)									
Unemployed	1.05	0.05	0.07						
Out of Labor Force	1.13	0.13 ***	0.04						
Constant		-0.31 ***	0.06		-0.31 ***	0.06		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. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix A. Additional controls included in Model 3 are race, immigrant status, 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 3-2. Moderating Effects of Being Unemployed and Historical Time Period for the Probability of Eating Breakfast
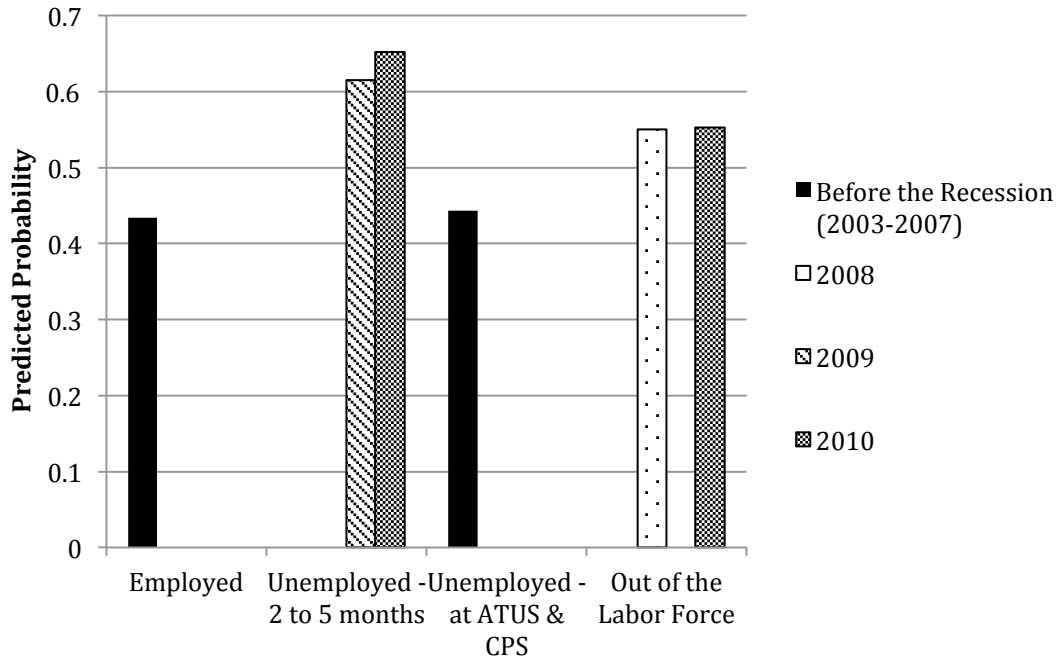
The full model including indicators of employment uncertainty and controls are shown in Model 3 of Table 3-9. After controlling for the socio-demographic characteristics and additional controls, a few more of the employment uncertainty measures become statistically significant. The long-term unemployed 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 (full models are available in Appendix C).[41] Figure 3-2 shows the statistically significant relationships converted to predicted probabilities of eating breakfast. Here we see that for the employed interviewed

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

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.

Moderating Effects of Socio-Demographic Characteristics

As hypothesized, gender, life stage, spouses'/partners' employment status, and education, are expected to moderate the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession due to the varying access to resources and the varying effects of the Great Recession. In order to test for interacting effects of socio-demographic characteristics, each set of models was predicted twice. First, the models included the two-way interactions between the socio-demographic variable of interest and each of the indicators of employment uncertainty as well as the direct effects for each.[42] Second, the models were predicted again including each of the three-way interactions, the two-way interactions, and the direct effects. A summary table of the statistically significant socio-demographic interaction effects is included in Table 3-10 (a summary table including the statistically significant main effects are included in Table 1 of Appendix A).

Looking at the moderating effects of the socio-demographic characteristics (Table 3-10), there are a few patterns worth exploring including the effects of gender, life stage, and spouses'/partners' employment status.[43] Figures 3-3 through 3-9 illustrate the estimated mean time spent in a given activity or the predicted probability (in the case of eating breakfast) for the statistically significant effects (all significant interaction models are included in Appendix D).[44] Gender is a particularly important moderator of the

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[42] Due to the varying effects of gender by life stage, gender and life stage were both run separately in interaction models as well as together in a gendered life stage model. However, the gendered life stage interaction effects were not significant in these models.

[43] Few models including three-way interactions converged and those that did were not informative. As such, the three-way interactions are not included in Table 10.

[44] Because the effect may simply be an artifact, I do not discuss those models where a small number of variables are significant (depending on the number of variables in a particular model).

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Table 3-10. Summary Table of Moderating Effects of Employment Uncertainty on Healthy Behaviors

	Exercise		Active Travel		Health-Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary
Employment Uncertainty							
Recent Unemployment*Unemployment Rate				-			
Unemployed at ATUS & CPS*Unemployment Rate				+	+		
Out of Labor Force*Unemployment Rate							
Recent Unemployment*2008							
Unemployed at ATUS & CPS*2008							
Out of Labor Force*2008							+
Recent Unemployment*2009				+			+
Unemployed at ATUS & CPS*2009							
Out of Labor Force*2009							
Recent Unemployment*2010							+
Unemployed at ATUS & CPS*2010	-						
Out of Labor Force*2010							+
2008*Unemployment Rate					-		
2009*Unemployment Rate							
2010*Unemployment Rate							
Gender							
Recent Unemployment*Female							
Unemployed at ATUS & CPS*Female	+		+				
Out of the Labor Force*Female						+	
Unemployment Rate*Female							

Note: [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 like that used to predict eating breakfast.
[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 3-10 cont. Summary Table of Moderating Effects on Healthy Behaviors

	Exercise		Active Travel		Health-Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary
2008*Female				-			
2009*Female							
2010*Female							
Life Stage							
Recent Unemployment*Parent of Child Under 18							
Recent Unemployment*Older than 45 without Children					-		
Unemployed at ATUS & CPS*Parent of Child Under 18							
Unemployed at ATUS & CPS*Older than 45 without Children							
Out of Labor Force*Parent of Child Under 18					+		
Out of Labor Force*Older than 45 without Children							
Unemployment Rate*Parent of Child Under 18				+			
Unemployment Rate*Older than 45 without Children							
2008*Parent of Child Under 18		-					
2008*Older than 45 without Children							
2009*Parent of Child Under 18		-					
2009*Older than 45 without Children							
2010*Parent of Child Under 18							
2010*Older than 45 without Children							
Gendered Life Stage							
Unemployment Rate * Father of Child Under 18							
Unemployment Rate * Men older than 45 w/out Children							

Note: [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 like that used to predict eating breakfast.
[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 3-10 cont. Summary Table of Moderating Effects on Healthy Behaviors

	Exercise		Active Travel		Health-Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary
Unemployment Rate * Women younger than 45 w/out Children							
Unemployment Rate * Mother of Child Under 18				+			
Unemployment Rate * Women older than 45 w/out Children							
2008 * Father of Child Under 18							
2008 * Men older than 45 w/out Children							
2008 * Women younger than 45 w/out Children							
2008 * Mother of Child Under 18							
2008 * Women older than 45 w/out Children							
2009 * Father of Child Under 18							
2009 * Men older than 45 w/out Children							
2009 * Women younger than 45 w/out Children							
2009 * Mother of Child Under 18		-					
2009 * Women older than 45 w/out Children							
2010 * Father of Child Under 18							
2010 * Men older than 45 w/out Children							
2010 * Women younger than 45 w/out Children							
2010* Mother of Child Under 18							
2010 * Women older than 45 w/out Children							
Recent Unemployment * Father of Child Under 18				-		-	
Recent Unemployment * Men older than 45 w/out Children							
Recent Unemployment * Women younger than 45 w/out Children							

Note: [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 like that used to predict eating breakfast.
[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 3-10 cont. Summary Table of Moderating Effects on Healthy Behaviors

	Exercise		Active Travel		Health-Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary
Recent Unemployment * Mother of Child Under 18							
Recent Unemployment * Women older than 45 w/out Children						-	
Unemployed at ATUS & CPS * Father of Child Under 18							
Unemployed at ATUS & CPS * Men older than 45 w/out Children							
Unemployed at ATUS & CPS * Women younger than 45 w/out Children						+	
Unemployed at ATUS & CPS * Mother of Child Under 18							
Unemployed at ATUS & CPS * Women older than 45 w/out Children		+					
Out of Labor Force * Father of Child Under 18							
Out of Labor Force * Men older than 45 w/out Children							
Out of Labor Force * Women younger than 45 w/out Children					+		
Out of Labor Force * Mother of Child Under 18					+		
Out of Labor Force * Women older than 45 w/out Children			+	-	+		
Spouse's Employment Status							
Recent Unemployment*Single			-				
Unemployed at ATUS & CPS*Single							
Out of Labor Force*Single			+				+
Recent Unemployment*Spouse/Partner Employed FTE							
Unemployed at ATUS & CPS*Spouse/Partner Employed FTE							
Out of Labor Force*Spouse/Partner Employed FTE					+		
Recent Unemployment*Spouse/Partner Employed PTE					-		
Unemployed at ATUS & CPS*Spouse/Partner Employed PTE							-

Note: [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 like that used to predict eating breakfast.
[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 3-10 cont. Summary Table of Moderating Effects on Healthy Behaviors

	Exercise		Active Travel		Health-Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary
Out of Labor Force*Spouse/Partner Employed PTE							
Unemployment Rate*Single							
Unemployment Rate*Spouse/Partner Employed FTE				+			
Unemployment Rate*Spouse/Partner Employed PTE			+	+			
2008*Single							
2008*Spouse/Partner Employed FTE	-		-				
2008*Spouse/Partner Employed PTE							-
2009*Single	-						+
2009*Spouse/Partner Employed FTE							
2009*Spouse/Partner Employed PTE			-				
2010*Single							
2010*Spouse/Partner Employed FTE							
2010*Spouse/Partner Employed PTE							
Education							
Unemployment Rate*High School Degree or Les							
Unemployment Rate*Associates Degree							
2008*High School Degree or Less				+			
2008*Associates Degree							
2009*High School Degree or Less	-						
2009*Associates Degree							
2010*High School Degree or Less	-						

Note: [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 like that used to predict eating breakfast.
[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 3-10 cont. Summary Table of Moderating Effects on Healthy Behaviors

	Exercise		Active Travel		Health-Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary
2010*Associates Degree							
Recent Unemployed*High School Degree or Less							
Unemployed at ATUS & CPS*High School Degree or Less							
Out of the Labor Force*High School Degree or Less			-	+	-		
Recent Unemployed*Associates Degree							
Unemployed at ATUS & CPS*Associates Degree							
Out of the Labor Force*Associates Degree					-		

Note: [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 like that used to predict eating breakfast.
[2]The count portion of the equation predicts the rate of time spent in a given activity.

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Figure 3-3. Moderating Effects of Gender, Being Unemployed and Historical Time Period on Time Spent in Active Travel
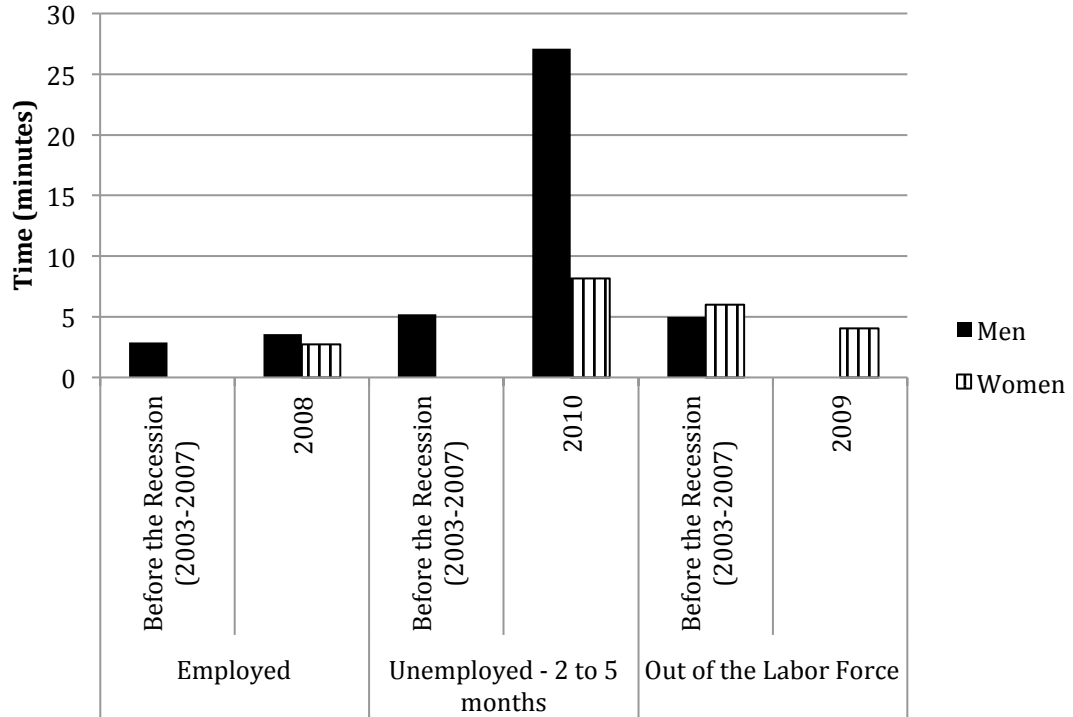
relationships between employment uncertainty and healthy behaviors. Figure 3-3 shows the importance of gender for the amount of time spent in active travel by being unemployed and being interviewed during the recessionary time period. Here we see that men who are recently unemployed and interviewed in 2010 spend 27 minutes in active travel when compared to employed men interviewed before the recession who only spend 3 minutes in active travel. While similarly situated women (recently unemployed interviewed in 2010) spend only 8 minutes in active travel. Figure 3-4 shows the moderating effects of gender, state economic conditions, and historical time period for time spent in active travel. Men and women living in states with high and low unemployment rates and interviewed in 2008 respond in opposite ways – as men in states with high unemployment rates spend less time in active travel while women spend slightly more time in active travel when compared to men and women in low

Figure 3-4. Moderating Effects of Gender, State economic conditions, and Historical Time Period on Time Spent in Active Travel
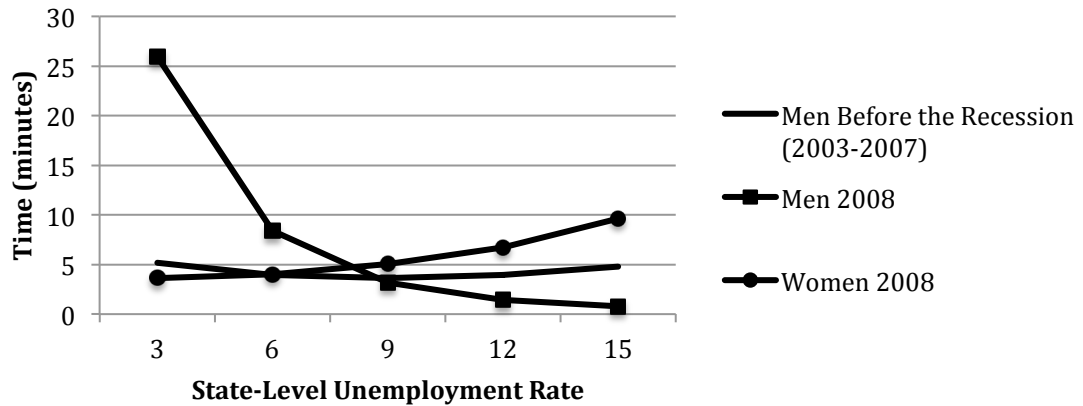
Figure 3-5. Moderating Effects of Gender, State economic conditions, and Historical Time Period on Time Spent in Health-related Self-care
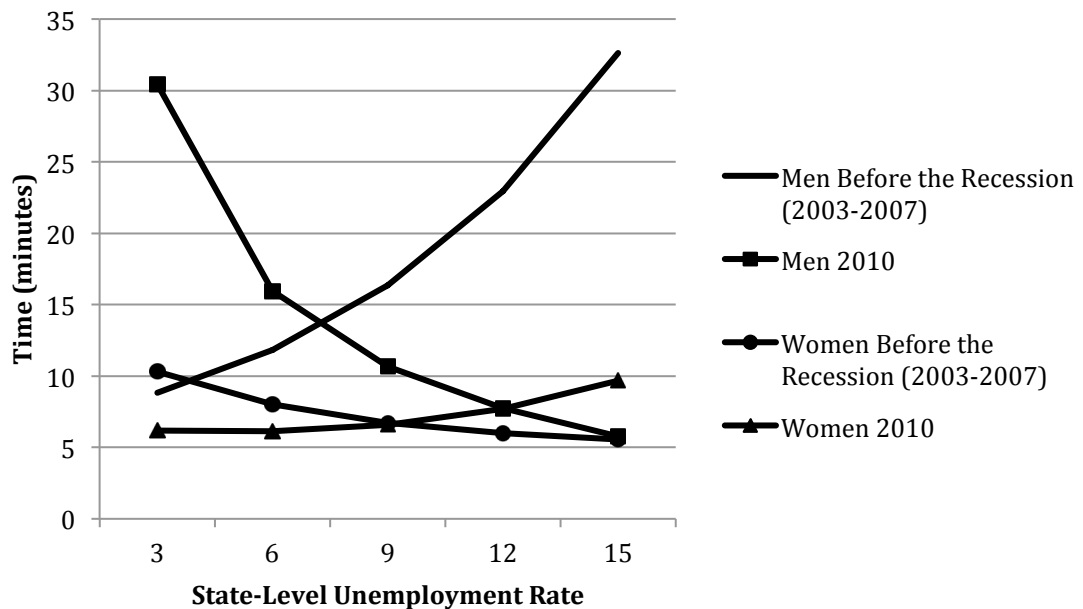
Figure 3-6. Moderating Effects of Gender, Being Unemployed, and State economic conditions on the Probability of Eating Breakfast
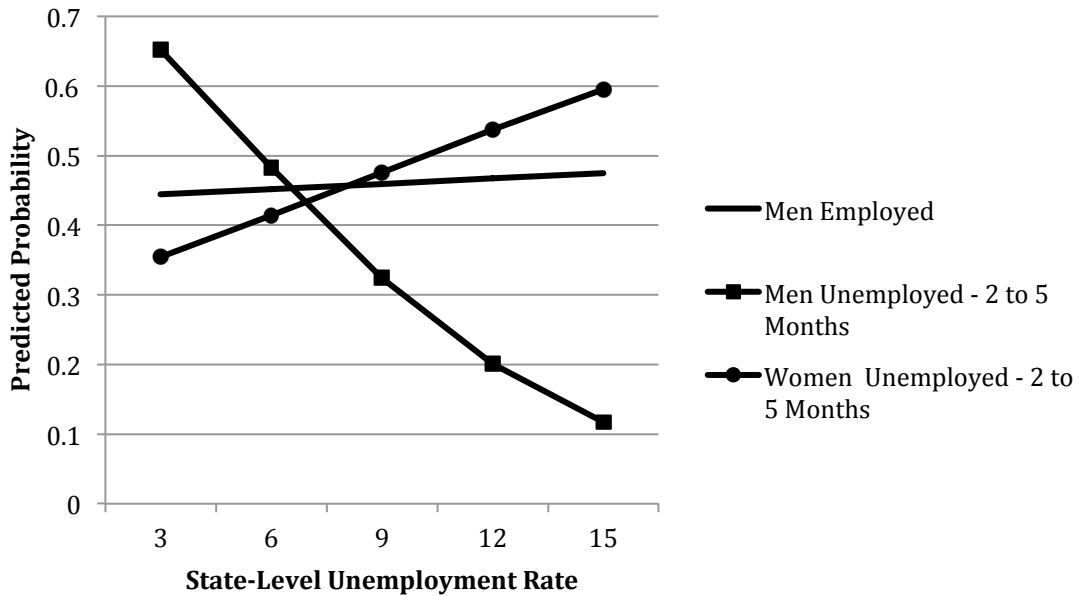
unemployment rate states. Figure 3-5 shows the moderating effects of gender, state economic conditions, and historical time period for time spent in health-related self-care. Here we see that men interviewed in 2010 spend less time in health-related self-care in states with higher unemployment rates (from over 30 minutes at the lowest levels of unemployment to less than 6 minutes at the highest levels), while the reverse pattern is evident for men interviewed before the recession. In contrast, the amount of time women spend in health self-care, though statistically significant, differs by only about 5 minutes across different unemployment rates. Figure 3-6 shows the moderating effects of gender, being unemployed, and state economic conditions for the probability of eating breakfast.[45] This figure shows that the probability of eating breakfast for men who are recently unemployed is lower for respondents living in states with high unemployment

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[45] To aid in interpretation, predicted probabilities are calculated for significant interaction effects in the models predicting the odds of eating breakfast (for explanation see Buis 2010).

Figure 3-7. Moderating Effects of Life Stage and Historical Time Period on Time Spent Exercising
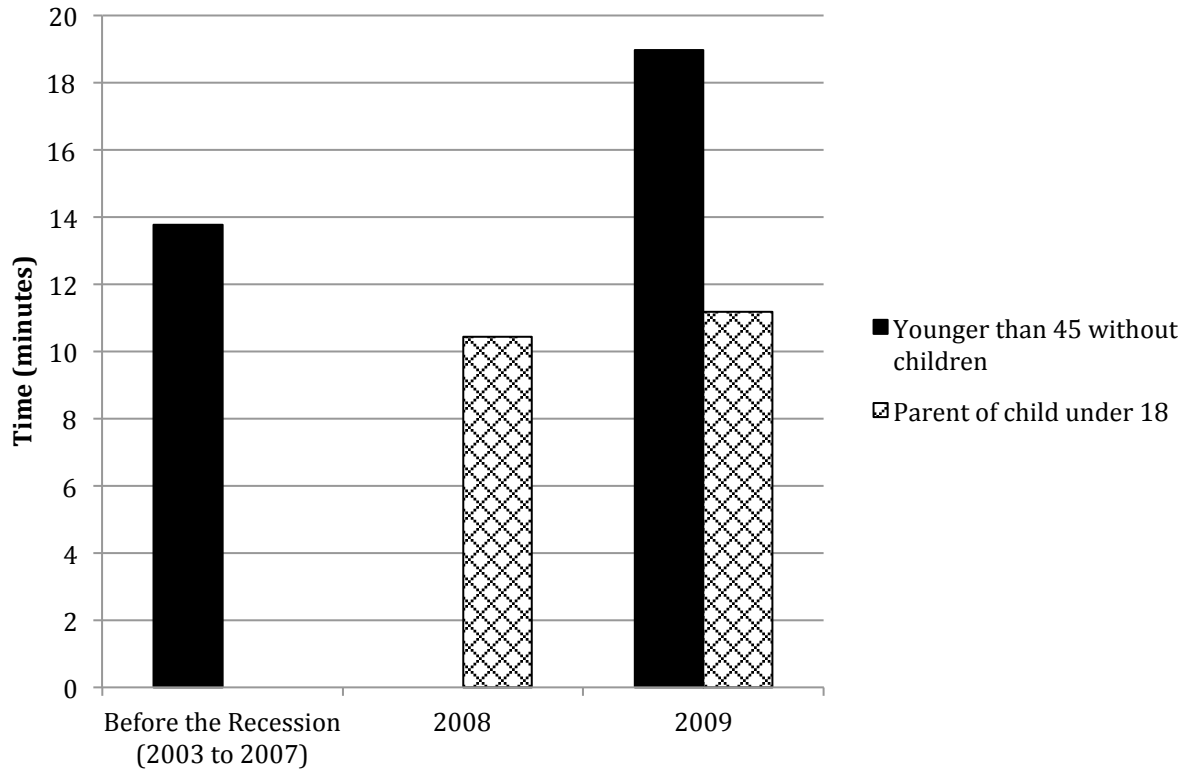
rates (from .65 at the lowest unemployment rates to .11 at the highest levels). In contrast, the probability of eating breakfast for women who are recently unemployed is higher for those living in states with high unemployment rates (from .35 at the lowest unemployment rates to .59 at the highest unemployment rates) and the probability for employed men is fairly stable (ranges from .44 to .47). Overall we see that men may be both positively and negatively impacted by economic difficulties. That is they may be less likely to engage in active travel, eat breakfast, or engage in health-related self-care when things get difficult but they may also be more likely to engage in active travel when they are recently unemployed late in the recession.

Life stage moderates the effects of employment uncertainty for healthy behaviors – specifically time spent exercising and the probability of eating breakfast. Figure 3-7

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Figure 3-8. Moderating Effects of Life Stage, Being Unemployed, and Historical Time Period on the Probability of Eating Breakfast
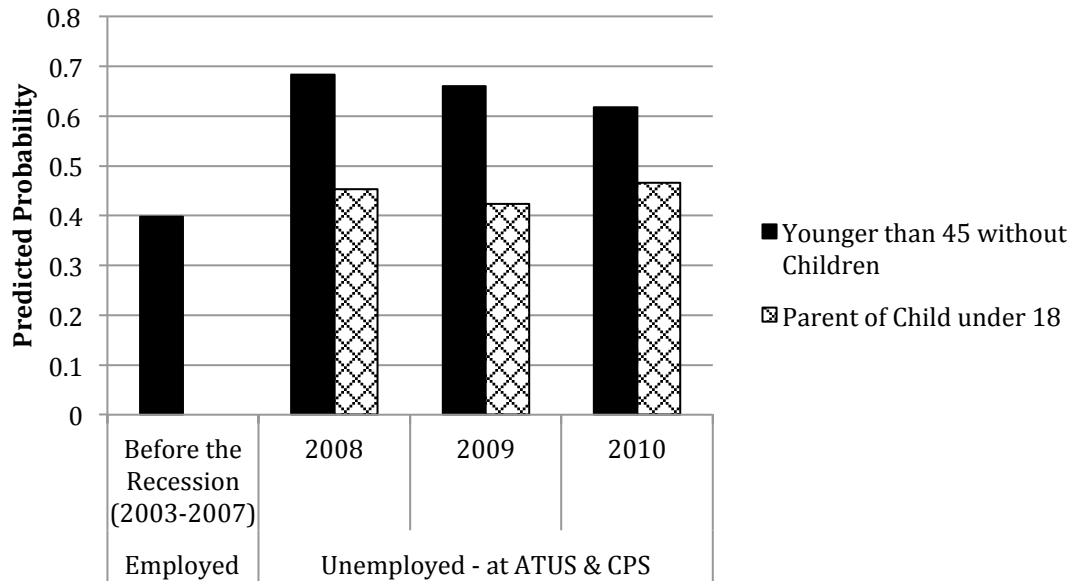
shows the moderating effects of life stage and historical time period on time spent exercising while Figure 3-8 shows the moderating effects of life stage, employment status, and historical period for the probability of eating breakfast. In both figures we see that the comparison group, respondents younger than 45 without children, fairs better as employment uncertainty is expected to worsen. For example, in Figure 3-7 we see that younger respondents spent nearly 14 minutes exercising if interviewed before the recession and younger respondents interviewed in 2009 (at the height of the recession for many) spent almost 19 minutes in exercise on the diary day. Across the work week this difference results in 26 additional minutes spent in exercise. In contrast, parents spend less time in exercise if they were interviewed in 2008 and 2009 than younger respondents interviewed before the recession. A similar pattern is evident in the probability of eating breakfast with the probability of eating breakfast for younger respondents being nearly .7 when interviewed in 2008 and only .45 for parents interviewed in that same year. In sum,

Figure 3-9. Moderating Effects of Spouses'/partners' employment status and State economic conditions on Time Spent in Active Travel
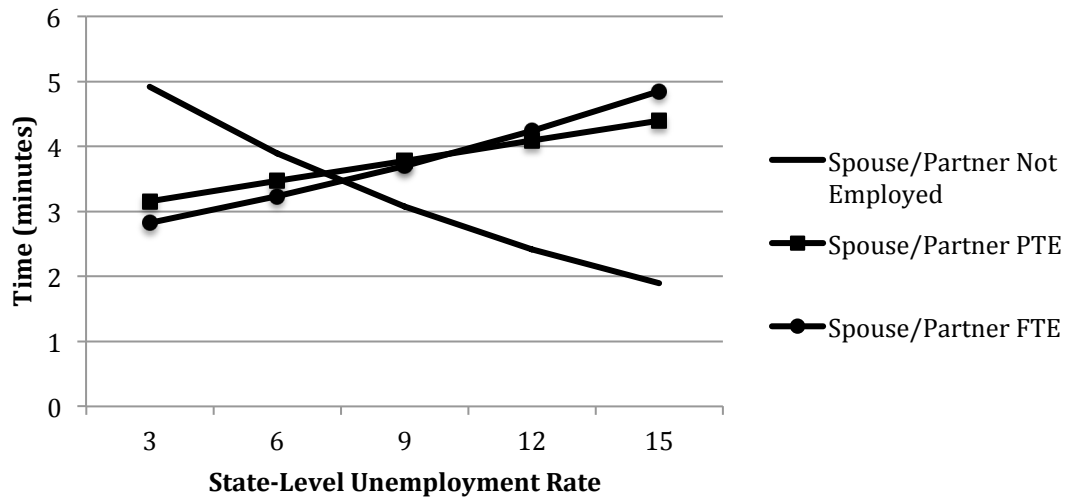
younger respondents seem to fair better experiencing economic challenges than do parents, which supports hypothesis H6a.

Spouses' or partners' employment status moderates the relationships between indicators of employment uncertainty and healthy behaviors, specifically state economic conditions and time spent in active travel. Figure 3-9 shows that the average time spent in active travel is greater for respondents whose spouse or partner is employed in high unemployment rate states but this pattern is reversed for respondents whose spouse or partner is not employed. This is partial evidence of H7.

Discussion

In general we see that of the indicators of employment uncertainty – being unemployed, living in states with poor state economic conditions, and being interviewed during a historical time period marked by a recession – being unemployed is the most consistently related to healthy behaviors. In particular, the long-term unemployed (those unemployed longer than two to five months) spend more time in exercise and active travel and are more likely to engage in exercise, active travel, and health-related self-care

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as well as being more likely to eat breakfast. The recently unemployed also spend more time in exercise and active travel and are more likely to engage in active travel on the diary day. Though the time estimates are fairly small (ranging from 3 and a half minutes to just over 5 minutes), the time investment is more notable when estimating the time investment for a workweek (17 and half minutes to 25 and a half minutes). In all, these findings support H3 that being unemployed is related to more time exercising, in active travel, and in health-related self-care as well as increased odds of eating breakfast.

In contrast, state economic conditions and historical time period are not as consistently related to healthy behaviors. Living in states with poor economic conditions, as captured by higher state-level unemployment rates, was related to increased likelihood of spending time in health-related self-care whereas being interviewed during the recessionary time period was related to spending more time in active travel and increased odds of eating breakfast. Such findings are contrary to H1 and H2. These results may demonstrate the greater intractability of health behaviors when the composition of a respondent's day is not altered. That is, becoming unemployed most often results in a dramatic change in the composition of a respondent's day whereas a similar time shift is not as likely simply because unemployment rates change or because the person is interviewed during a recession.

Hypotheses H4a and H4b propose the differing effects of employment uncertainty respondents may experience when they are faced with overlapping indicators of employment uncertainty. Figures 3-1 and 3-2 are partial support for H4a but I find no evidence to support H4b in these analyses. H4a argues that the unemployed will not be negatively influenced by living in states with poor economic conditions or being interviewed during a recession. Instead of being negatively affected, the long-term unemployed in states with high unemployment tend to spend more time in active travel than the long-term unemployed in low unemployment states and the recently unemployed interviewed during the recessionary years have greater probability of eating breakfast than the employed interviewed before the recession. However, not all the evidence supports the buffering hypothesis. Rather, Figure 3-1 also shows that the recently

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unemployed spend less time in active travel in high unemployment states compared to low unemployment states. The different relationship between the recently and the long-term unemployed may be an indicator that the duration being unemployed is important for how they respond to state-level changes.

Gender, life stage, and spouses'/partners' employment status are important moderators of the effects of employment uncertainty on healthy behaviors but in complicated and, occasionally, unexpected ways. Gender is a consistent moderator of such relationships but not in the expected direction. Figures 3-3 and 3-4 show how gender relates to active travel. Men are both more likely to engage in active travel if they are recently unemployed (in 2010) and less likely to engage in active travel when they live in states with high unemployment rates versus low (in 2008). Figure 3-5 shows the moderating effect of gender for time spent in health-related self-care. Here we see that men spend less time in health-related self-care in high unemployment rate states (in 2010). Such findings contradict hypotheses H5a and H5b that posit that men will be negatively impacted by being unemployed and women will be negatively impacted by state economic conditions and/or historical time period marked by a recession. Yet, H5b was supported in Figure 3-6 showing that unemployed men are less likely to eat breakfast in states with higher unemployment rates. Though it is difficult to determine why there is contradictory evidence for H5b, it is plausible that unique push and pull of active travel (needing to travel to another location and having alternative means of transportation) are important determinants outside of health and health outcomes. That is, unemployed men may be less able to travel by more expensive means (i.e. car) and may have more time to invest in walking or biking to their destination because they are not as constrained by other demands.

Figures 3-7 and 3-8 are evidence supporting H6a. Here we see that parents spend less time exercising and have lower probability of eating breakfast when they are interviewed during the recessionary years than similarly situated respondents who are younger than 45 without children. That is parents with children under 18 may find it

difficult to care for themselves while also managing increasing employment uncertainty. I find no evidence supporting H6b.

Lastly, I find some evidence supporting H7. As I expected, Figure 3-9 shows that respondents with employed partners or spouses fare better than those whose spouses or partners are not employed. Those with employed spouses or partners spend more time in active travel in higher unemployment rate states, while those with a spouse or partner who is not employed spend less time in active travel (whose mean time spent in active travel actually is actually less in high unemployment states).

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. 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. That being said, state economic conditions as captured by state-level unemployment rates and historical time period work in tandem with being unemployed and the socio-demographic characteristics to predict participation in healthy behaviors. Gender, in particular, is a key moderator of employment uncertainty with men both benefiting from and struggling with the Great Recession. Life stage and spouses' or partners' employment status also moderates the effects of employment uncertainty with parents losing out on healthy behaviors and those respondents with spouses and partners who are not employed experiencing both advantages and disadvantages.

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. Men and the recently unemployed benefited or 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 and men spent more time in active travel when they were unemployed as well as spent less time in active travel in

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states with high unemployment). 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

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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 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, J. P. Robinson, and Milkie 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.

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Such findings raise important questions about the role of work for individual health outcomes and behaviors.

Chapter 4: Staying Closer to Home? The Impact of the "Great Recession" and Unemployment on Time Spent with Family Members

Introduction

The "Great Recession," which economists say began in December of 2008 and ended in June of 2009, continues to be an ongoing issue for many due to high unemployment rates – 9.6% in 2010, 8.9% in 2011 and is currently (as of May 2012) 8.2% (U.S. Bureau of Labor Statistics 2012a). It is arguably one of the most significant economic events since the Great Depression (1929 to 1939), and is expected to have long-term implications for the U.S. economy. In light of the scope of this downturn, scholars and policy makers have raised questions about how individuals and families will fare (e.g. Aguiar et al. 2011; Condon 2010; Eckholm 2010; Morrill and Pabilonia 2011). Prior research has shown that periods of economic climate can have immediate and long-term negative (and potentially positive) consequences for families and family relationships (Burchell et al. 2002; Elder 1974; Fagin and Little 1984; Jahoda et al. 1971; Larson et al. 1994; Moen et al. 2010; Morrill and Pabilonia 2011; Newman 1988; Ström 2002, 2003; Uchitelle 2006; Yeung and Hofferth 1998). However, the unique circumstances of the Great Recession may have different effects on family relationships. Moreover, the focus of prior research on the immediate family leaves some important and consequential questions unanswered as to the effects of recessions on relationships with extended family members.

In particular, family relationships most often studied are limited to children and spouses or partners. I contribute to this line of research by including relationships with extended family members including parents as well as other family members (such as aunts and uncles, cousins, nieces, and nephews, parents, and may others) because of the important role of extended family members in caregiving and resource exchange highlighted elsewhere (e.g. Bengtson, Biblarz, and R. E. L. Roberts 2002; Ruggles 2007). In addition, increasing accessibility of time diary data and the advantages time diary data offer for capturing family interactions have created opportunities to investigate the effects of the Great Recession on time with family. Family relationships are important indicators

of many outcomes including child cognitive development, marital relationship stability, depression, and physical health (Cooksey and Fondell 1996; Dressler 1985; Erel and Burman 1995; Estrada et al. 1987; Gallo et al. 2003; Gray and Steinberg 1999; Hair et al. 2009; Holt-Lunstad, Birmingham, and B. Jones 2008; Howes and Markman 1989; Knoester, Haynie, and C. M. Stephens 2006; Kuntsche, Vorst, and Engels 2009; Linder, Crick, and Collins 2002; Mancini 1979; Schmeeckle and Sprecher 2004; Schwarz et al. 2005; Troxel et al. 2007; Umberson 1992; Zautra et al. 1998) and further investigation of the effects of economic climate for families may help illuminate effective family policies that will help children, families, and the elderly.

In light of the importance of families and family outcomes, I draw on a subsample of working-aged respondents (between 23 and 55 years old) from the American Time Use Survey (ATUS) from 2003 to 2010 to investigate the effects of being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession on spending time with family members. In this nationally representative sample of the U.S. population I find that the unemployed and those living in states with poor economic conditions spent more time on average with their children, spouses or partners, and extended family members. In contrast, those interviewed during the recession (specifically 2009 and 2010) spend more time with children and spouses or partners while also spending less time with extended family members.

Background

This study extends prior research in important ways by examining the amount of time spent with family members like children, spouses or partners, and extended family members. Research has consistently shown that immediate and extended families are important to the development and quality of life for individuals whether they are children (Cooksey and Fondell 1996; Erel and Burman 1995; Estrada et al. 1987; Gray and Steinberg 1999; Hair et al. 2009; Howes and Markman 1989; Knoester et al. 2006; Kuntsche et al. 2009; Linder et al. 2002) or adults (Dressler 1985; Gallo et al. 2003; Holt-Lunstad et al. 2008; Mancini 1979; Schmeeckle and Sprecher 2004; Schwarz et al. 2005; Troxel et al. 2007; Umberson 1992; Zautra et al. 1998). Though less is known about how

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the amount of time spent together is related to specific outcomes, prior research has argued that time together is important for development and quality of life for families and children (Bianchi et al. 2006). Though the quality of time spent together is not clear in time diary data, it is more reasonable to assume that less time together is worse for families relationships than is more time – even in those families riddled by conflict. Research investigating the time spent together supports this argument as parental time investment has been linked to children's well-being (Furstenberg, Morgan, and Allison 1987), reduced behavioral problems (Amato et al. 2007), and higher math scores (Muller 1995) and spousal time together has been found to be significantly related to reduced marital distress (G. T. Smith et al. 1988). These results begin to demonstrate the importance of understanding how time spent together shapes family relationships and outcomes.

There is also some evidence that the broader economic climate is related to family relationships. Family relationships, particularly relationships with immediate family members, have been shown to suffer following periods of economic decline and individual bouts of unemployment (Burchell et al. 2002; Burgess 1945; Cavan 1959; Elder 1974; Elder et al. 1995; Fagin and Little 1984; Newman 1988; Ström 2003; Sweet, Moen, and Meiksins 2007; Uchitelle 2006) and reducing marital and parent-child relationship quality (e.g. Burgess 1945; Cavan 1959; Fagin and Little 1984; Larson et al. 1994). Unfortunately, most prior research is on earlier cohorts and does not examine how these relationships work. While some qualitative studies have considered the importance of work and unemployment for workers' identities and the subsequent distress they may experience when no longer fulfilling expected roles (Fagin and Little 1984; Jahoda et al. 1971; Newman 1988; Uchitelle 2006), few have considered how the economic climate translates into declines in family relationships. One exception is a classic study of job loss by Jahoda and colleagues (1971). The authors examined the impact of being unemployed (by the male breadwinner) on the family in the small Austrian community of Marienthal in 1931. Despite limitations of the unique location, time period and methods of data collection, the authors find that unemployment disrupts the time structures of

work, which change how individuals spend time with family members. Findings from this classic study point to *time use as a key mechanism* between job loss, an economic downturn, and family relationships and lay the foundation for my study.

Research Questions

       I build on and extend the prior literature by investigating how the contemporary economic climate and being unemployed during these recessionary times are related to time spent with family. This is achieved by investigating the following research questions. First, is actually being unemployed (both recent and longer term) relating to time spent with family members? Second, what is the relationship between the state economic conditions (e.g. states with high unemployment rates) and time spent with family members, including children, spouses, and extended family members? Third, what effect do historical circumstances (i.e. being interviewed during the recessionary time period) have on time spent with family members? Fourth, what are the combined effects of actually being unemployed, living in states with high unemployment, and being interviewed in a recessionary time period on time spent with family? Lastly, are these relationships moderated by gender, life stage, spouses'/partners' employment status, or education?

       In order to answer these questions, I begin by describing prior research that frames the expected relationships between economic circumstances and time spent with family members as well as lay out my hypotheses. Few studies have investigated the separated and combined effects of being unemployed, living in states with poor economic conditions, or being interviewed during a historical time period marked by a recession for time spent with children, spouses, or extended family members. Below, I describe past scholarly work that investigates the time spent with family members by these factors (individual employment status, unemployment rates, and historical time period) separately. Where I am unable to find studies addressing a specific issue, I draw on past work that investigates the connection between employment uncertainty and family relationship quality. Next, I describe the data that I use in my analyses – the American Time Use Survey (Abraham et al. 2011) – and my quantitative methods. Finally, I

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explain the results of my analyses, focusing only the statistically significant results and discuss their larger significance.

The Economic Climate, Being Unemployed, and Time Spent with Family Members

Time with Children

A few studies have investigated how being unemployed influences the amount of time parents spend with children. In their classic study of unemployment, Jahoda and colleagues (1971) examined job loss (by male breadwinners) in the small, economically struggling, Austrian community of Marienthal in 1931. This was one of the first comprehensive studies of community-wide economic decline, and in it the authors identified key changes that resulted in negative family outcomes. One component of their study examined basic time diaries that included what each participant was doing at the beginning of every hour when they were awake. They found that unemployed men were particularly impacted by the absence of structured time that work provided as they lost the form of their workdays and their sense of purpose. Those individuals able to establish structure in their time (such as set activities at specific times like meeting with friends) rather than being overwhelmed by the expanse of free time experienced fewer negative outcomes. This was evident in the participants' ambivalence towards the large periods of unspoken for time that they regularly confronted and their lack of activities for large parts of the diary day. Those men most negatively impacted by their situation were more likely to not actively engage in housework or caring for their children (as determined by the researchers' visual evaluations), resulting in negative outcomes and extreme psychological and economic deprivation for their children. Though the results of this study are limited by the location, time period, and methods of data collection, the authors showed that being unemployed disrupted workers' time structures, which altered how individuals engaged with their family. This may demonstrate a possible mechanism – time use – linking employment uncertainty with family outcomes.

Drawing on data from the late 1970's, Fagin and Little (1984) arrived at similar conclusions in terms of the effects of being unemployed in 1979. The authors found that being unemployed was particularly difficult for the male breadwinner and that these

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challenges were related to behavioral problems for their children[46]. Though this research included some time diary data, the authors did not examine how much time the unemployed spent with their children, nor were the authors able to determine potential connections between being unemployed and their children's behavior. Lastly, the focus on male breadwinners in both the study by Fagin and Little (1984) as well as the study by Jahoda and colleagues (1971) is an illustration of the changing work and family dynamics that have occurred since that time. The increased representation of women in the work force (U.S. Department of Labor 2010) is another example of why a more contemporaneous investigation of the effects of recessions on time with children is important.

More recent work by Pailhe and Solaz (2008) expands on the findings above to investigate the amount of time French couples (both mothers and fathers) spend with their children in a more recent time period (1998 and 1999). Using time diary data, the authors examined time spent with children under the age of 15. Broadly, the authors noted the gendered division of labor in taking care of children even though most women are in the labor force. Both mothers and fathers who were unemployed spend more time in the direct care of children than employed parents but not to the same extent as their lost work hours.[47] The authors argue that this was likely because children spend a considerable amount of time at school. Moreover, they found that parental time was only partially transferrable. As the unemployed parent's time with children increased, the other parent's did not substantially decrease. The least valued tasks (transportation and care time) were transferred but the most valued were not (social interaction and assistance with homework). "Finally, the transfer remains asymmetric in almost all cases: men are more willing to abandon—or women to take over—their activities with their children, than the opposite" (Pailhe and Solaz 2008:234). The limited transfer of parental time confirms that it is different from other types of household labor as it is more

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[46] Families were considered to have dependent children if they had a child aged 16 or under who was financially dependent or between 16 and 18 who was in full-time education and financially dependent on the respondent.
[47] Mothers who were out of the labor force were analyzed as a separate group due to their different characteristics from unemployed mothers.

pleasurable, it represents an investment in the child's human capital, it is constrained by social norms, and participation in it likely influences parent's power of negotiation in the present and future (e.g. divorce). This study is an important indication of how time with children may be influenced when parents are unemployed. However, it is not clear how the French context may be similar to the parental time use patterns in in the United States or during the Great Recession. The increased access to public childcare programs and the higher percentage of French women who work part-time when compared to the United States makes it difficult to generalize such results to the U.S. context. Moreover, this study investigated time spent with all children under the age of 15. It is possible that parents of young children who are not constrained by school schedules – particularly in the United States where child care is less likely to be subsidized by the state – may allocate their time differently when they are unemployed.

Though I am not aware of prior research that investigates the effects of parents' being unemployed on the time they spend with children in the United States, there is a line of research that has examined time spent with children more generally. This prior research finds that though the average time spent with children has increased since the 1960s (Bianchi et al. 2006; Sayer, Bianchi, and J. P. Robinson 2004), non-employed mothers (i.e. those who are not in the labor force and those who are unemployed) spend on average 16 hours per week more with their children than do employed mothers (Bianchi et al. 2006:86; see also C. L. Booth et al. 2002).[48] In light of this and the other studies highlighted above, I expect that unemployed parents will spend more time with children because of increased time availability (even though being unemployed may be very stressful, I expect the increased time availability to trump the potential desire to avoid family and family interactions due to stress). In contrast, living in areas with poor economic conditions (i.e. states with high rates of unemployment) and being interviewed during a historical time period plagued by a recession may be related to spending less time with children, possibly because of increased stress related to employment

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[48] I was not able to identify prior research that investigates how being employed is related to fathers' time with children.

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uncertainty. However, I expect the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession on time spent with younger children to be weaker in part because of the high time demands of younger children and the lack of standardized child care in the United States that would continue to demand high involvement by parents regardless of employment uncertainty. Specifically, I expect the following (Table 4-1 includes all hypotheses):

> *H1a*: Being unemployed will be related to spending more time with children of all ages, though I expect this relationship to be weaker when looking only at time with children under age 6.

> *H1b*: Being interviewed during the recessionary time period (i.e. 2008-2010) and living in states with poor economic conditions (i.e. high state unemployment rates) will be related to spending less time with children regardless of their age. This relationship will be weaker when looking only at time with children under 6.

Time with Spouses or Partners

I can find no studies that investigate how employment uncertainty is related to time spent with spouses or partners. However, some prior research has investigated the effects of economic climate for marital relationship quality. In 1931, Johada and colleagues (1971) considered the effect of being unemployed by the male breadwinner for marital relationships but did not examine how time spent with spouses differed for the unemployed. Instead, the authors found that marriages and families suffered with greater financial deprivation (as indicated by lack of employment and limited financial resources like losing access to the social safety net). More recent research synthesizing studies of being unemployed for marital relationship quality found that studies of being unemployed consistently demonstrate negative outcomes for marital stability and well-related to relationship quality (Vinokur, Price, and Caplan 1996). Specifically, Ström finds that studies demonstrate a greater likelihood of divorce, negative mental health

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Table 4-1. Hypotheses

Economic Climate

H1a   Being unemployed will be related to spending more time with children of all ages, though I expect this relationship to be weaker when looking only at time with children under age 6.

H1b   Being interviewed during the recessionary time period (i.e. 2008-2010) and living in states with poor economic conditions (i.e. high state unemployment rates) will be related to spending less time with children regardless of their age. This relationship will be weaker when looking only at time with children under 6.

H2   Actually being unemployed, living in states with poor economic conditions, or being interviewed during the recessionary time period (i.e. 2008-2010) will be related to spending less time with spouses or partners (either alone or with others present).

H3   Being unemployed, living in areas with poor economic conditions (i.g. high unemployment rates), or being interviewed during a historical time period marked by a recession (i.e. 2008-2010) will be related to spending more time with parents and other extended family members.

Moderating Influence of Multiple Experiences of Economic Climate

H4a   Living in states with poor economic conditions or being interviewed during a historical period marked by a recession will moderate the effects of actually being unemployed for time spent with family. Specifically, being unemployed in conjunction with living in states with higher unemployment rates and/or being interviewed during the recessionary time period (i.e. 2008-2010) will be related to spending more time with children and less time with spouses or extended family members compared to the employed living in states with lower unemployment rates and/or being interviewed before the recession (i.e. 2003-2007).

H4b   Living in states with poor economic conditions in conjunction with being interviewed during a historical period marked by a recession will operate as a magnifier of time spent with family. Specifically, respondents living in states with high unemployment and being interviewed during the Great Recession (2008-2010) will be related to spending more time more time with children and less time with spouses and extended family members compared to those respondents living in states with lower unemployment rates and being interviewed before the recession (i.e. 2003-2007).

H5   Women who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession (i.e. 2008-2010) will spend more time with children and extended family than similarly situated men.

H6a   Parents of children under 18 who are unemployed, living states with poor economic conditions, or interviewed during the Great Recession will spend less time with their spouse or partner than respondents under 45 without children.

H6b   Respondents (who are not active parents) both younger and older than 45 who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession will spend more time with their parents and other extended family than respondents with children under 18.

H7a   Respondents who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession who have employed spouses or partners will spend more time with children than single respondents or those with spouses/partners who are not employed.

| H7b | Respondents who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession who have employed spouses or partners will spend more time with children than single respondents or those with spouses/partners who are not employed. |

Table 4-1 cont. Hypotheses

| H7c | Respondents who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession who are single will spend more time with extended family than those with spouses/partners who are not employed. |
| H8 | Respondents with lower levels of education who are unemployed, living in states with poor economic conditions, or interviewed during the historical time period marked by the Great Recession will spend less time with family members. |

outcomes for the spouse, and greater propensity for the wife to be unemployed if the husband is unemployed. Vinokur and colleagues (1996) examined data from southeast Michigan[49] and found that though being unemployed increased symptoms of depression, it was not significantly related relationship quality. Though it is reasonable to argue that decreased marital relationship quality is related to decreased time spent with spouses or partners because time spent together creates bonds and fosters positive interactions, it is equally plausible that increased time spent together is riddled with conflict. As such it is difficult to determine how time spent with spouses or partners may relate to the economic climate based on this prior research. Investigating time spent with spouses or partners during a contemporaneous time period and a recession may help illuminate the mechanisms between reduced relationship quality and a poor economic climate.

Though it is unclear how time spent with spouses or partners may be related to marital quality, there is some evidence that time spent with spouses or partners is, on average, viewed more positively than other times during the day (Flood and Genadak 2010). If the time with spouses or partners is better on average than other time throughout the day, we may expect that time with spouses or partners may decrease with a worsening economic climate due to increased stress. In light of the positive associations of marital quality with time with spouses or partners and the reductions in marital quality with declining economic climates identified in earlier research, I expect that being unemployed, living in states with poor economic conditions, and being interviewed

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[49] The authors of this study do not indicate when the data was collected.

during a historical time period marked by a recession will all be related to decreased time spent with spouses and partners. Specifically, I hypothesize the following:

> *H2*: Actually being unemployed, living in states with poor economic conditions, or being interviewed during the recessionary time period (i.e. 2008-2010) will be related to spending less time with spouses or partners (either alone or with others present).

Time with Extended Family

I can find no studies that investigate time spent with extended family members by exposure to differences in employment uncertainty. However, older research has argued that approximately 70% of adult children see their parents on a weekly basis (Mancini and Blieszner 1989).[50] Prior research has shown that individuals will often turn to extended family members or parents during times of need, such as losing ones' job or periods of financial uncertainty (e.g. Berry 2008; Suitor, Sechrist, and Pillemer 2007; Swartz et al. 2011) and this has been most certainly the case during the Great Recession (Pew Social and Demographic Trends 2011). Prior research has shown that adult children who are employed are less able to provide informal care to elderly or frail parents (R. W. Johnson and Lo Sasso 2000) making it possible that the unemployed are more able to provide care and, therefore, interact with extended family members. In light of the increasing benefits of sharing resources like time and housing and the challenges that employed respondents may experience when attempting to provide assistance to older family members while working, I expect that time spent with extended families will increase when respondents are unemployed, live in states with poor economic conditions, or are interviewed during a historical time period marked by a recession. Specifically, I hypothesize the following:

> *H3*: Being unemployed, living in areas with poor economic conditions (i.e. high unemployment rates), or being interviewed during a historical time period

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[50] A Dutch survey of young adults aged 18 to 34 collected between 2002 and 2004 found that 29.5% were living with their parents at the time of the survey and, of those living independently, 58.8% saw their mother on a weekly basis and 53.7% saw their father on a weekly basis (Bucx et al. 2008).

marked by a recession (i.e. 2008-2010) will be related to spending more time with parents and other extended family members.

The Intersection of Being Unemployed, State Economic Conditions, and Historical Time Period Marked by a Recession

Many of the studies discussed above investigate the effects of a single measure of the employment uncertainty such as actual job loss. However, a recessionary time period, such as the Great Recession, can expose individuals to multiple layers of employment uncertainty whether or not they are actually unemployed, and may exacerbate or attenuate their distress. For example, being unemployed during a period of economic growth or in states with low unemployment rates would be experienced very differently than being unemployed during a period of economic contraction or in states with high unemployment rates. Individuals who have lost their jobs may not feel the same amount of stress in communities where it is more acceptable to be unemployed because of larger social forces. Moreover, media attention on low job growth and high unemployment rates may reinforce a sense that one's own employment status is a reflection of the broader economic climate rather than one's own personal failings. In contrast, being unemployed during a period of economic growth or in states with low unemployment rates may have negative consequences, as unemployed individuals find themselves less able to attribute their situation to circumstances outside of their control. Similar patterns can be expected for people living in states of high unemployment during the Great Recession. Living in states with high unemployment rates during the Great Recession could magnify the negative experience of the recession by making the Great Recession that much more salient and raising concerns about future economic improvements. In contrast, those living in states with lower unemployment rates – though they are likely to struggle with the challenges of an uncertain economic future for the nation – may find the experience less problematic. Therefore, it is expected that living in states with poor economic conditions (i.e. higher unemployment rates) during the Great Recession will magnify the relationships between the Great Recession and time spent with family. As such, I expect the following:

H4a: Living in states with poor economic conditions or being interviewed during a historical period marked by a recession will moderate the effects of actually being unemployed for time spent with family. Specifically, being unemployed in conjunction with living in states with higher unemployment rates and/or being interviewed during the recessionary time period (i.e. 2008-2010) will be related to spending more time with children and less time with spouses or extended family members compared to the employed living in states with lower unemployment rates and/or being interviewed before the recession (i.e. 2003-2007).

H4b: Living in states with poor economic conditions in conjunction with being interviewed during a historical period marked by a recession will operate as a magnifier of time spent with family. Specifically, respondents living in states with high unemployment and being interviewed during the Great Recession (2008-2010) will be related to spending more time more time with children and less time with spouses and extended family members compared to those respondents living in states with lower unemployment rates and being interviewed before the recession (i.e. 2003-2007).

The Moderating Influence of Socio-Demographic Characteristics

There is reason to believe that the effects of employment uncertainty on time spent with family will not be uniform across the population. Differential access to resources and varying exposure to the likelihood of becoming unemployed are likely to result in different time investments with family. In particular, relationships between being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession and time with family are expected to be moderated by gender, life stage, spouse's/partners' employment status, and education.

The relationship between the economic climate and time spent with family is expected to be moderated by gender in part because of the gendered history of family relations. Women, in particular mothers, grandmothers, and daughters, have been primarily responsible for the care of children, the ill, and the elderly (e.g. Brazil et al. 2009; Brody 1981; R. Stone, Cafferata, and Sangl 1987) as well as maintaining relations throughout extended family networks (C. J. Rosenthal 1985; Schmeeckle 2007). Despite the growth in women's labor force participation since the 1950's, women continue to spend more time caring for children than men (Craig 2006). This gender difference coupled with the normative expectations that fathers are providers (Townsend 2002) and mothers should be fully engrossed in the role of motherhood (Hays 1996) means that during recessions or periods of unemployment this is unlikely to change. Living in states with high unemployment or during a recession may increase feelings of employment uncertainty. Such feelings are likely to result in fathers focusing on their role as breadwinner to try to maintain the financial position of their family. In contrast, mothers may then need to fill in gaps left by their spouses or partners and therefore spend more time with children. Similarly, the stress experienced when men become unemployed (e.g. Pearlin et al. 1981; Pearlin 1999; Pearlin et al. 2005) and are unable to fulfill the provider role may actually result in fathers not stepping in to provide childcare despite their increased time availability. Though extended family relationships don't include as strong of expectations to provide for these other family members, gender is expected to moderate the effects of employment uncertainty on time spent with extended family due to normative expectations regarding kin keeping (Rosenthal 1985). Such expectations mean that women, more so than men, spend more time with their family members including parents and other extended family members. Due to the gendered nature of family relationships, I expect the following:

> *H5:* Women who are unemployed, living in states with poor economic
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> conditions, or interviewed during the Great Recession (i.e. 2008-2010) will

spend more time with children and extended family than similarly situated men.

Life Stage

Life stage (as measured by age and parental status) is an important determinant of time spent with family members as well. Prior research has found that parental status and age of child is important for time parents spend with one another, such that when couples transition to parenthood their time together declines significantly and slowly rises as their children age reaching similar levels when children are 18 years of age or older (Flood and Genadak 2010). Moreover, research has shown that though spousal time declines at a slower rate for parents than non-parents, parents spent less time together in 1975 than in 2003 (Dew 2009). Prior research has also found that life stage influences the amount of time spent with extended family – particularly parents and adult children - due to changing family needs and resources. Bucx and colleagues (2008) found in their sample from the Netherlands that young adults (aged 18 to 34) with children have more face-to-face contact with their parents than do married/cohabitating young adults without children. However, this study may not be a good reflection of time with family in the United States because it captures a narrow age range of adult children and due to the different social supports for families and workers in the United States and the Netherlands (e.g. Gornick, Meyers, and Ross 1997; Kelly 2006). In addition, there is evidence that parents often provide assistance to their children during life course transitions such as young adulthood when adult children are establishing independent households (Lye 1996; Swartz et al. 2011). Similarly, adult children provide assistance and care for their parents at older ages due to increasing likelihood of health issues (Stoller 1983; R. Stone et al. 1987; Thornton and Hopp 2011; Wolff and Kasper 2006). Such results make it difficult to hypothesize how respondents' life course stages may be related to time with their parents and other extended family members. However, in light of the population Bucx and colleagues (2008) investigates and the challenges associated with work-family balance for families with children in the United States (Greenhaus and Beutell 1985; Winslow 2005), I expect the following:

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H6a: Parents of children under 18 who are unemployed, living states with poor
economic conditions, or interviewed during the Great Recession will spend
less time with their spouse or partner than respondents under 45 without
children.

H6b: Respondents (who are not active parents) both younger and older than 45
who are unemployed, living in states with poor economic conditions, or
interviewed during the Great Recession will spend more time with their parents
and other extended family than respondents with children under 18.

Spouses' Employment Status

Scholars have shown that time with children and spouse varies by spouses'
employment status and/or work hours (Casper and O'Connell 1998; Kingston and Nock
1987; Milkie et al. 2004; Presser 1988), while little is known about time spent with
extended family members by single-earner or dual-earner status. Casper and O'Connell
(1998) investigated childcare patterns drawing on the Survey of Income and Program
Participation using data from 1988, 1991, and 1993 and found that when the mother
worked part-time and husband worked full-time or when both parents worked part-time,
fathers spent more time caring for children compared to fathers in couples where both
parents worked full-time.[51] Presser (1988) arrived at similar results using the 1984 wave
of the National Longitudinal Survey of labor Market Experience, Youth Cohort and
found that couples work together to synchronize their schedules to care for children.
More recent research using time diary data finds that increases in spouses work hours are
related to spending more one-on-one time with the youngest (or only) child regardless of
gender potentially to make up for time that the other parent is unavailable (Milkie et al.
2004). These patterns suggest that parents may spend more time with children when their
spouses or partners spend more time at work. A study drawing on the 1981 Study of
Time Use (time diary data from the United States and collected in 1976) found that
spouses combined work hours (that is, fewer work hours for the husband and wife in

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[51] Single earner couples are excluded from the analyses in this study.

total) and asynchronized work schedules (e.g. husbands working the day shift and wives working the night shift) were negatively related to the time spouses spend together (Kingston and Nock 1987). These findings are in line with prior research on work-family conflict, which posits that the demands of work may make spending time with spouses or partners difficult (Moen 2003). Though, it is unclear how respondents' spouses'/partners' employment status may be related to the time respondents spend with extended family members, it is possible that single respondents may depend more on their extended family relationships and therefore spend more time with extended family (Swartz et al. 2011), while married or partnered respondents with employed partners may spend less time with extended family members due to competing work and nuclear family demands (Greenhaus and Beutell 1985). A study of contact between adult children and parents supports this finding and shows that married or cohabiting young adults have less face-to-face contact with their parents than do single young adults (Bucx et al. 2008).

Prior research has not investigated how the additional resources or constraints of the spouses'/partners' employment status may moderate the effects of the economic climate for time spent with family members. In light prior research on the direct effects of this additional (or lack of) wage earning role, I expect the following:

> *H7a*: Respondents who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession who have employed spouses or partners will spend more time with children than single respondents or those with spouses/partners who are not employed.

> *H7b*: Respondents who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession who have employed spouses or partners will spend less time with their spouses or partners and less time with extended family than those with spouses/partners who are not employed.

H7c: Respondents who are unemployed, living in states with poor economic conditions, or interviewed during the Great Recession who are single will spend more time with extended family than those with spouses/partners who are not employed.

Education

Prior research has shown that higher levels of education are related to spending more time with children (Gauthier, Smeeding, and Furstenberg 2004; Hook and Chalasani 2008; Sayer et al. 2004; Yeung et al. 2001). Due to the additional challenges those with lower levels of education face when they experience employment uncertainty, education is expected to moderate the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession on time spent with children. However, it is unclear how education will moderate these relationships as I can find no studies that examine time spent with such family members by educational attainment. However, it is possible that respondents with lower levels of education will spend less time with family members than those with higher levels due fewer resources like savings and social networks to help buffer the challenges associated with being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession.

In light of this, I expect the following:

H8: Respondents with lower levels of education who are unemployed, living in states with poor economic conditions, or interviewed during the historical time period marked by the Great Recession will spend less time with family members.

Data & Methods

Data

The American Time Use Survey (ATUS) is collected by the U.S. Census Bureau and disseminated by the Minnesota Population Center through the ATUS-X extract system (Abraham et al. 2011). The ATUS is an annual, cross-sectional, nationally representative sample of the non-institutionalized American population's diary days that

has been fielded continually since 2003. I pool data from all available survey years (2003-2010) to compare time with family members by whether respondents are unemployed, if they live in states with poor economic conditions (as captured by high unemployment rates), and whether they were interviewed during the recessionary time period. The analytic sample (n=32,528) is limited to those respondents between the ages of 23 and 55 because they are more likely to be connected to the labor force and, therefore, influenced by an economic recession.[52] Diary days are limited to weekdays in order to focus on the impact of the meaning of work, which for most people occurs on weekdays (U.S. Bureau of Labor Statistics 2012b), for time spent with family. (Appendix I shows supplemental analyses investigating patterns of time with family members on weekends).

The ATUS is a time diary survey that captures a respondent's daily activities from 4:00 AM the morning prior to the survey day until 3:59 AM of the survey day. The survey captures each activity a respondent engages in, how much time they spend in this activity (down to the minute), who they are with, and whether or not they provided secondary childcare during the activity. The ATUS is fielded continually throughout the year and spans the four seasons as well as each day of the week including holidays. Scholars have examined time diary data for reliability and have found it to be more accurate than stylized survey questions[53] (Juster and Stafford 1985; Juster et al. 2003; J. P. Robinson 1997). In addition, it is no less accurate for most activities measured by experiential sampling methodology while being less expensive.

The sampling frame for the ATUS is the Current Population Survey (CPS) and as such, respondents have completed eight waves of the CPS prior to participating in the ATUS. The CPS samples the U.S. civilian, non-institutionalized population (U.S. Bureau of Labor Statistics 2006). Eligible households are identified using the U.S. Census Bureau's listing operation. ATUS respondents are randomly selected from all household

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[52] Respondents under the age of 23 have increased odds of being involved in schooling while respondents over the age of 55 have greater odds of being retired or partially retired both of which would alter their attachment to the labor force.
[53] Stylized survey questions ask respondents to sum the total amount of time spent in any given activity across a specific time span.

members over the age of 15. The response rate for the ATUS is lower than other nationally representative surveys in part due to the time commitment necessary for the CPS (U.S. Bureau of Labor Statistics 2009). Sample weights are constructed to account for oversampling of particular groups, oversampling of weekends, and differing response rates. Sampling weights are applied in all of the following analyses.[54] Because the survey is primarily completed over the phone, respondents without phones or with intermittent service are underrepresented in the sampling frame (Davern et al. 2004).

In addition to nonresponse, missing values on household and demographic variables are imputed in the same manner as the CPS in order to maintain consistency between the two datasets (U.S. Bureau of Labor Statistics 2009).[55] Labor force participation edits are based on relational imputation and hot-deck. Demographic characteristics like age, sex, and household relationships are edited to ensure consistency and hot-deck allocations are used in the editing process. Race, marital status, Hispanic origin, and educational attainment are not updated during the ATUS to reduce respondent burden and as such are missing in the ATUS if they are missing in the CPS. Missing values on ATUS specific variables like records with fewer than 5 activities in a 24 hour period or activities that cover fewer than 21 hours in the 24 hour period are dropped from the public dataset.[56] "Who" and "where" codes that are inappropriately linked to activities (such as time with family members) are stripped from cases. "Where" codes that are missing are imputed using a set of rules defined by the survey administrators. Spouses'/partners' employment status is allocated based on prior longitudinal information or through imputation based on the age of the spouse when unavailable.

Missing data on the time spent with family members or indicators of employment uncertainty are not expected to influence the majority of my results in part because of the

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[54] I use the variable wto6 to weight the data in the following analyses.
[55] All cases of imputation or data editing are performed by the U.S. Bureau of Labor Statistics before the data is released publically.
[56] This is a small percentage of the full ATUS dataset (2.8%) but it is not clear how many of these individuals would have been included in my analytic sample because age is stripped from these non-respondents. Though there may be concerns that the most engaged would be most likely to be excluded from the dataset due to difficulty contacting them, prior research instead finds that those individuals who are weakly connected to their communities are least likely to be included because they are less likely to be contacted (Abraham et al. 2006).

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 state economic conditions or historical time period (U.S. Bureau of Labor Statistics 2009). 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 (when respondent was interviewed) is based on the year in which the interview occurred and is answered by the survey interviewer. Data on time spent with family members are potentially more problematic because they are self-reported. However, because the survey is not framed as a survey about time spent with family and the time allocated in the survey must sum to 24 hours, it is less likely that respondents will systematically bias their responses. It is possible that respondents may forget episodes where some family members are present – particularly if the episode was short – and omit it from their time diary. 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 my results but not bias them. In light of this, any significant findings should be interpreted as a conservative estimate.

Variables

Measuring Family Time

Family time is assessed through three types of relationships: time with children, time with spouses or partners, and time with extended family members. Each of the time variables is the summation of all time on the diary day when a respondent reports being with a person of that relationship. Respondents are not asked whom they were with while sleeping or during other personal care activities (e.g. showering). Time with children is examined through two measures, including time with children of all ages and time with children under the age of six. Time with spouses/partners[57] is assessed through time spent with spouses or partners during all activities and time spent with spouses or partners

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[57] Respondents are asked to categorize their relationships to all individuals living in the household and available options given to the interviewer includes both spouses and unmarried partners.

when no one else is present (i.e. time when others may be present versus time alone with spouses or partners). Measures of time spent with children, children under age six, and spouses or partners are limited to those respondents with those relationships.[58] Time with extended family is investigated through time spent with parents and time spent with all extended family members (including but not limited to parents, grandparents, cousins, aunts and uncles, etc.).

Measures of Employment Uncertainty

Much of the prior scholarly work examining the effects of employment uncertainty have focused on either a particular time period (e.g. the Great Depression) or local or state-level unemployment rates as proxies for economic conditions. However, these measures alone may not adequately capture the unique economic environment of the Great Recession. Figure 2-1 (see page 39) illustrates why this may be the case. Figure 2-1 shows monthly state-level unemployment rates since data was initially collected for the ATUS. The first vertical line in the figure marks the onset of the recession as determined by the National Bureau of Economic Research (NBER) (2010). The second vertical line marks the conclusion of the recession as determined by the NBER. Unemployment rates and the variation across states increased after the recession began. In addition, unemployment rates did not stabilize until the end of the recession but at much higher levels than the prior years shown. In light of the unique characteristics of this recession, both in terms of variation across state and time, it is more appropriate to investigate multiple measures of the recessionary climate – state economic conditions as captured by unemployment rates and historical time period – than a single measure of this multifaceted construct.

State economic conditions are captured by constructing a rolling average of state-level monthly unemployment rates. State-level monthly unemployment rates are available from the U.S. Bureau of Labor Statistics and are easily appended to the ATUS dataset.[59] I then calculate the rolling average including the month prior, during, and after survey

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[58] Measures of time with parents or other extended family members are constructed for all respondents included in the analytic sample.

[59] More specific geographic identifiers are not available for the ATUS.

participation.[60] This rolling average captures what respondents have recently experienced, what they are currently experiencing, and what they expect to experience in the near future.

The time period when respondents were interviewed is included in the analyses and captures both the broader economic climate of the recessionary period and any year-to-year variation following the onset of the recession including potential duration or peak effects. In the analyses, those interviewed during the recessionary years of 2008, 2009, and 2010 are compared to those interviewed during pre-recessionary years (2003-2007). Indicators for the recessionary years when respondents were interviewed are included separately to help parse out how effects may differ over time such as prolonged exposure or initial uncertainty followed by a period of stability.

Being unemployed is captured in the dataset by the longitudinal nature of the ATUS and the CPS. Because the CPS is the sampling frame of the ATUS, each respondent has participated in the CPS two to five months prior to their ATUS survey participation.[61] The CPS captures the employment status for each household member included in the survey. Upon entry into the ATUS, respondents are asked if their employment status has changed. From this information I am able to compare respondents by detailed exposure to unemployment including those who are employed (at the time of the ATUS), those who are recently unemployed (employed at CPS and unemployed ATUS), those who are longer-term unemployed (unemployed at both CPS and ATUS), and those who are not in the labor force (at the time of the ATUS). Respondents who are employed at the time of the ATUS are the comparison group.

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[60] 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 final models including all of the controls. Because it was only significant in the initial models (those without socio-demographic characteristics and controls) predicting time spent with spouses/partners, I excluded these terms from the analyses and the results described below.

[61] Because the sampling unit is based on location rather than the individual or household group, individuals and household members may move between waves of the CPS or before the ATUS begins. In this case, the new residents are included in the survey. This occurs for about 2.7% of the household members captured by the ATUS. However, the majority of such individuals are usually children born between the CPS and the ATUS and would not affect these results.

Measures of Socio-Demographic Characteristics

Socio-demographic characteristics are also key predictors of time spent with family members and as such are included in the analyses. Measures of socio-demographic characteristics included in this set of analyses are gender, life stage, spouses'/partners' employment status, and education.[62] Gender is captured by a dichotomous variable where men are the reference category. Life stage reflects shifting demands of both age and parental responsibility. Life stage is divided into three categorical variables including being younger than 45 and not having children under 18, being a parent of a child under age 18, and being older than 45 and not having children. Respondents younger than 45 without children is the comparison group. Spouses'/partners' employment status reflects both marital or partner status and the partner's employment status. Spouses'/partners' employment status is divided into four categorical variables including respondents who are single, married or partnered to a full-time employee, married or partnered to a part-time employee, and married or partnered to someone not currently employed. Respondents who are married or partnered to someone not currently working are the comparison group. Education captures the socioeconomic status of the respondents. It is divided into three categorical variables based on highest degree completed including high school degree or less, associate's degree or some college, and a college degree or higher. Respondents with a college degree or higher are the comparison group.

Analytic Strategy

Due to concerns regarding the distribution of the dependent variable and the rarity of spending time with particular family members (e.g. parents and extended family members), the following analyses are conducted using Zero-Inflated Poisson regression models (see Appendix G for a comparison of possible modeling strategies). Zero-Inflated Poisson regression models predict whether or not a respondent spends anytime with children, spouses/partners, and extended family members as well as the amount of time

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[62] Additional characteristics like living with an extended family member, race, immigrant status, region, metropolitan area, and season are also included in the analyses as controls but not discussed in the results.

spent with a particular family member on that day. In addition to the strength of predicting both whether or not a respondent engages in a particular activity (0/1 outcome), such models also allow for zeros to be generated by two distinct processes (Long and Freese 2006), which is beneficial for this analysis as there may be more than one reason a respondent spends no time with a given family member (including proximity, traveling, schedules, etc.). This model estimates two equations, one for binary outcomes (0/1 outcome of being *always zero*) and the other for count outcomes (the number of minutes predicted to be spent with a given type of family member given they are not *always zero*). The binary portion of the equation predicts the logged odds of spending *no time* with the family member of interest[63] while the count portion of the equation predicts the logged incidence rate ratio of time spent with that family member (Long and Freese 2006). The coefficients for the binary equation are exponentiated to odds ratios. I then use the Margins command in STATA 12 to estimate the marginal effects from the count equation to arrive at the expected number of minutes change as a given variable moves from 0 to 1 (Anon n.d.). Odds ratios and marginal effects are more straightforward to interpret than the coefficients produced by Zero-Inflated Poisson and are used throughout the results to aid in interpretation. The marginal effects shown here represent the marginal change (in minutes) with one unit increase in the independent variable and all other independent variables held at the mean. Odds ratios below one reduce the odds of being in the group of interest (in this case always being zero or spending no time with a given type of family member) while values above one increase the odds. In addition, odds ratios are multiplicative.

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 results changed in a notable manner, I excluded

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[63] This is the reverse of traditional logistic regression models which predict the odds of being in a particular group or experiencing a particular event.

the cases from the analysis.[64] The models predicting time spent alone with spouses/partners and time spent with extended family members had influential cases that were eventually dropped from the analysis.[65]

I begin the analysis by examining the descriptive statistics for the sample and the dependent variables of interest. Next, I build each model in a stepwise fashion to identify the relationships between time spent with family and measures of employment uncertainty as well as how they are mediated by socio-demographic characteristics. Each set of models includes the economic variables of interest, the socio-demographic characteristics, economic interactions, and socio-demographic interactions in a step-wise fashion. Interactions are tested across the economic variables of interest and the social context variables and include all appropriate main, two-way, and three-way interactions where appropriate. In order to test for statistically significant interactions I began by including in the models each of the direct effects and two-way interactions between the socio-demographic variable of interest and each of the economic climate variables.[66] Second, I tested for three way interactions by including in each of the models the direct effects, two-way interactions, and three-way interactions. Significant moderating relationships are presented in the results and illustrated in figures (tables showing regression results for the interactions are included in Appendix C and D).[67]

Results

Table 4-2 includes the descriptive statistics for the analytic sample (bivariate patterns across measures of employment uncertainty are shown in Appendix H). Here we see that most parents spend at least some time with their children of any age (89.6%) and on average spend a great deal of time with their children – 4 hours and 34 minutes on

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[64] 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.

[65] Four cases were dropped from the model predicting time spent alone with a spouse or partner and four cases were dropped from the model predicting time spent with extended family members.

[66] Due to the varying effects of gender by life stage, gender and life stage were both run separately in interaction models as well as together in a gendered life stage model.

[67] Selection into being unemployed is expected to differ before the recession when compared to during the recession. Unfortunately, I am unable to account for the selection in these models. Future analysis will need to account for this selection process.

Table 4-2. Descriptive statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Dependent Variables				
Time Spent with Children per Weekday				
% Spent Time with Children under 18	89.59%	0.003	18,385	126,233,056,059
Time with All Children under 18	273.54	1.924	20,200	140,903,196,146
% Spent Time with Children under 6	93.87%	0.003	8,720	61,107,055,658
Time with Children under 6	335.67	3.075	9,210	65,096,239,188
Time Spent with Spouses/Partners per Weekday				
% Spent Time with Spouses/Partners	87.57%	0.003	19,156	169,457,632,450
Time with Spouse or Partner	204.48	1.594	21,822	193,521,842,655
% Spent Time Alone with Spouses/Partners	69.71%	0.004	14,635	134,910,411,910
Time with Only Spouse or Partner	113.40	1.308	21,822	193,521,842,655
Time Spent with Extended Family per Weekday				
% Spent Time with Parent(s)	10.24%	0.002	2,733	29,295,675,357
Time with Parent(s)	17.27	0.583	33,528	286,052,297,649
% Spent Time with All Extended Family	28.76%	0.003	8,852	82,264,679,546
Time with All Extended Family	60.39	1.039	33,528	286,052,297,649
Independent Variables				
Employment Uncertainty				
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
Year Interviewed				
Before the Recession (2003-2007)	61.98%	0.003	22,050	177,308,268,704
2008	12.71%	0.002	3,690	36,354,562,066
2009	12.61%	0.002	3,875	36,080,970,759
2010	12.69%	0.002	3,913	36,308,496,119
Socio-Demographic Characteristics				
Female	50.69%	0.003	18,673	144,999,768,293
Life Stage				
45 or Younger without Children	29.10%	0.004	6,916	83,235,462,804
Parent of Child under 18	49.26%	0.003	20,200	140,903,196,145
Older than 45 without Children	21.64%	0.003	6,412	61,913,638,699
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed	14.6%	0.002	4,365	40,817,608,367
Spouse/Partner Employed Part-Time	7.2%	0.002	2,304	19,990,229,320
Spouse/Partner Employed Full-Time	45.2%	0.003	14,413	126,329,739,156
No Spouse or Partner	33.1%	0.003	11,706	92,530,454,994

Notes: Time is estimated in minutes. Time spent with children is limited to respondents with children under 18. Time spent with spouses/partners is limited to respondents with a spouse or partner. Estimates are weighted using the wt06 variable.

Table 4-2 cont. Descriptive statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Education				
College Degree or More	32.50%	0.003	12,180	92,980,501,763
Some College or Associates	26.59%	0.003	9,727	76,048,569,117
High School Diploma or Less	40.91%	0.003	11,621	117,023,226,769
Controls				
Living with Extended Family Members	16.7%	0.003	3,409	47,787,571,552
Race				
White	67.55%	0.003	23,229	193,221,566,911
African American	11.81%	0.002	4,035	33,770,009,166
Hispanic	15.26%	0.003	4,545	43,660,737,068
Other	5.38%	0.002	1,719	15,399,984,503
Immigrant	15.94%	0.003	4,814	45,602,875,726
Region				
Northeast	17.94%	0.003	6,104	51,330,852,583
Midwest	24.56%	0.003	8,469	70,242,153,502
South	34.87%	0.003	11,552	99,741,451,732
West	22.63%	0.003	7,403	64,737,839,830
Metropolitan Area				
Suburban	57.82%	0.003	19,439	164,387,371,144
Urban	25.22%	0.003	8,216	71,710,243,283
Rural	16.95%	0.003	5,686	48,201,940,337
Season				
Summer	24.81%	0.003	8,096	70,966,112,838
Fall	24.95%	0.003	8,024	71,382,658,740
Winter	24.66%	0.003	8,784	70,543,276,304
Spring	25.58%	0.003	8,624	73,160,249,767
Holiday Diary Day	1.59%	0.001	576	4,553,608,507

Notes: Time is estimated in minutes. Time spent with children is limited to respondents with children under 18. Time spent with spouses/partners is limited to respondents with a spouse or partner. Estimates are weighted using the wt06 variable.

weekdays. Parents of preschool children are even more likely to spend some time with children on the diary day (93.9%) and spend even more time with their children. Parents of preschoolers spend 5 hours and 36 minutes with their children on weekdays. Time spent with respondents' spouses/partners does not consume as much time during the diary day but is still a large proportion of the waking hours and the vast majority spend at least some time with spouses/partners at some point in the diary day (87.6%). Respondents who reports being married/living with partners spend on average 3 hours and 24 minutes with their spouses/partners. Time spent alone with spouses/partners makes up a smaller

percentage of the diary day but still the majority of married or partnered respondents report doing so at some point in the diary day (69.7%) and do so for a fairly large amount of time (1 hour 53 minutes on average). Time with extended family members composes much less of the diary day and fewer respondents spend time with parents (10.2%) and with all extended family members (28.8%). Respondents spend an average of 17 minutes with at least one parent on weekdays. Time spent with extended family is somewhat greater as respondents spend 60 minutes with extended family members on average.

Multivariate Models Predicting Time Spent with Family Members

Time Spent with Children

In general, Table 4-3 shows that being unemployed and being interviewed in 2009 are linked to spending more time with children on weekdays compared to the employed and those respondents interviewed before the recession began (2003-2007), while the state unemployment rate is negatively related to spending no time with children under 6 (which is relatively uncommon as only 6.13% of parents spend no time with their children under 6).[68] Model 1 in Table 4-3 shows the predicted odds of and time parents spent with children under the age of 18. In the binary portion of the model, only respondents not in the labor force are significantly related to the odds of spending time with children under 18. In this case, those not in the labor force have 45% lower odds of being in the always zero group or spending no time with children on the diary day. Model 2 in Table 4-3 shows a similar pattern for respondents not in the labor force and spending time with children under 6 (reducing the odds of spending no time with children under 6 by 58%), but we also see that higher unemployment rates are related to lower odds of being always zero. That is, in states with unemployment rates, respondents are more likely to spend at least some time with their child under 6.

Across Models 1 and 2 in the count portion of the models we see similar patterns. Being unemployed (both recently and long-term)[69] and being interviewed during the

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[68] Because weekends are distinctive from weekdays, I focus here on time spent on weekdays, that is, the "normal" work week.
[69] Being out of the labor force is also related to spending more time with children.

Table 4-3. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spent with Children, ATUS 2003-2010.

	Model 1: Children under 18								Model 2: Children under 6							
	Binary[1]				Count[2]				Binary[1]				Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate																
Detailed Employment Status																
Employed (ref.)																
Unemployed - 2 to 5 months	0.71	-0.34		0.22	139.48	0.46	***	0.04	1.18	0.17		0.40	156.32	0.47	***	0.05
Unemployed - at ATUS & CPS	1.01	0.01		0.18	134.91	0.48	***	0.03	1.23	0.21		0.36	161.00	0.49	***	0.04
Out of the Labor Force	0.55	-0.59	***	0.12	181.37	0.55	***	0.01	0.42	-0.87	***	0.25	204.79	0.53	***	0.02
State Economic Conditions																
Unemployment Rate	0.98	-0.02		0.02	-1.72	-0.01		0.00	0.90	-0.10	*	0.04	-0.80	-0.01		0.01
Time Period																
2003-2007 (ref.)																
2008	0.87	-0.14		0.10	6.73	0.01		0.02	0.79	-0.24		0.20	-0.59	-0.01		0.03
2009	1.27	0.24		0.13	9.34	0.06	*	0.03	1.53	0.43		0.25	13.03	0.06	*	0.03
2010	1.01	0.01		0.14	12.18	0.04		0.03	1.10	0.09		0.26	13.46	0.04		0.03
Constant		-1.58	***	0.16		5.47	***	0.03		-1.86	***	0.28		5.47	***	0.04

Notes: Model 1 N=19,569, Model 2 N=8,944. *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in the model and shown in Appendix A. Additional controls included in the model are living with an extended family member, race, immigrant status, 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.

recessionary time period are related to spending more time with children. Being unemployed in the short term (two to five months) is related to spending 139 more minutes and being unemployed in the longer-term (unemployed at the ATUS and the CPS – a minimum of two to five months) is related to spending 134 more minutes with children of all ages than the employed. In Model 2 we see that being unemployed in the short term is related to spending 156 minutes more and being unemployed in longer-term is related to spending 161 minutes more time with children under 6 than the employed. These findings support H1a. In contrast, being interviewed during the recessionary time period is related to spending more time with children while living in states with high unemployment rates does not predict time spent with children, which contradicts H1b. Parents interviewed in 2009 spent 9 minutes more with their children under 18 and 13 minutes more with their children under 6 than did parents interviewed before the recession. Interaction models 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 on time spent with children under 18 on weekdays were not informative and are therefore not included.

Interaction models testing the two- and three-way interactions for time spent with children under 6 showed significant interactions between being unemployed, living in states with poor economic conditions, and being interviewed during the recessionary time period (full models are available in Appendix C).[70] As shown in Figure 4-1, the recently unemployed interviewed in 2010 and the longer-term unemployed interviewed in 2008 spend more time with children under 6 in states with higher unemployment rates whereas the employed interviewed before the recession show no differences across different unemployment rates and the recently unemployed before the recession spend less time. Specifically, the expected time spent with children under 6 is stable across the unemployment rate at approximately 4 hours and 20 minutes for the employed interviewed before the recession. The time estimate for the recently unemployed

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[70] To aid in their interpretation, the predicted average time spent with children under 6 on weekdays were estimated and are shown in Figure 2. Each of the variables not shown are held at their mean. The reference group is those respondents employed before the recession began (2003-2007) and are represented in the figure by a solid line.

Figure 4-1. Moderating Effects of Recessionary Time Period, the Unemployment Rate, and Being Unemployed for Time Spent with Children Under 6
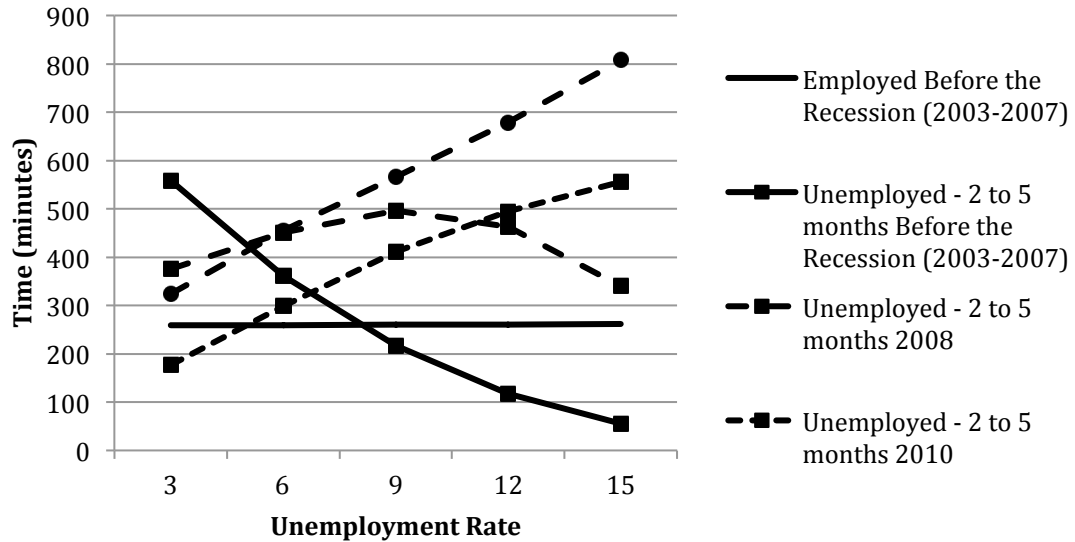
interviewed before the recession starts high but is much less in states with higher unemployment rates (over 9 hours for low unemployment areas and under an hour for high unemployment areas). The recently unemployed interviewed in 2008 show a curvilinear pattern and peak around 9% unemployment at about 8 hours and 20 minutes. Finally, the long-term unemployed interviewed in 2008 and the recently unemployed interviewed in 2010 show higher estimates of time spent with children under 6 for those living in states with higher unemployment rates. The contradictory relationships shown in Figure 4-1 (both positive and negative effects of unemployment rates is evidence of the overlapping indicators of employment uncertainty. These results support H4a.

Time Spent with Spouses/Partners

In Table 4-4 we see the Zero-Inflated Poisson regression models predicting the time and odds of spending time with the respondents' spouses/partners on weekdays. Overall, we see that, contrary to H2, the unemployed are less likely to spend *no time* with spouses or partners on the diary day and the unemployed (both recently and longer-term) spend more time with them. In Model 1 of Table 4-4 we see that the longer-term

Table 4-4. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adults Spent with Spouses/Partners, ATUS 2003-2010.

	Model 1: Spouses/Partners							Model 2: Alone with Spouses/Partners						
	Binary[1]			Count[2]				Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate																
Detailed Employment Status																
Employed (ref.)																
Unemployed - 2 to 5 months	0.74	-0.30		0.25	122.43	0.42	***	0.05	0.70	-0.35	*	0.17	91.33	0.44	***	0.06
Unemployed - at ATUS & CPS	0.65	-0.44	*	0.18	97.44	0.33	***	0.04	0.59	-0.54	***	0.13	63.97	0.29	***	0.05
Out of the Labor Force	0.80	-0.23	**	0.08	83.22	0.30	***	0.02	0.86	-0.15	**	0.05	54.29	0.30	***	0.03
State Economic Conditions																
Unemployment Rate	0.98	-0.02		0.02	0.26	0.00		0.01	0.99	-0.01		0.01	0.48	0.00		0.01
Time Period																
2003-2007 (ref.)																
2008	1.03	0.03		0.09	-5.18	-0.02		0.02	1.13	0.12	*	0.06	-5.44	-0.01		0.03
2009	1.07	0.07		0.12	15.44	0.07	*	0.03	1.02	0.02		0.08	6.69	0.05		0.04
2010	1.09	0.09		0.12	15.87	0.07	*	0.03	1.00	-0.01		0.08	9.92	0.06		0.04
Constant		-2.39	***	0.17		5.66	***	0.04		-1.99	***	0.12		5.48	***	0.06

Notes: Model 1 N=20,949, Model 2=20,948. *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in the model and shown in Appendix A. Additional controls included in the model are living with an extended family member, race, immigrant status, 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.

unemployed and those not in the labor force have significantly lower odds of spending no time with spouses/partners (regardless of who else was present) when compared to the employed. That is they are more likely to spend at least some time with their spouses or partners on weekdays. In the count portion of the equation we see that being unemployed is related to spending more time with spouses or partners – 2 hours and 2 minutes for the recently unemployed and 1 hour and 37 minutes for the long-term unemployed. Model 2 of Table 4-4 predicts the time spent with spouses/partners when no other individuals are present. Here we see similar patterns. The unemployed (both recently and longer-term) are less likely to spend no time alone with spouses/partners and spend more time on average with spouses/partners when no others are present. The recently unemployed spent on average an hour and a half more time alone with spouses/partners and the long-term unemployed spent an hour and four minutes more time alone with spouses/partners than did the employed on weekdays.

The historical time period (when respondent was interviewed) is related to spending more time with spouses/partners in Model 1 of Table 4-4 and to lower odds of spending time alone with spouses/partners in Model 2. The state economic conditions (as captured by the unemployment rate) were not significant in either model. Respondents interviewed in 2008 had 13% greater odds of spending no time alone with their spouses/partners (that is they are less likely to spend time alone with their spouses/partners). In contrast, during the recession, respondents interviewed in 2009 spent 15 more minutes and those interviewed in 2010 spent 16 more minutes with spouses/partners than did respondents interviewed before the recession. This is mixed support for H2 as only respondents interviewed in 2008 have greater odds of spending no time alone with spouses/partners. Interaction models 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 on time spent with spouses or partners regardless of whom else was present or time spent alone with spouses or partners were not informative and are therefore not included.

Time Spent with Extended Family Members

In general, Table 4-5 shows that the unemployed – particularly the longer-term unemployed – are more likely to spend time and spend more time overall with extended family members. In addition, living in states with poor economic conditions is related to a greater likelihood of spending time with parents and extended family members. In contrast, being interviewed during a historical time period marked by a recession is related to being less likely to spend time and spending less time overall with extended family members. These results both support and contradict H3. In Model 1 of Table 4-5 we see that only those not in the labor force are related to the lower odds of spending no time with a parent while in Model 2 the long-term unemployed are have lower odds of spending no time with all extended family members. In the count portion of Model 1 the longer-term unemployed spend 9 minutes more with their parents on average than did the employed. In Model 2 predicting time spent with all extended family members, we see that the recent and longer-term unemployed spend more time on average with extended family when compared to the employed (35 minutes and 53 minutes respectively). These results support H3.

H3 is also supported by the predicted relationship between the state economic conditions and the odds of spending time with extended family members. In the binary portion of Models 1 and 2 we see that higher unemployment rates are related to lower odds of spending no time with parents or other extended family members. That is they are more likely to spend at least some time with extended family members in states with poor economic conditions.

In contrast, the negative relationship between being interviewed during a recessionary time period and time spent with extended family members contradicts H3. In Model 1 we see that respondents interviewed in 2009 spent 4 minutes less with their parents than did respondents interviewed before the recession. Similarly, in Model 2 we see that respondents interviewed in 2010 have 18% higher odds of spending no time with extended family. That is, adult respondents surveyed in 2010 were less likely to spend time with parents, cousins, aunts, uncles, or other extended family members.

Table 4-5. Zero-Inflated Poisson Regression Models Predicting Time (Minutes Per Weekday) Adults Spent with Extended Family Members, ATUS 2003-2010.

	Model 1: Parent(s)								Model 2: All Extended Family							
	Binary[1]				Count[2]				Binary[1]				Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate																
Detailed Employment Status																
Employed (ref.)																
Unemployed - 2 to 5 months	1.09	0.09		0.22	1.47	0.22		0.17	0.78	-0.25		0.13	34.59	0.34	***	0.07
Unemployed - at ATUS & CPS	0.86	-0.15		0.14	9.44	0.52	***	0.10	0.71	-0.34	**	0.10	53.28	0.47	***	0.05
Out of the Labor Force	0.70	-0.35	***	0.07	13.46	0.53	***	0.05	0.66	-0.41	***	0.05	55.63	0.45	***	0.03
State Economic Conditions																
Unemployment Rate	0.95	-0.05	*	0.02	0.82	0.01		0.02	0.95	-0.05	***	0.01	1.75	-0.01		0.01
Time Period																
2003-2007 (ref.)																
2008	0.96	-0.04		0.09	-0.26	-0.06		0.08	1.08	0.08		0.06	-6.01	-0.04		0.04
2009	1.04	0.04		0.12	-4.18	-0.31	**	0.10	1.13	0.12		0.08	-8.05	-0.04		0.05
2010	1.23	0.21		0.13	-2.58	0.00		0.11	1.18	0.17	*	0.08	-1.32	0.10		0.06
Constant		3.72	***	0.18		4.92	***	0.17		2.31	***	0.11		5.20	***	0.08

Notes: Model 1 N=32,610, Model 2 N=32,607. *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in the model and shown in Appendix A. Additional controls included in the model are living with an extended family member, race, immigrant status, 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.

Figure 4-2. Moderating Effects of Recessionary Time Period and Being Unemployed for the Predicted Time Spent with Parent(s)
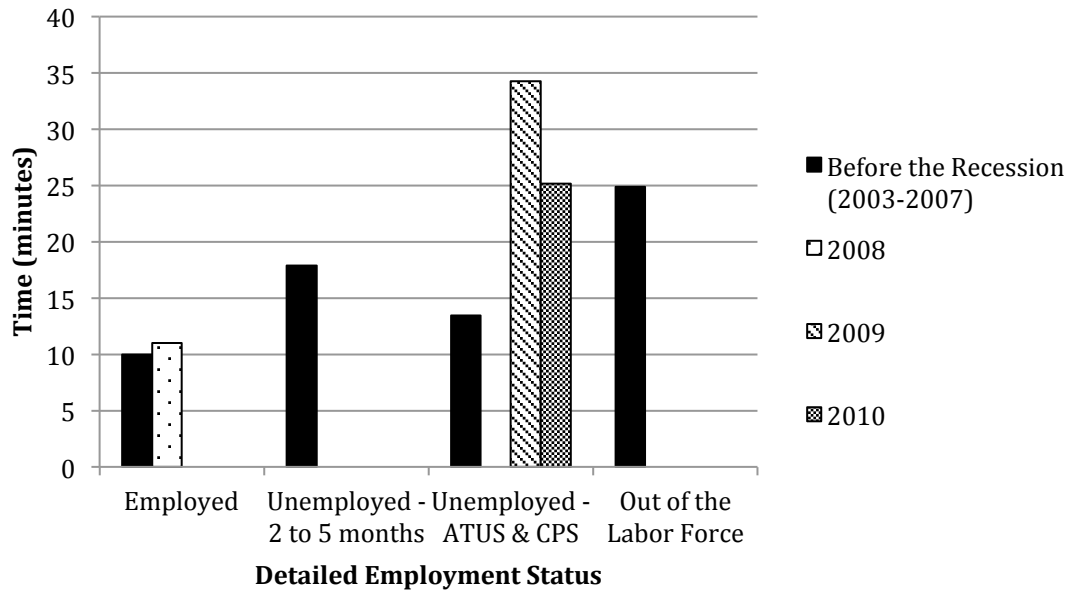
Interaction models testing the two- and three-way interactions showed significant interactions between being interviewed during the recessionary time period and being unemployed for time adults spend with their parents and extended family members (results shown in Figures 4-2 and 4-3). Figure 4-2 illustrates the predicted number of minutes spent on average with a respondent's parent(s)[71] and, in general, we see that the longer-term unemployed spend more time with their parents during the Great Recession. The long-term unemployed interviewed in 2009 and 2010 spent 34 minutes and 25 minutes respectively with their parents while the employed interviewed before the recession spent 10 minutes with their parent(s) on average. The time spent with parents by the longer-term unemployed is a fairly substantial amount of time when calculated out to represent a full week – 2 hours and 50 minutes in 2009 and 2 hours and 5 minutes in 2010. Such findings contradict H4a.

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[71] The reference group is the employed before the recession and is the solid bar on the far left of the figure.

Figure 4-3. Moderating Effects of the Recessionary Time Period and Being Unemployed for the Predicted Time Spent with Extended Family members
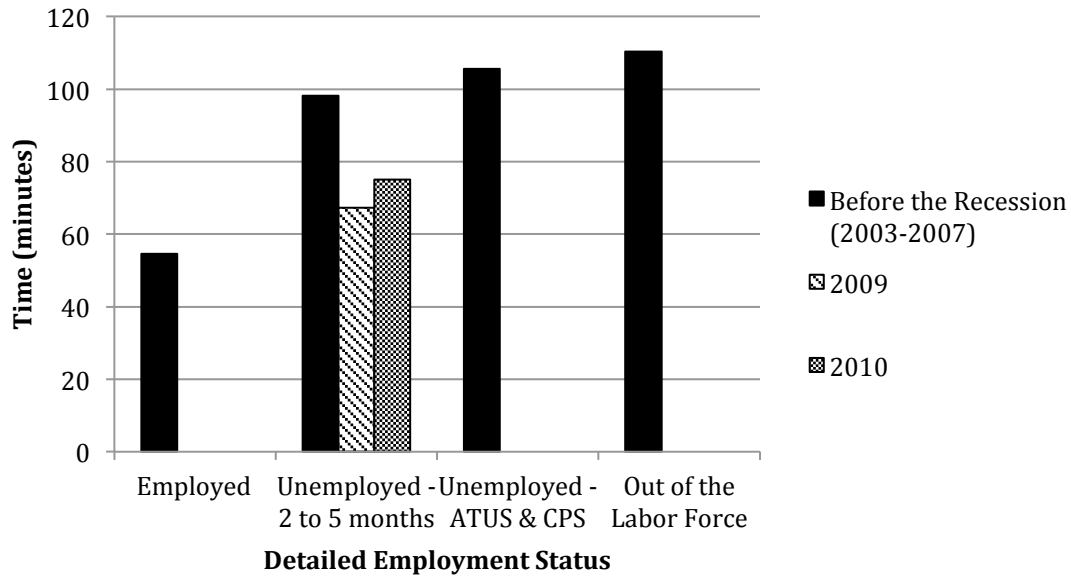
Figure 4-3 illustrates the predicted number of minutes spent on average with all extended family members. This figure shows that the recently unemployed spend less time with extended family members interviewed during the recession than did the employed interviewed before the recession and supports H4a. The employed interviewed before the recession (the reference group) is the solid bar on the far left and they spend on average about 55 minutes with their extended family members on weekdays. In contrast, the recently unemployed interviewed in 2009 and 2010 spend less time with their extended family members (67 minutes and 75 minutes respectively).

Moderating Influence of Socio-Demographic Characteristics

Is there heterogeneity across socio-demographic characteristics for the relationships between employment uncertainty and time with family members? As hypothesized, I find that socio-demographic characteristics matter for time spent with family members. Specifically, gender, spouses' or partners' employment status, and

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Figure 4-4. Moderating Effects of Gender and Being Unemployed for Time Spent with Children Under 18
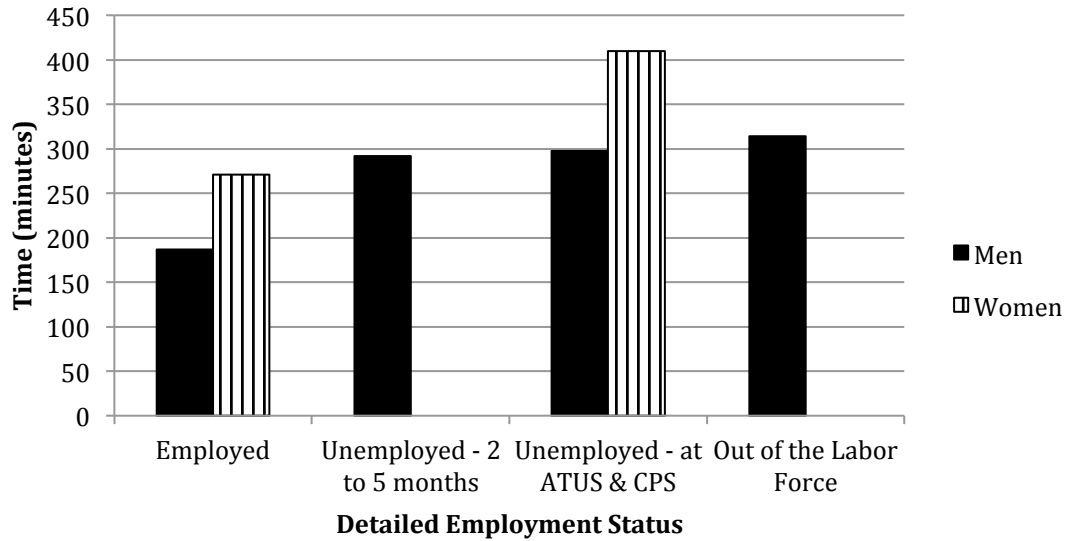
education moderate the effects of the employment uncertainty on time spent with family members.

Gender

Figure 4-4 shows how gender moderates the relationship between being unemployed and time spent with children under 18. Here we see that women, particularly women who are unemployed, spend the most time with children. Longer-term unemployed mothers spend 6 hours and 49 minutes with their children while longer-term unemployed fathers spend just under 5 hours with their children. Employed mothers spend 4.5 hours on average with children while employed fathers (the reference group) spend just over 3 hours with children under 18. These results support H5.

Figure 4-5 shows similar results to Figure 4-4 and also supports H5. In Figure 4-5 we see how gender moderates the relationship between being unemployed and time spent with children under 6. Again we see that women spend more time with children under 6. Employed men spend just over 3 and a half hours with children under 6 whereas employed women spend 5 hours and 41 minutes with children under 6. The longer-term

Figure 4-5. Moderating Effects of Gender and Being Unemployed for Time Spent with Children Under 6
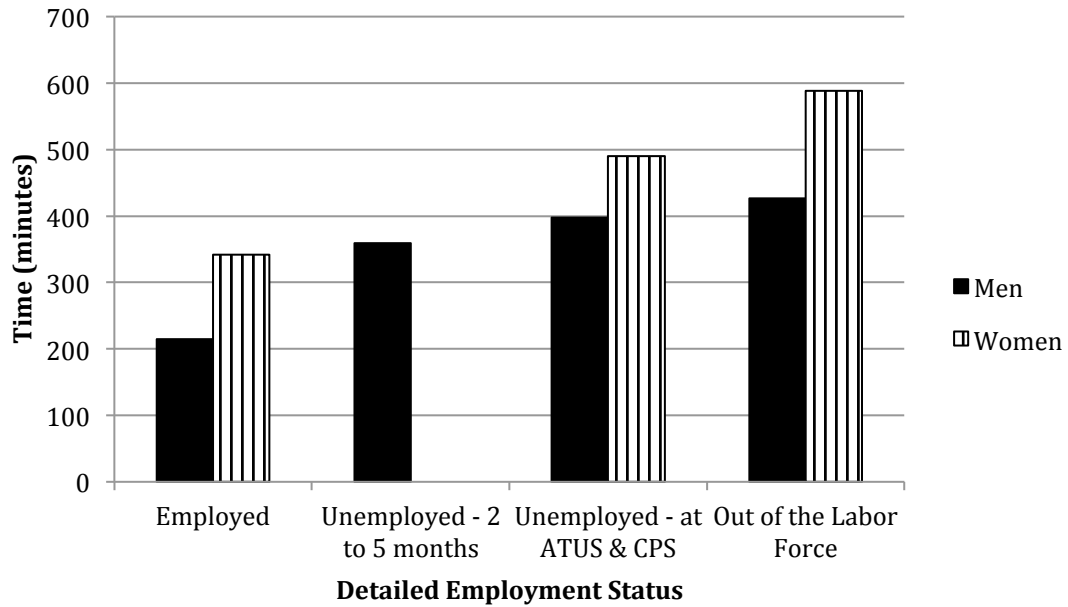
unemployed spend more time with children under 6 on weekdays but there remains a small difference between men and women – about an hour and a half. Men and women who are out of the labor force spend the most time with children but with the greatest difference between genders – 1 hour and 42 minutes.

Figure 4-6 shows how gender moderates the relationships between being unemployed, living in states with poor economic conditions, and time spent with extended family members and supports H5. The only group that spends more time with extended family members as the unemployment rate increases are women who are longer-term unemployed whereas men who are employed or unemployed (both recently and long-term) spend the same or less time. Men who are employed (the comparison group) spend a fairly consistent amount of time with extended family regardless of the unemployment rate. In contrast, men who are unemployed and women who are out of the labor force spend less time with extended family members in states with higher unemployment rates. This figure may demonstrate increased exchange of resources between the women and their extended family for those women who would be working if work were available in

Figure 4-6. Moderating Effects of Gender, Being Unemployed, and the Unemployment Rate for Time Spent with Extended Family
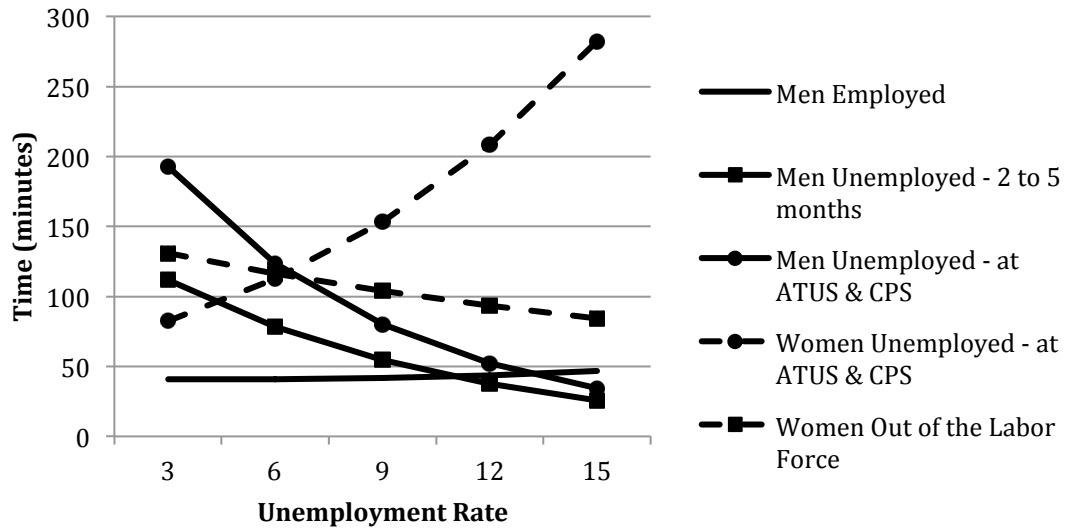
their community. Men may not be as involved in such exchanges with extended family and therefore this time does not increase as work becomes less available for them.

Spouses'/Partners' Employment Status

Figure 4-7 shows how spouses' or partners' employment status moderates the effects of being unemployed on time spent with children under 6. Here we see that as respondents become less attached to the labor force (recent to long-term to being out of the labor force), time spent with children under 6 is greater, especially if their spouses or partners are employed full-time. In particular, respondents who are long-term unemployed and have a spouse who is employed full-time spend the most time with children under 6: 8 hours and 17 minutes in comparison to the 3 hours and 42 minutes that the employed with spouses or partners who are not employed spend with children under 6. These results support H7a.

Figure 4-8 shows how spouses' or partners' employment status moderates the effects of being unemployed on the time adult children spent with parents. Here we see

Figure 4-7. Moderating Effects of Spouse/Partner Employment Status and Being Unemployed for Time Spent with Children Under 6
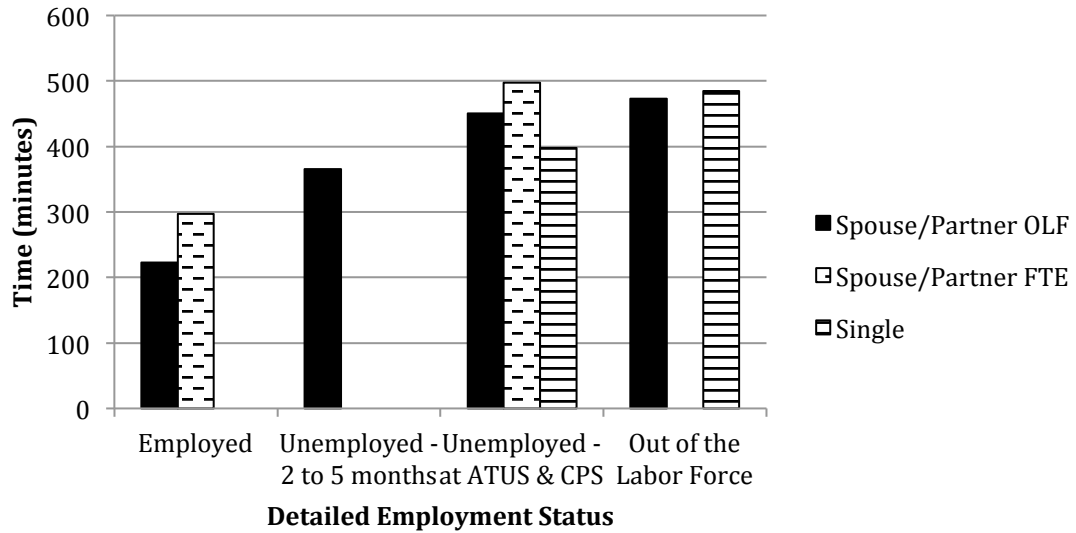
Figure 4-8. Moderating Effects of Spouse/Partner Employment Status and Being Unemployed for Time Spent with Parent(s)
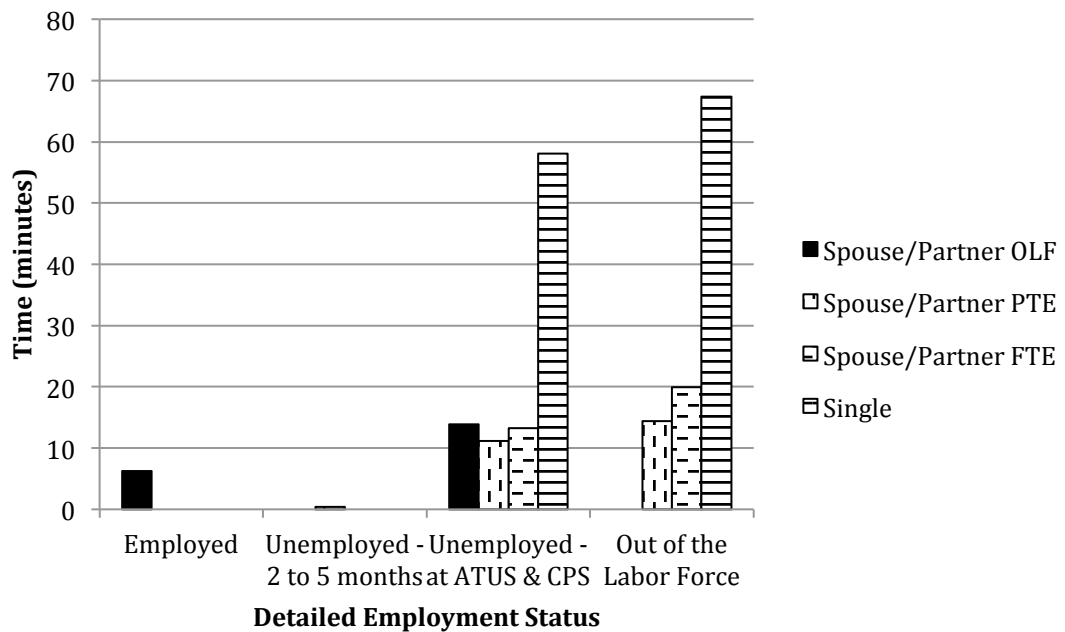
Figure 4-9. Moderating Effects of Education and Recessionary Time Period for Time Spent with Parent(s)
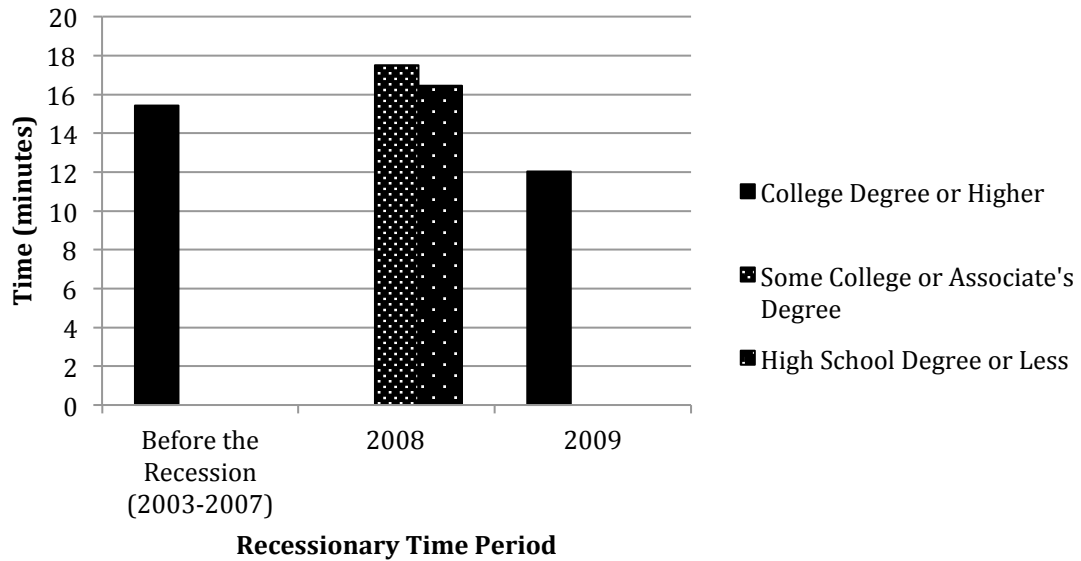
that single respondents spent the most time with their parents when they were long-term unemployed or not in the labor force – spending 58 minutes and 67 minutes more respectively. In contrast, respondents with spouses or partners all spent less than 20 minutes on the diary day with their parents. These results support H7c.

Education

Figure 4-9 and 4-10 show how education moderates the effects of employment uncertainty for time spent with extended family members. In general we see contradictory evidence for H8. In general, Figure 4-9 shows that respondents spend little time with their parents, yet we do see an interesting pattern where respondents with lower levels of education interviewed in 2008 spent about 17 minutes with their parents while those with a college degree interviewed in 2009 spent only 12 minutes on average. Similar findings are shown in Figure 4-10 which shows how education moderates the effects of being unemployed on time spent with extended family members. We see that though respondents who are not working spend more time with extended family regardless of education, those with a high school degree or less spend the most time (just

Figure 4-10. Moderating Effects of Education and Being Unemployed for Time Spent with Extended Family Members
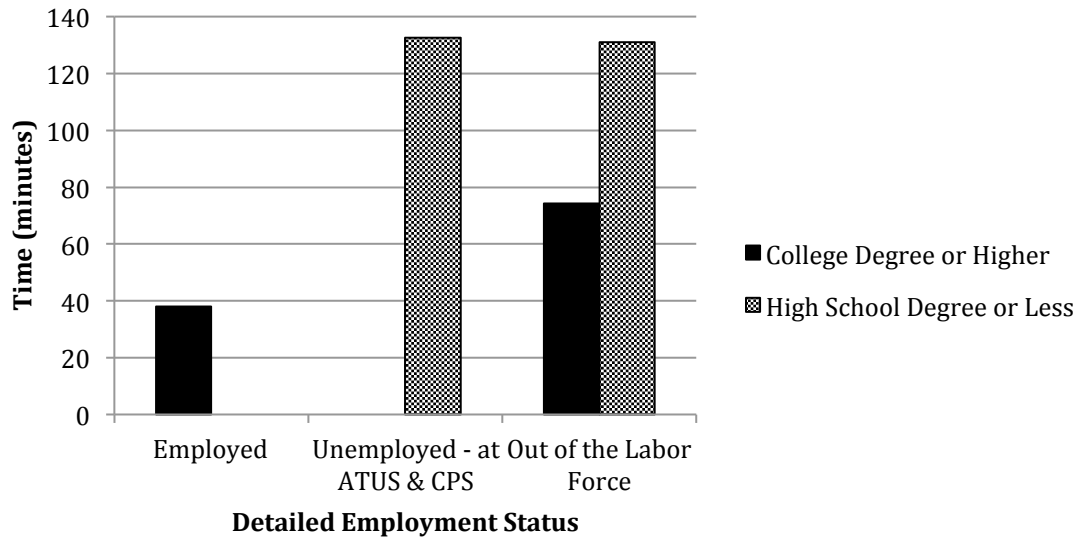
over 2 hours and 10 minutes for those wit a high school degree or less who are long-term unemployed or not in the labor force.

Discussion

The Great Recession, in particular the experience of being unemployed, has important implications for time spent with family members. Specifically, the unemployed are more likely to spend more time with their children, spouses/partners, and extended family members on weekdays. There is some evidence that being interviewed during a historical time period marked by recession is also related to spending more time with immediate family members but less time with extended family members while living in states with poor economic conditions is related to increased likelihood of spending any time with children and extended family members. These results support some of my proposed hypotheses while contradicting others. Specifically, the connection between being unemployed and time spent with children supports H1a demonstrating that the unemployed may be more able to allocate their time to their children when work is not a competing force. However, we cannot say whether that time is positive or negative. Older

research has raised questions about increased abuse as one example of how being unemployed may have negative implications for parent/child relationships. Unfortunately, this data is unable to examine such possibilities (L. Jones 1990; Sell et al. 2010).

In contrast to H1a, my results have mixed support for H2 and H3 and contradict H1b. H2 proposes that employment uncertainty will be related to spending less time with spouses/partners, for which I find partial support – respondents interviewed in 2008 have greater odds of spending no time alone with spouses/partners. However, all time with spouses/partners is on average greater for respondents interviewed in 2009 or 2010. It is not clear why this may be the case but it is possible that 2008 – before the Great Recession took hold – may not have the same effects as 2009 or 2010 when the unemployment rate was at its highest nationally and the general discourse was more focused on the recession. H3 posits that being unemployed, living in states with poor economic conditions, and being interviewed during the recessionary period will be related to spending more time with extended family members, which I find for the unemployed and those living in states with poor economic conditions. However, respondents interviewed during the historical period marked by the Great Recession (specifically 2009 or 2010) are less likely to spend time with extended family members overall and spend less time with their parents. It is not clear why the more proximal experiences of uncertainty are linked to more time with extended family while the distal effect of the national context has reverse effects. However, it is possible that the more proximal causes of uncertainty increase the need for extended families to share resources – whether that is time or money – and thereby result in some extended family members to increase their contact with one another. Whereas those interviewed during the recession may instead opt to increase their focus on work or saving (e.g. reduced traveling to extended family) when the national economy is unstable.

I find no support for H1b which proposes that living in states with poor economic conditions or being interviewed during a historical time period marked by a recession will be related to spending less time with children. Instead, I find the reverse pattern.

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Parents spend more time with children when their economic situation (both proximal and distal) is uncertain. Despite the evidence that stress related to being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession results in spending less time with family members, my results raise the possibility that time with children is more difficult to change either because it is a "necessary" time investment or because it is highly valued by individuals. If nothing else, parents maybe in such close proximity to children that they have less choice but to spend more time with them.

Similarly, I find no support for H2 that hypothesizes that time with spouses/partners will be lower or less likely with higher levels of employment uncertainty. Though the effect of being interviewed during the recession isn't completely clear (negative effect for time spent alone with spouses/partners in 2008 and positive effect for all time spent with spouses/partners in 2009 and 2010), it is possible that time spent with immediate family members like spouses/partners increases as the economy declines. This may be due to tight resources which could limit alternative activities (such as those that require childcare, money to pay admissions fees, etc.). Yet, it is unclear if this increased time is positive or negative in nature, it does appear that when times get tough, immediate families turn to one another. In light of declining divorce during periods marked by recessions (Chowdhury 2013) and the possible negative effects of recessions for parent/child relationships (L. Jones 1990; Sell et al. 2010), future research should investigate the quality of time spent together and how to promote positive interactions across good economic times and bad.

I find partial evidence that the overlapping effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession work in tandem to influence time spent with family members. Specifically, I find mixed support for H4a and no support H4b. H4a proposes that the unemployed living in communities marked by high unemployment or interviewed during a recession will spend more time with children and less time with other family members. In fact, I find that unemployed parents spend more time with

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children under 6 when they are living in states with high unemployment rates and are interviewed during the recessionary years. In regards to extended family members, I find some contradictory results. The recently unemployed spend less time with extended family members if they are interviewed during the recession while the longer-term unemployed spend more time with their parents if they were interviewed during this same period. It seems reasonable to argue that the duration of being unemployed may be particularly important in this case. The recently unemployed may be experiencing the stress of uncertainty due to their current state and therefore demonstrate time use patterns that support H4a. In contrast, the longer-term unemployed may be more acclimated to their situation and/or may need to depend on family members to a greater extent because of their long-term situation and challenges. Future research will need to further examine how the duration of being unemployed is important for family relationships. In light of the increased percentage of would be workers that are experiencing long-term unemployment (Ilg 2010), such differences will be important for future research and policy interventions. Despite the contradictory direction of my findings, such results support the assertion that multiple intersecting aspects of employment uncertainty are each important and, as such, it may not be appropriate to depend on a single measure when attempting to assess the importance of economics for time spent with family members and family relationships.

Gender, spouses' or partners' employment status, and education are important moderators of the relationships between employment uncertainty and time spent with family members. I find support for the moderating effects of gender (H5) and spouses'/partners' employment status (H7a and H7c) that operate in the expected directions. Specifically, I find that women spend more time on weekdays with their family members when they are unemployed, living in states with poor economic conditions, and if they were interviewed during a historical period marked by a recession. This provides support for gendered expectations about family roles and family relationships (Hays 1996; Ridgeway and Correll 2004a, 2004b; C. J. Rosenthal 1985). Similarly, spouses'/partners' employment status moderates the relationship between

being unemployed and time spent with children and extended family members demonstrating that couples work together to manage their time particularly when one member becomes unemployed. Not only do these results support H7a and H7c, they are also in line with the life course focus on adaptive strategies and linked lives (Elder et al. 2003; Moen 1980; Moen and Wethington 1992). In contrast, I find contradictory evidence against H8 that proposes that lower levels of education will be related to spending less time with family when they are unemployed, living in states with poor economic conditions, and being interviewed during a historical period marked by a recession. Instead, the results show that those with lower levels of education spend more time with their parents when interviewed during the recessionary year of 2008. Such findings raise the possibility that families may cope by sharing resources when times are tough rather than actually experiencing lower levels of stress or some other benefit experienced by those with fewer educational resources. Overall, these findings illustrate the important moderating effects of socio-demographic characteristics shaping the ways being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession are related to time spent with family members.

Conclusion

Overall, I find that being unemployed is related to spending more time with family members, including children, spouses or partners, and extended family members. There is also some evidence that the state economic conditions are related to spending more time children and extended family members and being interviewed during a historical time period marked by a recession is related to spending more time with children and spouses/partners but less time with extended family members. Moreover, the combined effects of being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession demonstrate the overlapping nature of individual context, the state level resources, and the national economic discourse and how they collide to influence time spent with family members, particularly children and extended family members. In addition, being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a

recession are not experienced uniformly across socio-demographic characteristics like gender, spouses' or partners' employment status, and education. The expectations and resources available to various groups result in important differences in time allocations to family members. Such differences may not only reflect variation in their relationships and interactions but also variation in resource exchanges and strategies for coping with uncertain or difficult economic circumstances.

This study is an important contribution to what is understood regarding the effects of employment uncertainty on time spent with family in four important ways. First, I examine the effects of the *current economic climate* for time spent with family members. The Great Recession is unique in part because of its uncharacteristic length and severity as well as the prevalence of long-term unemployment. Though this recession is unique in many ways, it also may be is a reflection of the economic environment of the future due in part to shifting assumptions regarding the implicit psychological contract between employee and employer (Burchell et al. 2002; Knoke 2001; Moghadam 1999; Perrons et al. 2005; K. V. W. Stone 2000), deindustrialization (Bluestone and Harrison 1982; Burchell et al. 2002), deskilling and downsizing (Burchell et al. 2002; Littler and Innes 2003), and the importance of mergers (Burchell et al. 2002; Knoke 2001). As such, a greater understanding of the effects of the Great Recession may improve policy makers' abilities to respond to the current economic environment as well as future economic challenges. Though scholars have begun to examine the implications of this unique and important time period (e.g. Aguiar et al. 2011; Hurd and Rohwedder 2010; Morrill and Pabilonia 2011), many questions remain regarding the effects of this economic event on time spent with family members like children, spouses/partners, and extended family members.

Second, I investigate the effects of three separate but intersecting indicators of employment uncertainty including being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession. Prior research has focused on single measures of employment uncertainty including being unemployed, being unemployed during periods of economic downturn,

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and unemployment rates but has not considered how these may represent different layers of exposure to recessions and, subsequently, stress. It is reasonable that each layer of exposure may have different implications for families and that combining multiple levels of exposure magnify or lessen some negative outcomes. As such, being unemployed, living in states with poor economic conditions captured by the unemployment rate, and being interviewed during recessionary time periods are expected to be experienced in tandem and therefore will each moderate how the others are related to family relationships (see Wheaton 1978).

Third, I extend the literature to include how employment uncertainty is related to time spent with extended family members rather than focus solely on children or spouses and partners. Of course, relationships with immediate family members (i.e. spouses/partners and children) are key for child and adult outcomes, but the quality of relationships with extended family members may have important implications for elderly outcomes, childcare, and exchange of resources to name a few (e.g. R. W. Johnson and Lo Sasso 2000; Pew Social and Demographic Trends 2011; Suitor et al. 2007; Swartz et al. 2011). As such, investigating patterns of time with immediate and extended family members during the Great Recession is an important extension of prior research.

Fourth, prior research on the Great Depression and the recession of the mid 1970s assumed men were the breadwinners and women's labor force participation (and potential job loss) was supplementary. Similarly, much of the work on family relationships and the employment uncertainty have assumed that all families at all life stages are equipped with comparable resources and face similar demands (see Elder 1974; Moen 1980 for exceptions). However, as much of the work-family interface and gender literature has demonstrated, resources and needs vary by gender, life stage, and social class and it is inappropriate to assume a uniform experience across these demographic divides. In addition, this 'mancession' – as it has been named in the popular press (Rampell 2009, 2010; Thompson 2009) – has resulted in a larger proportion of men experiencing job loss than women (U.S. Bureau of Labor Statistics 2011b). This challenges prior research showing that the unemployment rate is lower for men than for

women (e.g. Barrett and Morgenstern 1974; Rives and Sosin 2002). Instead, men have faced greater levels of insecurity and job loss, and it is unclear what implications this may have on family and household time use patterns. In light of norms that women are expected to manage relationships with (i.e. the kin keepers) (C. J. Rosenthal 1985) and provide care for family members (Folbre 2002), the unique gendered patterns of the Great Recession may have important implications for time spent with family members.

Few studies are able to examine the impact of employment uncertainty on time spent with family – particularly extended family members like parents. The American Time Use Survey makes such investigations possible. However, these analyses have limitations. First, it is not possible to examine within person change using these data. Instead, the continual fielding of the ATUS allows for pooled cross-sectional analyses. Despite this limitation, I am unaware of any longitudinal surveys that can look at time spent with such a wide range of family members across time. Second, it is not possible to examine the quality of time spent with family members. Particularly for the unemployed who may be experiencing significant amounts of stress, it is plausible that the quality of interactions with children, spouses/partners, and extended family is poor. However, I am only able to examine the amount of time spent with family members. As such, it is important to use caution when interpreting increased time with children or other family members as a benefit to families. Third, time spent with family can only be captured on a single diary day. It is impossible to determine from these data how time spent with children, spouses/partners, or extended family members vary across a respondent's week, month, or year. Lastly, the current analysis does not account for differences in the selection into unemployment during the Great Recession compared to before the recession began. It is reasonable to imagine that those who become unemployed during the recession are different in many ways from those who become unemployed before the recession began. The current analyses are unable to account for these differences and as such caution should be used in interpreting differences across being unemployed and other markers of employment uncertainty. Future work should investigate how such selection may influence these results.

Despite such limitations, these findings illustrate the importance of employment uncertainty for family relationships. The potential for employment uncertainty to have broad reaching effects for time with families demonstrates the value of investigating these patterns further. For example, how is the *quality* of time spent with children, spouses/partners, and extended family members influenced by employment uncertainty? How do patterns of time spent with family members influence future individual and family outcomes such as child development or individual recovery from unemployment? Future research will need to further investigate these relationships to better understand the implications of this study. This study only begins to disentangle the importance of multiple aspects of employment uncertainty that vary across time and place as well as how families have been influenced by the Great Recession.

Chapter 5: Conclusion

The Great Recession has been a powerful force in the United States and a central point of discussion both in popular media and academic research (e.g. Colman and Dave 2011; Hurd and Rohwedder 2010; Marchione 2010; Mattingly and K. Smith 2010; Morrill and Pabilonia 2011; Pew Social and Demographic Trends 2011; Sell et al. 2010; Vuolo et al. Forthcoming; Xu and Kaestner 2010). As the three studies described in this dissertation show, employment uncertainty related to the Great Recession is an important predictor of time spent sleeping, time in healthy behaviors, and time with family members. In addition to helping to better understand the relationships between employment uncertainty related to the Great Recession and health and family relationships, these three examinations demonstrate broader patterns regarding the importance of multiple levels of exposure to employment uncertainty, how they work together, the importance of socio-demographic characteristics, and understanding how healthy behaviors may differ from time spent with family members. Though there are notable limitations of this research, it also contributes to prior research in important ways.

This research aimed to extend our understanding of the effects of the Great Recession for health and family outcomes and the interconnected nature of multiple levels of exposure to employment uncertainty as well as the moderating role of socio-demographic characteristics. Specifically, I examined the effect of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession and their combined effects on time spent sleeping, in healthy behaviors, and with family members. Moreover, I investigated how gender, life stage, spouses' or partners' employment status, and education moderate these relationships.

In general, I find that indicators of employment uncertainty, specifically being unemployed, living in states with poor economic conditions, and being interviewed during the historical time period marked by a recession, are important for sleep, healthy behaviors, and time with family members while socio-demographic characteristics moderate only some of these relationships and in different ways. Employment uncertainty

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is related to sleep outcomes in many expected and unexpected ways. As expected, the unemployed and those interviewed during the historical time period marked by the Great Recession have worse sleep outcomes (more likely to sleep longer than the recommended amount and more likely to report sleeplessness) whereas living in states with poor economic conditions works in the opposite direction. That is, higher unemployment rates are related to being less likely to report and spend less time on average in sleeplessness. In contrast to time spent sleeping and sleeplessness, sleep disruptions appeared to operate differently – those interviewed during the recession were less likely report a sleep disruption while poor state economic conditions were related to a greater likelihood of doing so. Though it is difficult to determine why this pattern was the inverse of time spent sleeping or sleeplessness, it is possible that bimodal sleep patterns, which have recently gained attention (R. A. Friedman 2006; Hegarty 2012), may be one possible explanation. The argument is that healthy sleep patterns in fact include two sleep episodes broken by a period of quiet wakefulness. The combined effects of being unemployed, living in states with poor economic conditions, and being interviewed during a recessionary time period were also important as the unemployed and those living in states with the worst economic conditions during the recession had lower probabilities of sleeplessness.

Similar to sleep, health behaviors are related to employment uncertainty, but in unexpected ways. Being unemployed is particularly important for health behaviors as the unemployed spend more time on and/or are more likely to exercise, travel by bike or on foot, engage in health-related self-care, and eat breakfast. I also find that individuals who live in states with poor economic conditions are more likely to engage in health-related self-care and those interviewed during the historical time period marked by the recession spend more time in active travel and are more likely to eat breakfast. Different levels of exposure to employment uncertainty also interacted with one another in predicting healthy behaviors. Specifically, the long-term unemployed spent more time walking or biking for transportation when the state-level unemployment rate was greater and the recently unemployed were more likely to eat breakfast during the recessionary years.

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Finally, time spent with family members is related to the different levels of exposure to employment uncertainty. Being unemployed is the most consistent predictor of time with family, with the unemployed being more likely to spend time and spending more time on average with children, spouses/partners, and extended family members. Individuals living in states with poor economic conditions (as captured by unemployment rates) are more likely to spend time with children and extended family members. Individuals surveyed during the Great Recession are apt to spend more time with children and spouses/partners while also spending less time with extended family members. In addition to these direct relationships between employment uncertainty and time with family, I also found that the different levels of exposure to employment uncertainty interacted with one another to predict time with children and extended family members. Long-term unemployed respondents in 2008 and recently unemployed respondents in 2010 spent more time with children under 6 when the unemployment rate was high while the recently unemployed before the recession spent less time at this same point in time and the employed showed no difference across different unemployment rates. The long-term unemployed interviewed in 2009 and 2010 spent more time with their parents, while the recently unemployed in these same years spent less time with extended family members.

Broad Patterns

Taken together, these studies reveal several patterns, including the importance of being unemployed for time spent in particular activities as well as state economic conditions and historical time period marked by a recession, moderating effects of multiple aspects of employment uncertainty, and the importance of gender. Consistent across the three investigations of how time was allocated to sleep, healthy behaviors, and family members, actually being unemployed was an important determinant. The unemployed had worse indicators for sleep, spent more time in healthy behaviors, and spent more time with family members. Though the positive relationships between being unemployed and health and family outcomes are contrary to expectations, the increased time may reflect the increased time available for alternative activities besides work.

Moreover, in regards to time spent with family members, I was unable to determine from this data the quality of this additional time spent together. It is possible that the additional time spent by the unemployed with their children or spouses/partners is more likely to be conflicted or stressful. However, it is still noteworthy that being unemployed increases time to spend in healthy behaviors and with family members (including children, spouses/partners, and extended family members) as this time may have important effects on future health outcomes and family relationships.

The state economic conditions were similar in their expected and unexpected relationships. Poor state economic conditions were related to positive indicators of sleep and healthy behaviors while also predicting being more likely to spend time with family members. The positive relationship between the local economic conditions and health behaviors supports prior research where poor economic conditions have been shown to increase time spent exercising and engaging in other healthy behaviors (e.g. Ruhm 2005). Though time with extended family members may work differently than healthy behaviors because they depend on the availability and accessibility of other people that may not live with the respondent, the costs of particular activities may influence how time is allocated. Individuals living in states with high unemployment rates may be more able to redirect their time towards their children or extended family members rather than advancing their career or towards costly activities like movies or other sources of entertainment.

Though the time period during which individuals were interviewed (that is being interview during the Great Recession versus before the recession began) was also important for sleep, healthy behaviors, and time spent with family, the patterns varied in their direction and strength. Respondents interviewed during the Great Recession reported worse sleep outcomes but were also more likely to engage in active travel and to eat breakfast. In addition, those interviewed during the recession spent more time with children and spouses/partners while also spending less time with extended family members. It is possible that the Great Recession has been a stressful time period that influenced individuals sleep habits while also making it more possible for them to travel by foot or bike, eat breakfast, and spend time with immediate family members due to

decreased work hours or work commitments as the national economy slowed down. Time with extended family members may work differently. Time with extended family members requires that extended family members are accessible and available. During the Great Recession other family members may have been less available due to competing money and time demands and therefore influencing how respondents allocated their time.

The moderating effects of the multiple levels of exposure to employment uncertainty are more consistent. In particular, being unemployed while living in states with poor economic conditions and/or being interviewed during the Great Recession was related to better sleep, more healthy behaviors, and spending more time with family members. However, there was some indication that the recently (in the last 2 to 5 months) and longer-term (2 to 5 months or longer) unemployed were differentially influenced by being interviewed during the Great Recession or living in states with poor economic conditions. That is, the long-term unemployed spent more time exercising and with their own parents while the recently unemployed spent less time exercising and with extended family members. These results may demonstrate the possibility that the recently unemployed may be more negatively impacted by their recent transition even when the economic climate may indicate that it is not a reflection of their own shortcomings. In contrast, the long-term unemployed may have had more of an opportunity to become acclimated to their position and therefore attribute their lack of employment to the economy.

Finally, gender is a consistent moderator of how employment uncertainty is related to time spent sleeping, in healthy behaviors, and with family members. In particular, being unemployed is differentially related to time allocation for men and women. Unemployed men report worse sleep outcomes, are less likely to eat breakfast, and spend less time with family members than unemployed women or employed men. The one exception to this pattern is that unemployed men spend more time exercising. Most of this evidence supports the argument that being unemployed is particularly difficult for men, and the one exception – physical activity – is more normatively acceptable for men than is housework or childcare. As such, physical activity may be a

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more acceptable way for men to fill their time when unemployed. The moderating effects of gender for employment uncertainty reinforces theoretical claims that the provider role, which occurs through employment, is particularly important for men (e.g. Bernard 1981; Moen and Roehling 2005; Townsend 2002).

Limitations

Though such findings help to explicate the effects of the Great Recession, and employment uncertainty more broadly, it is important to identify the limitations of this work, including the importance of selection into unemployment, the cross-sectional design, and the lack of information regarding the quality of time spent in activities.

First, this research does not account for selection into being unemployed. Specifically, it is unable to account for changes in who or how different individuals are selected into unemployment, which may have changed with the onset of the Great Recession. During the years most strongly affected by the Great Recession, the selection process into becoming unemployed is expected to be different than before the recession began. One could argue that when the national economy is strong, those with weaker attachments to the labor force are more likely to become unemployed. However, such assumptions become weaker during the Great Recession when companies downsized or folded almost unexpectedly. Though the duration of being unemployed, captured by the longitudinal data in the CPS and ATUS, helps to contextualize variation in experiences of being unemployed, there is no evidence that the duration of unemployment captures the differences in selection into unemployment. Potential differences in those who were likely to be unemployed before the recession in comparison to those who were likely to be unemployed during the Great Recession raise concerns about generalizable claims regarding unemployment. Future research must investigate how such differences influence these findings.

Second, the ATUS time diaries are not longitudinal and therefore it is not possible to identify change in how individuals allocate their time or how their time allocation varies across multiple diary days within a week or month. Instead, this analysis is limited to comparing the averages of a nationally representative sample of diary days across

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multiple years spanning the Great Recession. Few data sources are able to make such comparisons, making this data a relatively strong one for such comparisons. Yet, it is possible that variation across days, months, or years within an individual may better inform scholars and policy makers as to the effects of employment uncertainty on time spent sleeping, in healthy behaviors, and with family members.

Lastly, this data does not offer detailed information regarding the quality of time spent in given activities. That is, it is not known if the additional time spent with family members is positive or negative, conflicted or harmonious. Therefore, it is plausible that the increased time spent with family members by the unemployed is filled with conflict and stress and has negative implications for family and individual outcomes. Similarly, though individuals report sleeping a set number of hours during the diary day, there is no information regarding the quality of the time spent sleeping. Even if a respondent does not report waking in the middle of the night or sleeplessness, sleep can be restful or not. Future research should investigate the quality of such activities so as to allow for more informed comparisons for the unemployed, those living in states with poor economic conditions, and those interviewed during a historical time period marked by a recession.

What does this all mean?

Despite the limitations, this research contributes to scholarship on the effects of employment uncertainty by considering the contemporary situation, the Great Recession, and assessing how indicators of employment uncertainty relate to sleep, healthy behaviors, and time with family. Specifically, this research helps to illuminate distinctions between state economic conditions and the historical time period, the overlapping and interacting effects of multiple levels of exposure to employment uncertainty, the importance of socio-demographic characteristics for moderating these relationships, and the different effects of employment uncertainty for health behaviors versus time with family members.

The majority of research investigating the effects of recessions or economic downturns for sleep, health, or family are based on the experiences of previous cohorts, which may or may not apply to the contemporary experience. Moreover, much extant

research compares a single measure of employment uncertainty [either local economic conditions (e.g. Colman and Dave 2011; Ruhm 2005) or a historical time period marked by a recession (e.g. Aguiar et al. 2011; Hurd and Rohwedder 2010)] and does not consider the multiple levels of exposure to this potentially stressful experience. This research demonstrates that state economic conditions as measured by state-level unemployment rates may have very different effects than a historical time period marked by a recession. Moreover, it is possible that research that fails to consider this additional variation (i.e. living in states with poor economic conditions during a recession versus living in states with strong economic conditions during the same historical time period) may mask such differences or find no difference at all. The research described above investigating both the economic conditions at the state level and the broader historical time period illustrates how these effects are both important and may in fact work in opposite directions. For example, sleeplessness is more common during the Great Recession but less common in states with poor economic conditions. Though such results are counterintuitive, they demonstrate the difference between a diffuse belief that the economy is in dire straits that one is unable to influence and the more proximal experience that though a community is suffering, life goes on – often very successfully. As such, this research is a clear indication that it is not enough to examine only a single measure of employment uncertainty without also identifying and situating other potential effects of local and historical effects. Yet, to truly speak to the effects of employment uncertainty, multiple levels of exposure must be examined.

In addition to examining the multiple levels of exposure to employment uncertainty, this research supports the interacting and overlapping effects of employment uncertainty identified by Wheaton (1978). As the results of this research demonstrate, being unemployed does not have a uniform effect. Rather, being unemployed is different when living in states with strong versus weak economic conditions or before or during an economic recession. The unemployed situate their employment status within their state and national context, thereby taking or shifting responsibility for their position. When being unemployed can be connected to declines in the local or national economy,

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individuals may be less likely to experience stigma for their position and therefore experience less stress. This increased acceptability of being unemployed may in fact result in fewer detrimental effects of being unemployed. Though, there is less evidence in these analyses for the interacting effects of state economic conditions and being interviewed during a recessionary time period, it is also plausible that living in a state with high unemployment during a recession would have different effects than living in states with strong economic conditions during the same time period (e.g. Michigan versus North Dakota during the Great Recession). Future research will need to investigate whether or not such differences exist.

Though there is a great deal of variation in how socio-demographic characteristics moderate the relationships between employment uncertainty and time spent sleeping, in healthy behaviors, or with family members, gender, life stage, spouses'/partners' employment status, and education each moderate how employment uncertainty relates to how individuals allocate their time. Individuals have different access to resources and are constrained by different limitations that are often captured by socio-demographic characteristics. Despite the variation in the direction of such effects, as well as which socio-demographic characteristics moderates which outcome, the consistent importance of gender, life stage, spouses'/partners' employment status, and education is evidence for understanding such these differences across economic conditions. Policies that attempt to assist individuals and families when they become unemployed or as the economy changes cannot be singular in their approach. Rather policy makers must consider the multiple groups that may or may not be helped by such policy changes.

Finally, it is important to understand that despite assumptions that employment uncertainty will have uniform effects, this research demonstrates how individuals and families may be influenced differently. This is due in part to the differences in value assigned to caring for oneself versus caring for others – particularly children. The high value of children in the United States (Zelizer 1985) and the centrality of the nuclear family (Ruggles 1994) may, in part, explain why patterns of time with family are different than time spent sleeping or in healthy behaviors. In addition, time spent caring

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for self is not interdependent of the availability and needs of others. Children, particularly younger children, need supervision and couples may work together to manage this need. In contrast, caring for oneself can be put aside for a more convenient time or be avoided all together if one is stressed or feeling down. As such, different patterns evident in this research demonstrate the value of examining health and family outcomes separately.

Contributions

This research extends prior scholarship in important ways including developing a deeper knowledge of the importance of the Great Recession and future economic changes more generally, investigating and building support for multiple levels of exposure to employment uncertainty, and drawing on the unique and rich time diary data available through the ATUS. This research investigates the effects of the Great Recession for time spent sleeping, in healthy behaviors, and with family members. As a timely investigation of a particularly severe and important economic event (Borbely 2010), this research demonstrates the broad reach of not only increased unemployment rates but also a broader feeling of insecurity that predominated during this time period. In addition, the shift towards a new economy (Beck 2000; Bluestone and Harrison 1982; Burchell et al. 2002; Knoke 2001; Littler and Innes 2003; K. V. W. Stone 2000; Uchitelle 2006) is evidence for a more contemporaneous examination of the effects of employment uncertainty that is likely to have applications in the future. The role of the Great Recession in influencing individual and family outcomes as well as the changes in the economy more generally demonstrate the importance of this research.

These studies of the Great Recession extend prior research by demonstrating the value of multiple indicators of employment uncertainty as well as how they may interact in important ways. Much of the prior research assumes a singular effect of changes in the broader economy. However, this research challenges this more simplified approach and demonstrates the importance of variation across different levels of exposure to employment uncertainty. By examining multiple indicators of employment uncertainty like being unemployed, living in states with poor economic conditions, and being interviewed during a recessionary time period, this research helps to deepen our

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understanding of how changes in the economy may not have singular or uniform effects as well as begin to investigate why prior research may arrive at contradictory conclusions.

Finally, these analyses draw on the unique and rich time diary data available from the ATUS. Time diary data is an alternative means of understanding how individuals are influenced by their social context as time allocation illustrates not only priorities and values but also resources and constraints that influence individuals. Moreover, many studies are interested in the amount of time spent in particular activities but must depend on self-reported summary measures that may be subject to bias or inaccurate recall. For the activities investigated here, time diary data is likely to more accurately reflect the time spent on the average diary day because of the broader focus of the interview generally and the 24 hour period. Because of these benefits, research on sleep, health behaviors, and time with family is further extended by drawing on this this alternative means of measurement.

Conclusion

This research investigates the effects of being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession for time spent sleeping, in healthy behaviors, and with family members. This investigation extends prior research on the significance and effects of employment uncertainty by demonstrating its importance for how time is allocated to sleep, health, and family. Specifically, I find that being unemployed is a consistent and important predictor of how time is allocated to sleep, health behaviors, and with family members by reducing sleep quality and increasing health behaviors and time spent with family members. Though the local economic conditions and the historical time period are not as consistently related to health and family time, several outcomes are impacted by these broader effects and, potentially most interestingly, are moderators for how being unemployed relates to time allocation.

The effects of the Great Recession, as captured by these different levels of exposure to employment uncertainty, are important for individuals' sleep, health, and

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family relationships and demonstrate the importance of policies that aim to support the unemployed and limit the time a recession lasts such as extensions of unemployment insurance or policies like the American Recovery and Reinvestment Act which were both implemented in response to the Great Recession.

The Great Recession has had an important and powerful effect on individuals and families either by increasing the likelihood that one will experience unemployment or through state and national economic indicators. The effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession will need to be continually examined as the structure of employment and the economy continues to change. However, this research demonstrates the value of extending beyond examining state economic conditions or historical time periods in isolation. Employment uncertainty is a complex and multifaceted construct and this research continues a long history of research that has served to unpack what the economy means for individuals and families.

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Appendices

Appendix A. Regression Models Including Socio-Demographic Characteristics

Sleep Outcomes

Table A-1 shows the predicted relative risk of sleeping less than 7 hours or more than 9 hours when compared to sleeping the recommended 7 to 9 hours on the diary day. Each of the socio-demographic characteristics (i.e. gender, life stage, spouses'/partners' employment status, and education) predicts time spent sleeping. Specifically, sleeping less than 7 hours on the diary day is negatively related to being a woman and positively related to being older than 45 without children at home, having a spouse or partner who works part-time, having some college or an associate's degree, and having a high school degree or less. Being a parent of a child under 18, being older than 45 without children at home, and having a spouse/partner who is employed full-time are negatively related to the relative risk of sleeping more than 9 hours. In contrast, being a woman, having a high school degree or less, or some college or an associate's degree are related to increased odds of sleeping more than 9 hours.

Most of the socio-demographic characteristics are statistically significantly related to the odds of experiencing sleep disruptions including gender, life stage, and education (results shown in Table A-2). Women have greater odds of reporting a sleep disruption as do parents of children under 18, respondents over age 45 without children at home, and respondents with a high school degree or less.

Few of the socio-demographic characteristics are statistically significant predictors of sleeplessness (results shown in Table A-3). Only respondents with some college or an associate's degree are statistically significantly related to the odds of experiencing sleeplessness. Specifically, those with an associate's degree have 25% greater odds of reporting sleeplessness.

Table A-4 shows the statistically significant predictors of the logged number of minutes in sleepless and a few of the socio-demographic characteristics are statistically significant predictors. Women and respondents older than 45 without children spend more time in sleeplessness when compared to men and those under 45 without children.

Table A-5 shows the main effects of the socio-demographic characteristics across all of the main models (shown in Tables A-1 through A-4). Table A-5 shows consistent patterns relating socio-demographic characteristics to sleep outcomes. Women are more likely to sleep more than 9 hours and to experience a sleep disruption likely owing to the fewer number of work hours on average and their increased sleep issues more generally. Parents of children under 18 are less likely to sleep more than 9 hours and more likely to report a sleep disruption while respondents older than 45 without children are more likely to sleep less than 7 hours, experience a sleep disruption, and spend more time in sleeplessness. Finally low levels of education are related to increased risk of sleeping more or less than the recommended amount, increased odds of a sleep disruption and sleeplessness, and spend more time in sleeplessness. In general, few socio-demographic characteristics predict the logged number of sleep disruptions or the odds of

sleeplessness. In light of these findings, gender, life stage, and education are key predictors of sleep behaviors as expected.

Table A-1. Multinomial Logistic Regression Models Predicting Time Spent Sleeping, ATUS 2003-2010.

	Sleeping Less than 7 Hours		Sleeping More than 9 Hours		
	RRR	SE	RRR		SE
Employment uncertainty					
Detailed Employment Status					
Employed (ref.)					
Unemployed - 2 to 5 Months	0.786	0.116	2.009	***	0.237
Unemployed - at ATUS & CPS	0.835	0.089	2.010	***	0.181
Out of Labor Force	0.939	0.048	2.255	***	0.096
State Economic Conditions					
State-Level Unemployment Rate	0.979	0.012	1.007		0.013
Time Period					
2003-2007 (ref.)					
2008	0.988	0.051	0.974		0.053
2009	1.082	0.076	1.159	*	0.079
2010	0.977	0.073	1.017		0.076
Employment Status					
Employed (ref.)					
Unemployed					
Out of Labor Force					
Socio-demographic Characteristics					
Female	0.840 ***	0.029	1.127	***	0.039
Life Stage					
45 or Younger without Children (ref.)					
Parent of Child under 18	1.078	0.048	0.736	***	0.033
Older than 45 without Children	1.169 **	0.061	0.660	***	0.034
Marital or Partner Status/Spouse's Employment Status					
No Spouse or Partner	1.113	0.077	0.892		0.069
Spouse/Partner Employed Full-Time	1.021	0.052	0.808	***	0.040
Spouse/Partner Employed Part-Time	1.140 *	0.064	1.064		0.058
Spouse/Partner is Not Employed (ref.)					
Education					
High School Diploma or Less	1.157 ***	0.046	1.483	***	0.063
Some College or Associates	1.122 **	0.045	1.720	***	0.070
College Degree or More (ref.)					
Constant	0.599 ***	0.061	0.359	***	0.036

Notes: N=42,978. * p<.05, ** p <.01, *** p<.001. Reference group are those who sleep between 7 and 9 hours on the diary day. Controls include race, immigrant status, 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.

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Table A-2. Logistic Regression Models Predicting Experiencing a Sleep Disruption, ATUS 2003-2010.

	Model 3		
	OR		SE
Employment uncertainty			
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 months	0.536		0.282
Unemployed - at ATUS & CPS	0.988		0.266
Out of Labor Force	1.636	***	0.165
State Economic Conditions			
State-Level Unemployment Rate	1.067	*	0.032
Time Period			
2003-2007 (ref.)			
2008	0.670	**	0.101
2009	0.424	***	0.078
2010	0.447	***	0.093
Employment Status			
Employed (ref.)			
Unemployed			
Out of Labor Force			
Socio-demographic Characteristics			
Female	1.761	***	0.174
Life Stage			
45 or Younger without Child (ref.)			
Parent of Child under 18	1.656	***	0.226
Older than 45 without Child	1.592	**	0.246
Marital or Partner Status/Spouse's Employment Status			
No Spouse or Partner	1.016		0.196
Spouse/Partner FTE	1.040		0.150
Spouse/Partner PTE	0.812		0.132
Spouse/Partner is Not Emp (ref.)			
Education			
High School Diploma or Less	1.341	**	0.136
Some College or Associates	1.180		0.122
College Degree or More (ref.)			
Constant	0.007	***	0.002

Notes: N=42,978. * p<.05, ** p <.01, *** p<.001. Controls include race, immigrant status, 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.

Table A-3. Logistic Regression Models Predicting Experiencing Sleeplessness, ATUS 2003-2010.

	Model 3		
	OR		SE
Employment uncertainty			
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 months	1.547		0.387
Unemployed - at ATUS & CPS	1.604	*	0.305
Out of Labor Force	1.538	***	0.135
State Economic Conditions			
State-Level Unemployment Rate	0.912	***	0.021
Time Period			
2003-2007 (ref.)			
2008	1.371	**	0.135
2009	2.100	***	0.260
2010	1.664	***	0.220
Employment Status			
Employed (ref.)			
Unemployed			
Out of Labor Force			
Socio-demographic Characteristics			
Female	1.131		0.083
Life Stage			
45 or Younger without Child (ref.)			
Parent of Child under 18	1.036		0.102
Older than 45 without Child	1.167		0.128
Marital or Partner Status/Spouse's Employment Status			
No Spouse or Partner	0.975		0.144
Spouse/Partner FTE	0.950		0.110
Spouse/Partner PTE	1.093		0.140
Spouse/Partner is Not Emp (ref.)			
Education			
High School Diploma or Less	1.165		0.099
Some College or Associates	1.254	**	0.104
College Degree or More (ref.)			
Constant	0.053	***	0.012

Notes: N=42,978. * p<.05, ** p <.01, *** p<.001. Controls include race, immigrant status, 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.

Table A-4. OLS Regression Models Predicting the Logged Time in Sleeplessness, ATUS 2003-2010.

	Model 3		
	Coef.		SE
Employment uncertainty			
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 Months	0.10		0.19
Unemployed - at ATUS & CPS	0.11		0.18
Out of Labor Force	0.43	**	0.15
State Economic Conditions			
State-Level Unemployment Rate	-0.09	**	0.03
Year Interviewed			
2003-2007 (ref.)			
2008	0.28	*	0.11
2009	0.70	**	0.24
2010	0.40	*	0.18
Employment Status			
Employed (ref.)			
Unemployed			
Out of Labor Force			
Socio-demographic Characteristics			
Female	0.14	*	0.06
Life Stage			
45 or Younger without Children (ref.)			
Parent of Child under 18	0.05		0.07
Older than 45 without Children	0.26	**	0.09
Marital or Partner Status/Spouse's Employment Status			
No Spouse or Partner	0.00		0.11
Spouse/Partner Employed Full-Time	-0.01		0.07
Spouse/Partner Employed Part-Time	0.10		0.08
Spouse/Partner is Not Employed (ref.)	0.11		0.07
Education			
High School Diploma or Less	0.18		0.09
Some College or Associates	0.06		0.08
College Degree or More (ref.)	-0.09	**	0.03
Constant	4.32	***	0.35

Notes: N=1,754. * p<.05, ** p <.01, *** p<.001. Controls include race, immigrant status, region, metropolitan area, season, and predicted probability of Sleeplessness calculated from the models shown in Table A-3. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table A-5. Summary Table of Main Effects of the Socio-demographic Characteristics on Sleep Outcomes

	Odds of Sleeping Less than 7 Hours	Odds of Sleeping More than 9 Hours	Odds of a Sleep Disruption	Logged Number of Sleep Disruptions	Odds of Sleeplessness	Logged Time in Sleeplessness
Female	-	+	+			+
Life Stage						
45 or Younger without Children (ref.)						
Parent of Child under 18		-	+			
Older than 45 without Children	+	-	+			+
Marital or Partner Status/Spouse's Employment Status						
No Spouse or Partner						
Spouse/Partner Employed Full-Time		-				
Spouse/Partner Employed Part-Time	+					
Spouse/Partner is Not Employed (ref.)						
Education						
High School Diploma or Less	+	+	+			
Some College or Associates	+	+			+	
College Degree or More (ref.)						

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Table A-6. Summary Table of Main Effects of the Socio-demographic Characteristics on Health Behaviors

	Exercise		Active Travel		Health Related Self-Care		Breakfast
	Binary[1]	Count[2]	Binary[1]	Count[2]	Binary[1]	Count[2]	Logistic
Female		-	-	-	-	-	-
Life Stage							
45 or Younger without Children (ref.)							
Parent of Child under 18	+	-					
Older than 45 without Children	+	-	+		-		+
Marital or Partner Status/Spouse's Employment Status							
Spouse/Partner is Not Employed (ref.)							
Spouse/Partner Employed Part-Time	-						
Spouse/Partner Employed Full-Time	-						-
No Spouse or Partner			-				-
Education							
College Degree or More (ref.)							
Some College or Associates	+	-	+	-	-		-
High School Diploma or Less	+		+			+	-

Note: [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 like that used to predict eating breakfast.

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

Table A-7. 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
Economic Climate								
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								
Socio-Demographic Characteristics								
Female	1.07	0.07		0.04	-3.16	-0.24	***	0.03
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	1.23	0.21	***	0.05	-3.01	-0.09	*	0.04
Older than 45 without Children	1.19	0.17	**	0.06	-3.44	-0.16	***	0.04
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner is Not Employed (ref.)								
Spouse/Partner Employed Part-Time	0.81	-0.22	*	0.09	1.01	-0.08		0.06
Spouse/Partner Employed Full-Time	0.83	-0.19	**	0.06	2.50	0.08		0.04
No Spouse or Partner	0.89	-0.12		0.07	1.62	0.06		0.05
Education								
College Degree or More (ref.)								
Some College or Associates	1.79	0.58	***	0.05	-5.34	0.08	*	0.04
High School Diploma or Less	2.36	0.86	***	0.05	-8.25	0.02		0.03
Constant		0.83	***	0.12		4.51	***	0.08

Notes: N=32,607. *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix B. Additional controls included in Model 3 are race, immigrant status, 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 A-8. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Active Travel, ATUS 2003-2010.

	Binary[1]			Count[2]		
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
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								
Socio-Demographic Characteristics								
Female	0.89	-0.12	**	0.05	-0.15	-0.15	**	0.05
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	1.08	0.07		0.05	-0.39	-0.05		0.07
Older than 45 without Children	1.21	0.19	**	0.07	-0.33	0.07		0.08
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner is Not Employed (ref.)								
Spouse/Partner Employed Part-Time	0.98	-0.02		0.10	-0.28	-0.12		0.12
Spouse/Partner Employed Full-Time	1.06	0.06		0.07	-0.34	-0.08		0.10
No Spouse or Partner	0.69	-0.36	***	0.07	1.51	0.11		0.10
Education								
College Degree or More (ref.)								
Some College or Associates	1.46	0.38	***	0.06	-1.59	-0.19	**	0.06
High School Diploma or Less	1.29	0.26	***	0.05	-0.50	0.09		0.07
Constant		1.57	***	0.13		3.35	***	0.19

Notes: N=32,605. *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix B. Additional controls included in Model 3 are race, immigrant status, 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 A-9. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Health-Related Self-Care, ATUS 2003-2010.

	Model 3							
	Binary[1]				Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
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								
Socio-Demographic Characteristics								
Female	0.72	-0.33	***	0.06	0.43	-0.25	**	0.09
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	1.09	0.09		0.08	-0.76	-0.04		0.13
Older than 45 without Children	0.55	-0.59	***	0.08	3.16	-0.15		0.13
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner is Not Employed (ref.)								
Spouse/Partner Employed Part-Time	1.31	0.27		0.14	-1.34	0.04		0.22
Spouse/Partner Employed Full-Time	1.00	0.00		0.09	0.67	0.09		0.13
No Spouse or Partner	0.99	-0.01		0.09	0.82	0.11		0.14
Education								
College Degree or More (ref.)								
Some College or Associates	0.83	-0.19	**	0.07	2.32	0.16		0.11
High School Diploma or Less	0.95	-0.05		0.07	2.04	0.25	*	0.11
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. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix B. Additional controls included in Model 3 are race, immigrant status, 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 A-10. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

		Model 3		
	OR	Coef.		SE
Economic Climate				
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				
Socio-Demographic Characteristics				
Female	0.83	-0.18	***	0.03
Life Stage				
45 or Younger without Children (ref.)				
Parent of Child under 18	1.06	0.06		0.04
Older than 45 without Children	1.57	0.45	***	0.05
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed (ref.)				
Spouse/Partner Employed Part-Time	0.95	-0.06		0.06
Spouse/Partner Employed Full-Time	0.86	-0.16	***	0.04
No Spouse or Partner	0.77	-0.26	***	0.05
Education				
College Degree or More (ref.)				
Some College or Associates	0.80	-0.22	***	0.04
High School Diploma or Less	0.79	-0.24	***	0.04
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. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) are included in Model 3 and shown in Appendix B. Additional controls included in Model 3 are race, immigrant status, 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.

Time Spent with Family Members

Table A-11. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spent with Children under 18, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.71	-0.34		0.22	139.48	0.46	***	0.04
Unemployed - at ATUS & CPS	1.01	0.01		0.18	134.91	0.48	***	0.03
Out of the Labor Force	0.55	-0.59	***	0.12	181.37	0.55	***	0.01
State Economic Conditions								
Unemployment Rate	0.98	-0.02		0.02	-1.72	-0.01		0.00
Time Period								
2003-2007 (ref.)								
2008	0.87	-0.14		0.10	6.73	0.01		0.02
2009	1.27	0.24		0.13	9.34	0.06	*	0.03
2010	1.01	0.01		0.14	12.18	0.04		0.03
Socio-Demographic Characteristics								
Female	0.28	-1.28	***	0.08	113.52	0.28	***	0.02
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	0.83	-0.19		0.12	12.48	0.03		0.03
Spouse/Partner FTE	1.10	0.09		0.08	10.00	0.04	*	0.02
No Spouse or Partner	2.82	1.04	***	0.11	40.56	-0.04		0.03
Education								
College Degree or More (ref.)								
Some College or Associates	1.14	0.13		0.08	2.06	0.02		0.01
High School Diploma or Less	1.54	0.43	***	0.08	-8.98	0.01		0.02
Living with Extended Family Members	1.17	0.16		0.11	2.71	0.03		0.03
Constant		-1.58	***	0.16		5.47	***	0.03

Notes: N=19,569. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.

[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 A-12. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spent with Children under 6, ATUS 2003-2010.

	Binary[1]				Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	1.18	0.17		0.40	156.32	0.47	***	0.05
Unemployed - at ATUS & CPS	1.23	0.21		0.36	161.00	0.49	***	0.04
Out of the Labor Force	0.42	-0.87	***	0.25	204.79	0.53	***	0.02
State Economic Conditions								
Unemployment Rate	0.90	-0.10	*	0.04	-0.80	-0.01		0.01
Time Period								
2003-2007 (ref.)								
2008	0.79	-0.24		0.20	-0.59	-0.01		0.03
2009	1.53	0.43		0.25	13.03	0.06	*	0.03
2010	1.10	0.09		0.26	13.46	0.04		0.03
Socio-Demographic Characteristics								
Female	0.15	-1.92	***	0.18	150.28	0.34	***	0.02
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	0.72	-0.32		0.19	20.42	0.05		0.04
Spouse/Partner FTE	1.01	0.01		0.15	30.05	0.09	***	0.02
No Spouse or Partner	4.31	1.46	***	0.21	-20.81	0.03		0.04
Education								
College Degree or More (ref.)								
Some College or Associates	1.08	0.08		0.14	21.60	0.07	***	0.02
High School Diploma or Less	1.44	0.36	*	0.14	10.09	0.05	*	0.02
Living with Extended Family Members	1.30	0.26		0.19	-3.55	0.00		0.03
Constant		-1.86	***	0.28		5.47	***	0.04

Notes: N=8,944.*p<.05. **p<.01. ***p<.001. Additional controls included in the model race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.
[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 A-13. Zero-Inflated Poisson Regression Models Predicting (All) Time (Minutes per Weekday) Adults Spent with Spouses/Partners, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.74	-0.30		0.25	122.43	0.42	***	0.05
Unemployed - at ATUS & CPS	0.65	-0.44	*	0.18	97.44	0.33	***	0.04
Out of the Labor Force	0.80	-0.23	**	0.08	83.22	0.30	***	0.02
State Economic Conditions								
Unemployment Rate	0.98	-0.02		0.02	0.26	0.00		0.01
Time Period								
2003-2007 (ref.)								
2008	1.03	0.03		0.09	-5.18	-0.02		0.02
2009	1.07	0.07		0.12	15.44	0.07	*	0.03
2010	1.09	0.09		0.12	15.87	0.07	*	0.03
Socio-Demographic Characteristics								
Female	0.94	-0.06		0.06	-6.59	-0.03	*	0.02
Life Stage								
45 or Younger without Children under 18 (ref.)								
Parent of Child under 18	1.09	0.09		0.08	-42.28	-0.17	***	0.02
Older than 45 without Children under 18	1.04	0.04		0.10	-14.42	-0.05	*	0.03

Notes: N=20,949. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-13 cont. Zero-Inflated Poisson Regression Models Predicting (All) Time (Minutes per Weekday) Adults Spent with Spouses/Partners, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Marital or Partner Status/Spouse's Employment Status								
No Spouse or Partner								
Spouse/Partner Employed Full-Time	1.15	0.14		0.11	-42.17	-0.16	***	0.03
Spouse/Partner Employed Part-Time	1.42	0.35	***	0.07	-72.05	-0.26	***	0.02
Spouse/Partner is Not Employed (ref.)								
Education								
College Degree or More (ref.)								
Some College or Associates	1.13	0.13		0.07	-0.80	0.01		0.02
High School Diploma or Less	1.41	0.35	***	0.07	1.12	0.04	*	0.02
Living with Extended Family Members	1.28	0.25	*	0.10	-10.03	-0.01		0.03
Constant		-2.39	***	0.17		5.66	***	0.04

Notes: N=20,949. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-14. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adults Spent Alone with Spouses/Partners, ATUS 2003-2010.

	Binary[1]			Count[2]		
	OR	Coef.	SE	Marginals	Coef.	SE
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	0.70	-0.35 *	0.17	91.33	0.44 ***	0.06
Unemployed - at ATUS & CPS	0.59	-0.54 ***	0.13	63.97	0.29 ***	0.05
Out of the Labor Force	0.86	-0.15 **	0.05	54.29	0.30 ***	0.03
State Economic Conditions						
Unemployment Rate	0.99	-0.01	0.01	0.48	0.00	0.01
Time Period						
2003-2007 (ref.)						
2008	1.13	0.12 *	0.06	-5.44	-0.01	0.03
2009	1.02	0.02	0.08	6.69	0.05	0.04
2010	1.00	-0.01	0.08	9.92	0.06	0.04
Socio-Demographic Characteristics						
Female	0.92	-0.08	0.04	-3.32	-0.04	0.02
Life Stage						
45 or Younger without Children under 18 (ref.)						
Parent of Child under 18	3.58	1.28 ***	0.07	-130.47	-0.65 ***	0.02
Older than 45 without Children under 18	0.99	-0.01	0.09	-6.12	-0.03	0.03

Notes: Model 2=20,948. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-14 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adults Spent Alone with Spouses/Partners, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Marital or Partner Status/Spouse's Employment Status								
No Spouse or Partner								
Spouse/Partner Employed Full-Time	1.03	0.03		0.07	-27.26	-0.17	***	0.03
Spouse/Partner Employed Part-Time	1.17	0.16	**	0.05	-42.91	-0.24	***	0.02
Spouse/Partner is Not Employed (ref.)								
Education								
College Degree or More (ref.)								
Some College or Associates	1.09	0.08		0.05	1.98	0.03		0.02
High School Diploma or Less	1.37	0.32	***	0.05	3.71	0.09	***	0.02
Living with Extended Family Members	1.49	0.40	***	0.08	-38.50	-0.16	***	0.04
Constant		-1.99	***	0.12		5.48	***	0.06

Notes: Model 2=20,948. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-15. Zero-Inflated Poisson Regression Models Predicting Time (Minutes Per Weekday) Adults Spent with Parents, ATUS 2003-2010.

	Binary[1]			Count[2]		
	OR	Coef.	SE	Marginals	Coef.	SE
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	1.09	0.09	0.22	1.47	0.22	0.17
Unemployed - at ATUS & CPS	0.86	-0.15	0.14	9.44	0.52 ***	0.10
Out of the Labor Force	0.70	-0.35 ***	0.07	13.46	0.53 ***	0.05
State Economic Conditions						
Unemployment Rate	0.95	-0.05 *	0.02	0.82	0.01	0.02
Time Period						
2003-2007 (ref.)						
2008	0.96	-0.04	0.09	-0.26	-0.06	0.08
2009	1.04	0.04	0.12	-4.18	-0.31 **	0.10
2010	1.23	0.21	0.13	-2.58	0.00	0.11
Socio-Demographic Characteristics						
Female	0.70	-0.35 ***	0.06	6.46	0.15 **	0.05
Life Stage						
45 or Younger without Children under 18 (ref.)						
Parent of Child under 18	0.90	-0.10	0.07	-0.65	-0.14 *	0.07
Older than 45 without Children under 18	1.53	0.42 ***	0.09	-4.56	0.05	0.07

Notes: N=32,610. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-15 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes Per Weekday) Adults Spent with Parents, ATUS 2003-2010.

	Binary[1]				Count[2]		
	OR	Coef.		SE	Marginals	Coef.	SE
Marital or Partner Status/Spouse's Employment Status							
Spouse/Partner is Not Employed (ref.)							
Spouse/Partner Employed Part-Time	0.98	-0.02		0.17	-0.43	-0.08	0.14
Spouse/Partner Employed Full-Time	0.67	-0.41	***	0.12	3.18	-0.05	0.09
No Spouse or Partner	0.32	-1.13	***	0.12	13.16	-0.06	0.10
Education							
College Degree or More (ref.)							
Some College or Associates	0.97	-0.03		0.07	0.15	-0.02	0.06
High School Diploma or Less	1.25	0.22	**	0.07	-2.03	0.05	0.06
Living with Extended Family Members	0.10	-2.26	***	0.06	28.60	0.04	0.05
Constant		3.72	***	0.18		4.92 ***	0.17

Notes: N=32,610. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-16. Zero-Inflated Poisson Regression Models Predicting Time (Minutes Per Weekday) Adults Spent with All Extended Family, ATUS 2003-2010.

	Binary[1]			Count[2]		
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.78	-0.25		0.13	34.59	0.34	***	0.07
Unemployed - at ATUS & CPS	0.71	-0.34	**	0.10	53.28	0.47	***	0.05
Out of the Labor Force	0.66	-0.41	***	0.05	55.63	0.45	***	0.03
State Economic Conditions								
Unemployment Rate	0.95	-0.05	***	0.01	1.75	-0.01		0.01
Time Period								
2003-2007 (ref.)								
2008	1.08	0.08		0.06	-6.01	-0.04		0.04
2009	1.13	0.12		0.08	-8.05	-0.04		0.05
2010	1.18	0.17	*	0.08	-1.32	0.10		0.06
Socio-Demographic Characteristics								
Female	0.64	-0.45	***	0.04	30.69	0.15	***	0.03
Life Stage								
45 or Younger without Children under 18 (ref.)								
Parent of Child under 18	0.83	-0.19	***	0.05	-3.67	-0.19	***	0.03
Older than 45 without Children under 18	0.79	-0.23	***	0.06	12.24	0.01		0.04

Notes: N=32,607. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-16 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes Per Weekday) Adults Spent with All Extended Family, ATUS 2003-2010.

	Binary[1]			Count[2]		
	OR	Coef.		SE	Marginals	Coef.		SE
Marital or Partner Status/Spouse's Employment Status							
Spouse/Partner is Not Employed (ref.)							
Spouse/Partner Employed Part-Time	0.82	-0.20	*	0.08	1.27	-0.12		0.06
Spouse/Partner Employed Full-Time	0.90	-0.10		0.06	-0.68	-0.08		0.04
No Spouse or Partner	0.85	-0.16	**	0.06	4.35	-0.05		0.04
Education							
College Degree or More (ref.)							
Some College or Associates	0.89	-0.12	**	0.04	7.73	0.04		0.03
High School Diploma or Less	0.83	-0.18	***	0.04	14.21	0.09	**	0.03
Living with Extended Family Members	0.11	-2.24	***	0.05	110.01	0.10	***	0.03
Constant		2.31	***	0.11		5.20	***	0.08

Notes: N=32,607. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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 A-17. Summary Table of Socio-Demographic Relationships Predicting Time Spent with Family Members

Weekday	Children Under 18	Children Under 6	Spouses/ Partners All Time	Spouses/ Partners Alone	Extended Family Parent(s)	Extended Family All Members
Female	+	+	-		+	+
Life Stage						
45 or Younger without Children (ref.)						
Parent of Child under 18			-	-	-	-
Older than 45 without Children			-			
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner is Not Employed (ref.)						
Spouse/Partner Employed Part-Time	+	+	-	-		
Spouse/Partner Employed Full-Time			-	-		
No Spouse or Partner						
Education						
College Degree or More (ref.)						
Some College or Associates		+				
High School Diploma or Less		+	+	+		+
Living with Extended Family Members				-		+
Weekend						
Female	+	+	-	-	+	+
Life Stage						
45 or Younger without Children (ref.)						
Parent of Child under 18			-	-	-	-
Older than 45 without Children			-	-	-	
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner is Not Employed (ref.)						
Spouse/Partner Employed Part-Time			-	-		
Spouse/Partner Employed Full-Time			-			-
No Spouse or Partner	-					-
Education						
College Degree or More (ref.)						
Some College or Associates	-	-	-		-	-
High School Diploma or Less	-	-	-	+		
Living with Extended Family Members	-			-	+	+

Appendix B. Additional Analyses – Logged Number of Sleep Disruptions

Table B-1. OLS Regression Models Predicting the Logged Number of Sleep Disruptions, ATUS 2003-2010.

	Model 1		Model 2		Model 3		Model 4			Model 5		
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.		SE	Coef.		SE
Employment uncertainty												
Detailed Employment Status												
Employed (ref.)												
Unemployed - 2 to 5 Months			0.229	0.178	0.207	0.178	0.927	***	0.253	1.765	***	0.219
Unemployed - at ATUS & CPS			-0.008	0.047	0.018	0.047	-0.054		0.355	-0.024		0.446
Out of Labor Force			0.043	0.140	0.094	0.059	0.127		0.159	0.301		0.180
State Economic Conditions												
Unemployment Rate	-0.015	0.013	-0.013	0.013	-0.007	0.011	0.114		0.067	0.323	***	0.058
Year Interviewed												
2003-2007 (ref.)												
2008	0.058	0.096	0.046	0.096	0.008	0.066	0.236		0.153	0.321		0.173
2009	0.042	0.126	0.015	0.128	-0.041	0.080	-0.041		0.185	0.099		0.169
2010	0.079	0.149	0.055	0.150	0.003	0.087	0.338		0.263	0.585		0.307
Employment Status												
Employed (ref.)												
Unemployed	0.059	0.075										
Out of Labor Force	0.020	0.139										
Social Context												
Female					-0.023	0.045	-0.020		0.042	-0.020		0.041
Life Stage												
45 or Younger without Children (ref.)												
Parent of Child under 18					0.036	0.049	0.047		0.045	0.048		0.044
Older than 45 without Children					0.025	0.051	0.030		0.048	0.032		0.047

Notes: Model 1 N=1,066, Model 2 N= 1,066, Model 3 N=1,066, Model 4 N=1,026, Model 5=1,026. * p<.05, ** p <.01, *** p<.001. Controls include living with a child under 2, race, immigrant status, region, metropolitan area, season, and predicted probability of a Sleep Disruption calculated from the models shown in Table 7 and Table A-2. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table B-1 cont. OLS Regression Models Predicting the Logged Number of Sleep Disruptions, ATUS 2003-2010.

	Model 1		Model 2		Model 3		Model 4		Model 5		
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.		SE
Marital or Partner Status/Spouse's Employment Status											
No Spouse or Partner					0.047	0.051	0.052	0.052	0.050		0.052
Spouse/Partner Employed Full-Time					0.037	0.032	0.027	0.032	0.029		0.031
Spouse/Partner Employed Part-Time					0.029	0.042	0.019	0.041	0.024		0.041
Spouse/Partner is Not Employed (ref.)											
Education											
High School Diploma or Less					-0.002	0.036	-0.003	0.033	-0.003		0.033
Some College or Associates					0.014	0.027	0.015	0.026	0.012		0.025
College Degree or More (ref.)											
Interactions											
*Unemployed - 2 to 5 Months*Unemployment Rate*							-0.107	0.064	-0.306	***	0.048
*Unemployed - at ATUS & CPS*Unemployment Rate*							0.230	0.142	0.622	***	0.124
*Out of Labor Force*Unemployment Rate*							0.318	0.190	0.883	***	0.135
*Unemployed - 2 to 5 Months*2008*							0.000	0.000	0.000		0.000
*Unemployed - at ATUS & CPS*2008*							-0.102	0.135	-0.430		0.583
*Out of Labor Force*2008*							-0.147	0.084	-0.427		0.300
*Unemployed - 2 to 5 Months*2009*							0.107	0.403	-1.518	***	0.413
*Unemployed - at ATUS & CPS*2009*							-0.141	0.430	1.123		2.527
*Out of Labor Force*2009*							0.071	0.118	-0.443		0.527
*Unemployed - 2 to 5 Months*2010*							0.077	0.479	-2.235	***	0.486
*Unemployed - at ATUS & CPS*2010*							-0.051	0.397	0.054		0.980
*Out of Labor Force*2010*							-0.103	0.123	-1.262	**	0.445
*2008*Unemployment Rate*							-0.036	0.026	-0.051		0.028
*2009*Unemployment Rate*							-0.006	0.022	-0.026		0.020
*2010*Unemployment Rate*							-0.038	0.027	-0.068	*	0.032

Notes: Model 1 N=1,066, Model 2 N= 1,066, Model 3 N=1,066, Model 4 N=1,026, Model 5=1,026. * p<.05, ** p <.01, *** p<.001. Controls include living with a child under 2, race, immigrant status, region, metropolitan area, season, and predicted probability of a Sleep Disruption calculated from the models shown in Table 7 and Table A-2. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table B-1 cont. OLS Regression Models Predicting the Logged Number of Sleep Disruptions, ATUS 2003-2010.

	Model 1		Model 2		Model 3			Model 4		Model 5		
	Coef.	SE	Coef.	SE	Coef.		SE	Coef.	SE	Coef.		SE
Unemployed - 2 to 5 Months*Unemployment Rate*2008										0.000		0.000
Unemployed - at ATUS & CPS*Unemployment Rate*2008										0.052		0.106
Out of Labor Force*Unemployment Rate*2008										0.052		0.050
Unemployed - 2 to 5 Months*Unemployment Rate*2009										0.280	***	0.062
Unemployed - at ATUS & CPS*Unemployment Rate*2009										-0.111		0.248
Out of Labor Force*Unemployment Rate*2009										0.072		0.069
Unemployed - 2 to 5 Months*Unemployment Rate*2010										0.342	***	0.066
Unemployed - at ATUS & CPS*Unemployment Rate*2010										-0.006		0.117
Out of Labor Force*Unemployment Rate*2010										0.133	**	0.051
Constant	0.109	0.128	0.127	0.129	0.129	+	0.077	0.043	0.098	-0.009		0.096

Notes: Model 1 N=1,066, Model 2 N= 1,066, Model 3 N=1,066, Model 4 N=1,026, Model 5=1,026. * p<.05, ** p <.01, *** p<.001. Controls include living with a child under 2, race, immigrant status, region, metropolitan area, season, and predicted probability of a Sleep Disruption calculated from the models shown in Table 7 and Table A-2. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Figure B-1. Moderating Effects of Being Unemployed and Life Stage on Number of Sleep Disruptions

■ Younger than 45 without Children ⊠ Parent of Child under 18

⊠ Older than 45 without Children
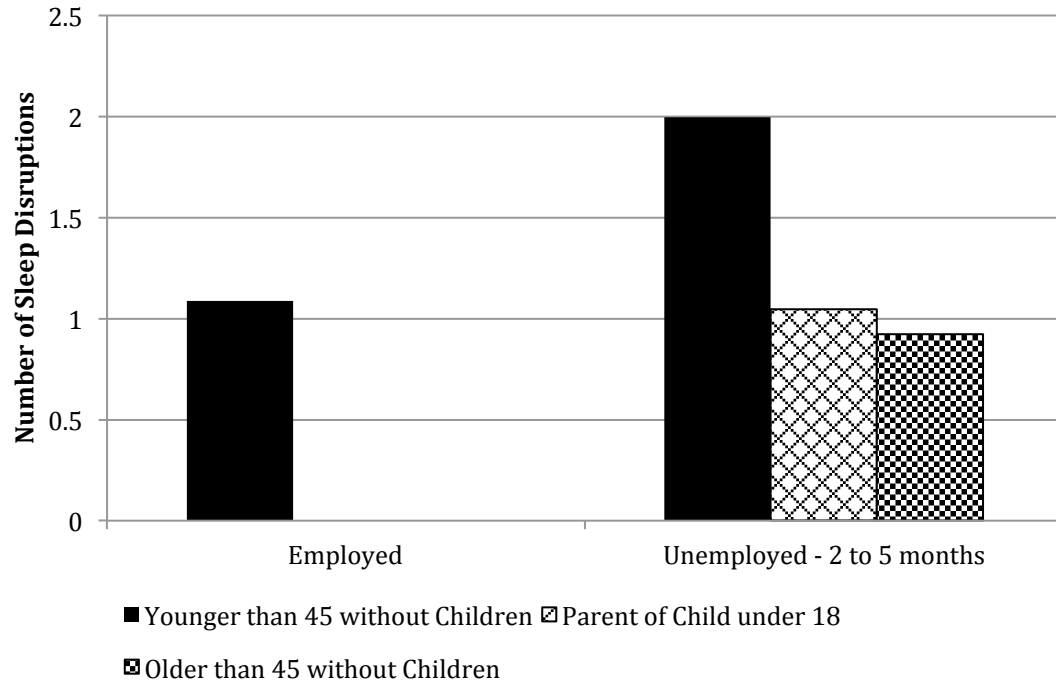
Table B-2. OLS Regression Models Predicting the Logged Number of
Sleep Disruptions by Life Stage, ATUS 2003-2010.

	Coef.		SE
Life Stage			
Under 40 without Children (ref.)			
Parent of Child under 18	-0.01		0.13
Over 40 without Children	0.06		0.15
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 Months	0.61	***	0.05
Unemployed - at ATUS & CPS	-0.07	*	0.03
Out of Labor Force	0.02		0.09
State Economic Conditions			
State-Level Unemployment Rate	-0.01		0.02
Recessionary Time Period			
2003-2007 (ref.)			
2008	0.20		0.17
2009	-0.02		0.08
2010	-0.01		0.09
Interactions			
Unemployed - 2 to 5 Months*Parent of Child under 18	-0.67	***	0.06
Unemployed - 2 to 5 Months*Over 40 without Children	-0.77	***	0.12
Unemployed - at ATUS & CPS*Parent of Child under 18	0.13		0.09
Unemployed - at ATUS & CPS*Over 40 without Children	-0.01		0.06
Out of Labor Force*Parent of Child under 18	0.01		0.10
Out of Labor Force*Over 40 without Children	0.11		0.10
Unemployment Rate*Parent of Child under 18	0.01		0.02
Unemployment Rate*Over 40 without Children	-0.01		0.03
2008*Parent of Child under 18	-0.20		0.18
2008*Over 40 without Children	-0.18		0.18
2009*Parent of Child under 18	0.02		0.09
2009*Over 40 without Children	0.04		0.11
2010*Parent of Child under 18	0.01		0.11
2010*Over 40 without Children	0.19		0.17
Constant	0.12		0.12

Notes: N=1,066. + p<.10, * p<.05, ** p <.01, *** p<.001. Living with a child under
the age of two is controlled for in the models. Models are weighted using wt06 and
cases with missing values not imputed by the U.S. Bureau of Labor Statistics are
excluded.

Appendix C. Moderating Effects of Employment Uncertainty

Sleep Outcomes

Table C-1. Logistic Regression Models Predicting Experiencing Sleeplessness with Moderating Effects of Employment Uncertainty, ATUS 2003-2010.

	OR		SE
Employment uncertainty			
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 months	0.885		0.684
Unemployed - at ATUS & CPS	6.670	**	4.864
Out of Labor Force	1.204		0.369
State Economic Conditions			
State-Level Unemployment	0.704	*	0.119
Time Period			
2003-2007 (ref.)			
2008	1.228		0.481
2009	1.050		0.489
2010	1.000		0.459
Social Context			
Female	1.136		0.084
Life Stage			
45 or Younger without Children (ref.)			
Parent of Child under 18	1.031		0.102
Older than 45 without Children	1.162		0.127
Marital or Partner Status/Spouse's Employment Status			
No Spouse or Partner	0.973		0.144
Spouse/Partner Employed Full-Time	0.950		0.110
Spouse/Partner Employed Part-Time	1.094		0.140
Spouse/Partner is Not Employed (ref.)			
Education			
High School Diploma or Less	1.163		0.099
Some College or Associates	1.254	**	0.104
College Degree or More (ref.)			
Interactions			
*Unemployed - 2 to 5 months*Unemployment Rate*	1.203		0.196
*Unemployed - at ATUS & CPS*Unemployment Rate*	0.548		0.188
*Out of Labor Force*Unemployment Rate*	0.620		0.302
*Unemployed - 2 to 5 months*2008*	0.149	*	0.126
*Unemployed - at ATUS & CPS*2008*	0.374		0.268
*Out of Labor Force*2008*	0.540	*	0.135
*Unemployed - 2 to 5 months*2009*	0.081	*	0.098
*Unemployed - at ATUS & CPS*2009*	2.087		1.398

Notes: N=42,978. * p<.05, ** p <.01, *** p<.001. Controls include race, immigrant status, 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.

Table C-1 cont. Logistic Regression Models Predicting Experiencing Sleeplessness with Moderating Effects of Employment Uncertainty, ATUS 2003-2010.

	OR		SE
Out of Labor Force*2009	0.579		0.168
Unemployed - 2 to 5 months*2010	0.419		0.438
Unemployed - at ATUS & CPS*2010	1.648		0.978
Out of Labor Force*2010	0.555		0.187
2008*Unemployment Rate	1.058		0.074
2009*Unemployment Rate	1.127	*	0.066
2010*Unemployment Rate	1.102		0.063
Constant	0.074	***	0.021

Notes: N=42,978. * p<.05, ** p <.01, *** p<.001. Controls include race, immigrant status, 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.

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

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Economic Climate					
Detailed Employment Status					
Employed (ref.)					
Unemployed - 2 to 5 months	-0.42	0.53	2.27	***	0.54
Unemployed - at ATUS & CPS	-0.19	0.42	-0.50		0.41
Out of Labor Force	-0.66 **	0.22	0.25		0.29
State Economic Conditions					
Unemployment Rate	0.01	0.03	0.01		0.03
Time Period					
2003-2007 (ref.)					
2008	-0.38	0.32	0.87	*	0.43
2009	0.07	0.34	0.75	*	0.36
2010	-0.25	0.31	0.56		0.35
Socio-Demographic Characteristics					
Female	-0.12 **	0.05	-0.16	**	0.05
Life Stage					
45 or Younger without Children (ref.)					
Parent of Child under 18	0.07	0.05	-0.06		0.06
Older than 45 without Children	0.19 **	0.07	0.06		0.08
Marital or Partner Status/Spouse's Employment Status					
Spouse/Partner is Not Employed (ref.)					
Spouse/Partner Employed Part-Time	-0.02	0.10	-0.12		0.12
Spouse/Partner Employed Full-Time	0.06	0.07	-0.07		0.09
No Spouse or Partner	-0.36 ***	0.07	0.11		0.10
Education					
College Degree or More (ref.)	0.38 ***	0.06	-0.18	**	0.06
Some College or Associates	0.26 ***	0.05	0.09		0.06
High School Diploma or Less					
Interactions					
*Unemployed - 2 to 5 months*Unemployment Rate*	0.01	0.10	-0.28	***	0.08
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.07	0.07	0.16	**	0.06
*Out of Labor Force*Unemployment Rate*	0.05	0.04	0.02		0.05
*Unemployed - 2 to 5 months*2008*	0.35	0.41	-0.30		0.30
*Unemployed - 2 to 5 months*2009*	-0.38	0.54	0.58		0.69
*Unemployed - 2 to 5 months*2010*	-0.05	0.58	0.80	*	0.41

Notes: N=32,605.*p<.05. **p<.01. ***p<.001. Additional controls included in model are race, immigrant status, 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 C-2 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) in Active Travel, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
*Unemployed - at ATUS & CPS*2008*	0.24	0.40	0.08	0.25
*Unemployed - at ATUS & CPS*2009*	0.17	0.39	-0.35	0.34
*Unemployed - at ATUS & CPS*2010*	0.09	0.40	-0.49	0.37
*Out of Labor Force*2008*	-0.03	0.18	0.21	0.23
*Out of Labor Force*2009*	-0.05	0.22	-0.10	0.23
*Out of Labor Force*2010*	-0.07	0.24	-0.08	0.26
*2008*Unemployment Rate*	0.05	0.06	-0.13	0.08
*2009*Unemployment Rate*	-0.02	0.04	-0.07	0.05
*2010*Unemployment Rate*	0.01	0.04	-0.06	0.04
Constant	1.61 ***	0.17	3.15 ***	0.21

Notes: N=32,605.*p<.05. **p<.01. ***p<.001. Additional controls included in model are race, immigrant status, 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 C-3. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.	SE
Economic Climate		
Detailed Employment Status		
Employed (ref.)		
Unemployed - 2 to 5 months	0.68	0.43
Unemployed - at ATUS & CPS	0.70 *	0.33
Out of Labor Force	0.12	0.16
State Economic Conditions		
Unemployment Rate	-0.02	0.02
Time Period		
2003-2007 (ref.)		
2008	-0.19	0.21
2009	-0.33	0.23
2010	-0.38	0.23
Socio-Demographic Characteristics		
Female	-0.19 ***	0.03

Notes: N=32,610.*p<.05. **p<.01. ***p<.001. Additional controls included in model are race, immigrant status, 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.

Table C-3 cont. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.		SE
Life Stage			
45 or Younger without Children (ref.)			
Parent of Child under 18	0.06		0.04
Older than 45 without Children	0.45	***	0.05
Marital or Partner Status/Spouse's Employment Status			
Spouse/Partner is Not Employed (ref.)			
Spouse/Partner Employed Part-Time	-0.06		0.06
Spouse/Partner Employed Full-Time	-0.16	***	0.04
No Spouse or Partner	-0.26	***	0.05
Education			
College Degree or More (ref.)			
Some College or Associates	-0.23	***	0.04
High School Diploma or Less	-0.24	***	0.04
Interactions			
Unemployed - 2 to 5 months*Unemployment Rate	-0.13		0.08
Unemployed - at ATUS & CPS*Unemployment Rate	-0.10		0.06
Out of Labor Force*Unemployment Rate	-0.01		0.03
Unemployed - 2 to 5 months*2008	-0.02		0.34
Unemployed - 2 to 5 months*2009	0.94	*	0.46
Unemployed - 2 to 5 months*2010	1.10	*	0.46
Unemployed - at ATUS & CPS*2008	0.36		0.30
Unemployed - at ATUS & CPS*2009	0.56		0.32
Unemployed - at ATUS & CPS*2010	0.55		0.33
Out of Labor Force*2008	0.29	*	0.13
Out of Labor Force*2009	0.13		0.17
Out of Labor Force*2010	0.45	*	0.18
2008*Unemployment Rate	0.04		0.04
2009*Unemployment Rate	0.04		0.03
2010*Unemployment Rate	0.05		0.03
Constant	0.14		0.11

Notes: N=32,610.*p<.05. **p<.01. ***p<.001. Additional controls included in model are race, immigrant status, 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.

Time with Family Members

Table C-4. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spend with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	-1.69		2.27	1.06	***	0.28
Unemployed - at ATUS & CPS	-6.98	*	3.03	0.79	**	0.26
Out of Labor Force	-1.47		1.35	0.61	***	0.09
State Economic Conditions						
Unemployment Rate	-0.02		0.07	0.00		0.01
Time Period						
2003-2007 (ref.)						
2008	0.18		1.19	0.09		0.17
2009	1.90	*	0.84	0.15		0.14
2010	1.23		0.92	0.04		0.15
Social Context						
Female	-1.96	***	0.18	0.34	***	0.02
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner is Not Employed (ref.)						
Spouse/Partner Employed Part-Time	-0.34		0.19	0.05		0.04
Spouse/Partner Employed Full-Time	0.00		0.15	0.09	***	0.02
No Spouse or Partner	1.49	***	0.21	0.03		0.03

Notes: N=8,944. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 C-4 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spend with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Education						
College Degree or More (ref.)						
Some College or Associates	0.08		0.14	0.07	***	0.02
High School Diploma or Less	0.36	*	0.14	0.05	*	0.02
Living with Extended Family	0.29		0.19	0.01		0.03
Interactions						
*Unemployed - 2 to 5 months*Unemployment Rate*	0.35		0.43	0.11	*	0.05
*Unemployed - at ATUS & CPS*Unemployment Rate*	1.22	*	0.48	0.07		0.05
*Out of Labor Force*Unemployment Rate*	0.11		0.25	0.02		0.02
*Unemployed - 2 to 5 months*2008*	-2.07		4.80	-1.12	*	0.51
*Unemployed - 2 to 5 months*2009*	-0.15		3.31	1.15		0.74
*Unemployed - 2 to 5 months*2010*	4.82		4.36	0.81		0.55
*Unemployed - at ATUS & CPS*2008*	9.34	*	3.78	0.73		0.46
*Unemployed - at ATUS & CPS*2009*	14.56	***	3.73	0.31		0.42
*Unemployed - at ATUS & CPS*2010*	6.15		3.67	0.23		0.44
*Out of Labor Force*2008*	4.17		2.15	0.15		0.22
*Out of Labor Force*2009*	-3.59		3.41	0.34		0.21
*Out of Labor Force*2010*	0.95		2.22	0.16		0.23
*2008*Unemployment Rate*	-0.08		0.203	0.02		0.029
*2009*Unemployment Rate*	-0.21		0.11	0.01		0.017
*2010*Unemployment Rate*	-0.17		0.114	0.00		0.018
*Unemployed - 2 to 5 months*Unemployment Rate*2008*	0.21		0.78	0.21	*	0.08
*Unemployed - 2 to 5 months*Unemployment Rate*2009*	-0.22		0.48	0.16		0.09

Notes: N=8,944. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 C-4 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spend with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Unemployed - 2 to 5 months*Unemployment Rate*2010	-0.61		0.59	0.14	*	0.07
Unemployed - at ATUS & CPS*Unemployment Rate*2008	-1.71	**	0.60	0.15	*	0.08
Unemployed - at ATUS & CPS*Unemployment Rate*2009	-1.93	***	0.53	0.08		0.06
Unemployed - at ATUS & CPS*Unemployment Rate*2010	-1.08	*	0.52	0.03		0.06
Out of Labor Force*Unemployment Rate*2008	-0.66		0.36	0.03		0.04
Out of Labor Force*Unemployment Rate*2009	0.36		0.41	0.04		0.03
Out of Labor Force*Unemployment Rate*2010	-0.20		0.30	0.02		0.03
Constant	-2.30	***	0.43	5.43	***	0.07

Notes: N=8,944. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 C-5. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adult Children Spent with Parents, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	2.59	**	0.88	1.41	*	0.69
Unemployed - at ATUS & CPS	0.11		0.55	1.90	***	0.38
Out of Labor Force	-0.20		0.26	0.46	*	0.23
State Economic Conditions						
Unemployment Rate	-0.01		0.03	-0.01		0.04
Time Period						
2003-2007 (ref.)						
2008	-0.01		0.43	-0.80	*	0.37
2009	-0.16		0.46	-0.52		0.39
2010	1.06	*	0.47	-0.43		0.37
Social Context						
Female	-0.36	***	0.06	0.15	**	0.05
Life Stage						
45 or Younger without Children (ref.)						
Parent of Child under 18	-0.10		0.07	-0.15	*	0.07
Older than 45 without Children	0.42	***	0.09	0.04		0.07
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner is Not Employed (ref.)						
Spouse/Partner Employed Part-Time	-0.04		0.17	-0.09		0.14
Spouse/Partner Employed Full-Time	-0.41	***	0.12	-0.05		0.10
No Spouse or Partner	-1.14	***	0.12	-0.06		0.10
Education						
College Degree or More (ref.)						
Some College or Associates	-0.03		0.07	-0.02		0.06
High School Diploma or Less	0.21	**	0.07	0.05		0.06
Living with Extended Family	-2.26	***	0.06	0.05		0.05
Interactions						
Unemployed - 2 to 5 months*Unemployment Rate	-0.48	***	0.15	-0.20		0.11
Unemployed - at ATUS & CPS*Unemployment Rate	0.00		0.09	-0.23	***	0.07
Out of Labor Force*Unemployment Rate	-0.04		0.05	0.01		0.04
Unemployed - 2 to 5 months*2008	0.84		0.74	0.49		0.26
Unemployed - 2 to 5 months*2009	2.56	**	0.82	-0.05		0.71
Unemployed - 2 to 5 months*2010	2.51	**	0.91	0.78		0.54
Unemployed - at ATUS & CPS*2008	-1.17	**	0.41	0.21		0.29

Notes: N=32,610. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 C-5cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adult Children Spent with Parents, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
*Unemployed - at ATUS & CPS*2009*	-0.45		0.57	0.66	*	0.30
*Unemployed - at ATUS & CPS*2010*	-0.33		0.55	0.76	*	0.37
*Out of Labor Force*2008*	0.24		0.22	-0.04		0.18
*Out of Labor Force*2009*	0.28		0.28	-0.02		0.23
*Out of Labor Force*2010*	0.12		0.29	0.07		0.24
*2008*Unemployment Rate*	-0.01		0.07	0.13	*	0.06
*2009*Unemployment Rate*	0.00		0.06	0.04		0.05
*2010*Unemployment Rate*	-0.11	*	0.05	0.05		0.05
Constant	3.49	***	0.23	5.05	***	0.24

Notes: N=32,610. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 C-6. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent with Extended Family Members, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	0.60		0.56	0.96	***	0.23
Unemployed - at ATUS & CPS	-0.03		0.37	0.72	**	0.22
Out of Labor Force	-0.25		0.19	0.55	***	0.12
State Economic Conditions						
Unemployment Rate	-0.04	*	0.02	0.00		0.02
Time Period						
2003-2007 (ref.)						
2008	-0.09		0.27	-0.25		0.21
2009	-0.31		0.28	-0.04		0.20
2010	0.46		0.28	-0.05		0.21
Social Context						
Female	-0.45	***	0.04	0.15	***	0.03

Notes: N=32,607. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 C-6 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent with Extended Family Members, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Life Stage						
45 or Younger without Children (ref.)						
Parent of Child under 18	-0.19	***	0.05	-0.19	***	0.03
Older than 45 without Children	-0.24	***	0.06	0.01		0.04
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner is Not Employed (ref.)						
Spouse/Partner Employed Part-Time	-0.20	*	0.08	-0.12		0.06
Spouse/Partner Employed Full-Time	-0.10		0.06	-0.08		0.04
No Spouse or Partner	-0.16	**	0.06	-0.05		0.04
Education						
College Degree or More (ref.)						
Some College or Associates	-0.12	**	0.04	0.04		0.03
High School Diploma or Less	-0.19	***	0.04	0.09	**	0.03
Living with Extended Family	-2.24	***	0.05	0.10	***	0.03
Interactions						
*Unemployed - 2 to 5 months*Unemployment Rate*	-0.19	*	0.10	-0.12	**	0.04
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.05		0.06	-0.04		0.04
*Out of Labor Force*Unemployment Rate*	-0.03		0.03	-0.02		0.02
*Unemployed - 2 to 5 months*2008*	0.66		0.48	-0.01		0.26
*Unemployed - 2 to 5 months*2009*	1.21	*	0.54	0.49	*	0.21
*Unemployed - 2 to 5 months*2010*	1.05		0.56	0.65	**	0.22
*Unemployed - at ATUS & CPS*2008*	0.08		0.32	0.17		0.16
*Unemployed - at ATUS & CPS*2009*	-0.03		0.36	0.18		0.21
*Unemployed - at ATUS & CPS*2010*	0.17		0.39	0.13		0.22
*Out of Labor Force*2008*	0.13		0.15	0.09		0.09
*Out of Labor Force*2009*	0.19		0.19	0.05		0.12
*Out of Labor Force*2010*	0.08		0.20	0.21		0.12
*2008*Unemployment Rate*	0.02		0.05	0.03		0.04
*2009*Unemployment Rate*	0.04		0.03	0.00		0.02
*2010*Unemployment Rate*	-0.03		0.03	0.01		0.02
Constant	2.276	***	0.139	5.167	***	0.109

Notes: N=32,607. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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.

Appendix D. Moderating Effects of Socio-Demographic Characteristics

Sleep Outcomes

Table D-1. OLS Regression Models Predicting Logged Time in Sleeplessness by Gender, ATUS 2003-2010.

	Coef.		SE
Female	0.64	**	0.20
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 Months	0.06		0.24
Unemployed - at ATUS & CPS	1.08	*	0.52
Out of Labor Force	1.10	***	0.31
State Economic Conditions			
State-Level Unemployment	-0.10	*	0.05
Year Interviewed			
2003-2007(ref.)			
2008	0.40	**	0.15
2009	0.89	**	0.32
2010	0.44		0.24
Interactions			
*Unemployed - 2 to 5 Months*Female*	0.74	**	0.28
*Unemployed - at ATUS & CPS*Female*	-1.05	*	0.49
*Out of the Labor Force*Female*	-0.56	**	0.19
*Unemployment Rate*Female*	-0.07	*	0.03
*2008*Female*	0.06		0.14
*2009*Female*	0.39		0.21
*2010*Female*	0.41		0.21
Constant	0.64	**	0.20

Notes: N=1,816. * p<.05, ** p <.01, *** p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table D-2. OLS Regression Models Predicting Logged Time in Sleeplessness by Life Stage, ATUS 2003-2010.

	Coef.		SE
Life Stage			
Under 40 without Children (ref.)			
Parent of Child under 18	-0.31		0.26
Over 40 without Children	-0.26		0.28
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 Months	0.49		0.41
Unemployed - at ATUS & CPS	0.79		0.47
Out of Labor Force	0.71	**	0.25
State Economic Conditions			
State-Level Unemployment Rate	-0.19	**	0.06
Year Interviewed			
2003-2007 (ref.)			
2008	0.52	**	0.17
2009	1.23	***	0.35
2010	0.65	**	0.25
Interactions			
*Unemployed - 2 to 5 Months*Parent of Child under 18*	-0.21		0.37
*Unemployed - 2 to 5 Months*Over 40 without Children*	-0.25		0.39
*Unemployed - at ATUS & CPS*Parent of Child under 18*	-0.57		0.40
*Unemployed - at ATUS & CPS*Over 40 without Children*	-0.54		0.31
*Out of Labor Force*Parent of Child under 18*	-0.46	*	0.20
*Out of Labor Force*Over 40 without Children*	0.43		0.23
*Unemployment Rate*Parent of Child under 18*	0.09	*	0.05
*Unemployment Rate*Over 40 without Children*	0.10	*	0.05
*2008*Parent of Child under 18*	-0.29		0.17
*2008*Over 40 without Children*	-0.18		0.20
*2009*Parent of Child under 18*	-0.40		0.23
*2009*Over 40 without Children*	-0.47		0.29
*2010*Parent of Child under 18*	-0.21		0.25
*2010*Over 40 without Children*	-0.07		0.36
Constant	5.18	***	0.56

Notes: N=1,816. * p<.05, ** p <.01, *** p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

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

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Female	0.36	0.26	0.49	0.33
Economic Climate				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 months	0.29	0.64	2.93 ***	0.80
Unemployed - at ATUS & CPS	-0.67	0.55	0.11	0.57
Out of Labor Force	-0.69	0.42	1.76 **	0.58
State Economic Conditions				
Unemployment Rate	0.04	0.04	0.09	0.05
Time Period				
2003-2007 (ref.)				
2008	-0.05	0.43	1.65 **	0.57
2009	-0.14	0.46	0.97	0.52
2010	0.22	0.41	0.33	0.60
Interactions				
*Unemployed - 2 to 5 Months*Female*	-2.02 *	0.94	-1.02	1.10
*Unemployed - at ATUS & CPS*Female*	0.14	0.74	-0.96	0.77
*Out of the Labor Force*Female*	0.00	0.49	-2.28 ***	0.64
*Unemployment Rate*Female*	-0.09	0.05	-0.10	0.07
*2008*Female*	-0.34	0.58	-1.90 **	0.67
*2009*Female*	0.25	0.62	-0.64	0.68

Notes: N=33,523. *p<.05. **p<.01. ***p<.001. 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 D-3 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Active Travel, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
*2010*Female*	-0.75	0.58	0.17		0.71
*Unemployed - 2 to 5 Months*Unemployment Rate*	-0.07	0.12	-0.39	***	0.12
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.03	0.09	0.07		0.08
*Out of the Labor Force*Unemployment Rate*	0.05	0.08	-0.24	*	0.10
*Unemployed - 2 to 5 Months*2008*	0.26	0.56	-0.29		0.45
*Unemployed - 2 to 5 Months*2009*	-0.61	0.73	1.03		0.79
*Unemployed - 2 to 5 Months*2010*	-0.13	0.82	1.59	**	0.56
*Unemployed - at ATUS & CPS*2008*	0.57	0.70	0.16		0.30
*Unemployed - at ATUS & CPS*2009*	0.02	0.54	-0.28		0.54
*Unemployed - at ATUS & CPS*2010*	-0.29	0.54	-0.15		0.50
*Out of the Labor Force*2008*	-0.47	0.36	0.55		0.39
*Out of the Labor Force*2009*	-0.02	0.45	0.71		0.40
*Out of the Labor Force*2010*	-0.19	0.45	0.49		0.51
*2008*Unemployment Rate*	-0.02	0.07	-0.25	*	0.10
*2009*Unemployment Rate*	-0.01	0.06	-0.12		0.07
*2010*Unemployment Rate*	-0.05	0.05	-0.07		0.07
*Unemployed - 2 to 5 Months*Unemployment Rate*Female*	0.29	0.17	0.17		0.17
*Unemployed - at ATUS & CPS*Unemployment Rate*Female*	0.01	0.12	0.17		0.12
*Out of the Labor Force*Unemployment Rate*Female*	0.00	0.09	0.39	***	0.11
*Unemployed - 2 to 5 Months*2008*Female*	-0.16	0.85	0.59		0.64
*Unemployed - 2 to 5 Months*2009*Female*	0.48	1.08	-1.30		0.92
*Unemployed - 2 to 5 Months*2010*Female*	-0.21	1.14	-2.03	**	0.76
*Unemployed - at ATUS & CPS*2008*Female*	-0.23	0.84	-0.22		0.48

Notes: N=33,523. *p<.05. **p<.01. ***p<.001. 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 D-3 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Active Travel, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Unemployed - at ATUS & CPS*2009*Female	0.24	0.71	-0.13		0.65
Unemployed - at ATUS & CPS*2010*Female	1.11	0.73	-0.72		0.72
Out of the Labor Force*2008*Female	0.49	0.41	-0.39		0.43
Out of the Labor Force*2009*Female	-0.03	0.51	-1.21	**	0.47
Out of the Labor Force*2010*Female	0.24	0.52	-1.10		0.58
2008*Unemployment Rate*Female	0.08	0.10	0.27	*	0.12
2009*Unemployment Rate*Female	0.01	0.08	0.09		0.09
2010*Unemployment Rate*Female	0.09	0.07	0.03		0.09
Constant	1.83 ***	0.19	2.67	***	0.27

Notes: N=33,523. *p<.05. **p<.01. ***p<.001. 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 D-4. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Health-Related Self-Care, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Female	-1.17	**	0.38	0.95		0.56
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	-2.64	***	0.79	0.45		1.66
Unemployed - at ATUS & CPS	-2.99	**	0.97	0.11		1.00
Out of Labor Force	-2.94	***	0.40	-0.33		0.51
State Economic Conditions						
Unemployment Rate	-0.08		0.05	0.10		0.08
Time Period						
2003-2007 (ref.)						
2008	1.35	*	0.67	0.11		0.90
2009	-0.51		0.63	0.55		0.88
2010	0.69		0.63	1.71		1.25
Interactions						
*Unemployed - 2 to 5 Months*Female*	3.13	*	1.38	-0.75		2.21
*Unemployed - at ATUS & CPS*Female*	2.17		1.12	-0.16		1.42
*Out of the Labor Force*Female*	2.43	***	0.49	0.03		0.72
*Unemployment Rate*Female*	0.10		0.07	-0.26	*	0.10
*2008*Female*	-0.72		0.85	-0.59		1.16
*2009*Female*	1.17		0.82	-0.96		1.10
*2010*Female*	-0.62		0.80	-2.32		1.68
*Unemployed - 2 to 5 Months*Unemployment Rate*	0.56	***	0.12	-0.29		0.36

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. 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.

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Table D-4 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Health-Related Self-Care, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Unemployed - at ATUS & CPS*Unemployment Rate	0.40	*	0.16	-0.07		0.21
Out of the Labor Force*Unemployment Rate	0.17	*	0.07	0.07		0.09
Unemployed - 2 to 5 Months*2008	-0.41		0.92	0.54		0.57
Unemployed - 2 to 5 Months*2009	-1.58		1.01	2.98	*	1.29
Unemployed - 2 to 5 Months*2010	-3.69	***	0.98	1.64		1.73
Unemployed - at ATUS & CPS*2008	-0.54		1.11	-2.57	***	0.51
Unemployed - at ATUS & CPS*2009	-0.81		0.74	0.08		1.33
Unemployed - at ATUS & CPS*2010	-0.16		0.78	0.97		1.26
Out of the Labor Force*2008	-0.88	*	0.35	0.51		0.63
Out of the Labor Force*2009	-0.56		0.42	-0.24		0.49
Out of the Labor Force*2010	-0.85	*	0.43	-0.21		0.59
2008*Unemployment Rate	-0.17		0.11	-0.07		0.13
2009*Unemployment Rate	0.08		0.08	-0.10		0.11
2010*Unemployment Rate	-0.04		0.08	-0.24	*	0.12
Unemployed - 2 to 5 Months*Unemployment Rate*Female	-0.72	***	0.22	0.37		0.45
Unemployed - at ATUS & CPS*Unemployment Rate*Female	-0.27		0.19	0.09		0.28
Out of the Labor Force*Unemployment Rate*Female	-0.22	*	0.09	0.07		0.12
Unemployed - 2 to 5 Months*2008*Female	0.85		1.12	-0.93		1.03
Unemployed - 2 to 5 Months*2009*Female	2.47		1.32	-5.87	**	2.22
Unemployed - 2 to 5 Months*2010*Female	5.39	***	1.51	-2.20		2.01
Unemployed - at ATUS & CPS*2008*Female	1.29		1.26	3.24	***	0.84
Unemployed - at ATUS & CPS*2009*Female	-0.10		0.95	0.58		1.66
Unemployed - at ATUS & CPS*2010*Female	-1.12		0.99	-1.15		1.56

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. 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 D-4 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Health-Related Self-Care, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
*Out of the Labor Force*2008*Female*	1.33	**	0.41	-0.74		0.69
*Out of the Labor Force*2009*Female*	0.50		0.51	-0.45		0.64
*Out of the Labor Force*2010*Female*	0.74		0.53	-0.59		0.76
*2008*Unemployment Rate*Female*	-0.01		0.14	0.21		0.17
*2009*Unemployment Rate*Female*	-0.15		0.10	0.17		0.14
*2010*Unemployment Rate*Female*	0.04		0.10	0.37	*	0.17
Constant	3.65	***	0.30	4.19	***	0.47

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. 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 D-5. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.		SE
Female	-0.10		0.18
Economic Climate			
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 months	1.36	*	0.57
Unemployed - at ATUS & CPS	0.28		0.49
Out of Labor Force	0.06		0.31
State Economic Conditions			
Unemployment Rate	0.00		0.02
Time Period			
2003-2007 (ref.)			
2008	-0.17		0.30
2009	-0.24		0.32
2010	-0.54		0.32
Interactions			
*Unemployed - 2 to 5 Months*Female*	-1.98	*	0.82
*Unemployed - at ATUS & CPS*Female*	0.58		0.64
*Out of the Labor Force*Female*	0.06		0.36
*Unemployment Rate*Female*	-0.03		0.03
*2008*Female*	0.04		0.41
*2009*Female*	-0.32		0.44
*2010*Female*	0.30		0.45
*Unemployed - 2 to 5 Months*Unemployment Rate*	-0.26	*	0.10
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.09		0.08
*Out of the Labor Force*Unemployment Rate*	-0.01		0.06
*Unemployed - 2 to 5 Months*2008*	-0.36		0.44
*Unemployed - 2 to 5 Months*2009*	0.98		0.61
*Unemployed - 2 to 5 Months*2010*	1.88	**	0.66
*Unemployed - at ATUS & CPS*2008*	0.91		0.50
*Unemployed - at ATUS & CPS*2009*	0.87		0.48
*Unemployed - at ATUS & CPS*2010*	0.82		0.49
*Out of the Labor Force*2008*	0.36		0.28
*Out of the Labor Force*2009*	-0.06		0.34
*Out of the Labor Force*2010*	0.39		0.33
*2008*Unemployment Rate*	0.03		0.05
*2009*Unemployment Rate*	0.03		0.04
*2010*Unemployment Rate*	0.05		0.04
*Unemployed - 2 to 5 Months*Unemployment Rate*Female*	0.35	*	0.15
*Unemployed - at ATUS & CPS*Unemployment Rate*Female*	-0.04		0.11
*Out of the Labor Force*Unemployment Rate*Female*	0.01		0.07
*Unemployed - 2 to 5 Months*2008*Female*	0.64		0.72

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

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Table D-5cont. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.		SE
Unemployed - 2 to 5 Months*2009*Female	-0.32		0.87
Unemployed - 2 to 5 Months*2010*Female	-1.94	*	0.90
Unemployed - at ATUS & CPS*2008*Female	-0.68		0.61
Unemployed - at ATUS & CPS*2009*Female	-0.41		0.62
Unemployed - at ATUS & CPS*2010*Female	-0.45		0.64
Out of the Labor Force*2008*Female	-0.17		0.32
Out of the Labor Force*2009*Female	0.16		0.39
Out of the Labor Force*2010*Female	-0.05		0.39
2008*Unemployment Rate*Female	0.01		0.07
2009*Unemployment Rate*Female	0.05		0.05
2010*Unemployment Rate*Female	-0.01		0.05
Constant	-0.14		0.13

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table D-6. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Exercising, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Life Stage				
Under 45 without Children (ref.)				
Parent of Child under 18	0.07	0.19	-0.18	0.13
Over 45 without Children	-0.02	0.25	-0.17	0.16
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 Months	0.22	0.25	0.25	0.18
Unemployed - at ATUS & CPS	-0.08	0.23	0.16	0.10
Out of Labor Force	-0.04	0.14	0.15	0.10
State Economic Conditions				
Unemployment Rate	-0.03	0.03	-0.02	0.02
Recessionary Time Period				
2003-2007 (ref.)				
2008	-0.11	0.13	0.17	0.09
2009	0.00	0.16	0.32 ***	0.09
2010	-0.06	0.17	0.24	0.13
Interactions				
*Unemployed - 2 to 5 Months*Parent of Child under 18*	-0.38	0.31	-0.10	0.20
*Unemployed - at ATUS & CPS*Parent of Child under 18*	0.12	0.27	-0.02	0.14
*Out of Labor Force*Parent of Child under 18*	-0.16	0.15	-0.07	0.11
*Unemployed - 2 to 5 Months*Older than 45 without Children*	-0.18	0.43	0.21	0.30

Notes: N=33,525. *p<.05. **p<.01. ***p<.001. 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 D-6 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Exercising, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Unemployed - at ATUS & CPS*Older than 45 without Children	0.13	0.40	0.19		0.18
Out of Labor Force*Older than 45 without Children	0.27	0.18	-0.09		0.12
Unemployment Rate*Parent of Child under 18	0.03	0.03	0.03		0.02
Unemployment Rate*Older than 45 without Children	0.04	0.05	0.01		0.03
2008*Parent of Child under 18	0.15	0.14	-0.23	*	0.10
2009*Parent of Child under 18	-0.08	0.19	-0.42	***	0.12
2010*Parent of Child under 18	0.04	0.20	-0.24		0.15
2008*Older than 45 without Children	0.06	0.19	-0.13		0.13
2009*Older than 45 without Children	-0.07	0.26	-0.14		0.16
2010*Older than 45 without Children	0.03	0.27	-0.18		0.16
Constant	1.68 ***	0.16	4.42	***	0.11

Notes: N=33,525. *p<.05. **p<.01. ***p<.001. 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 D-7. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.	SE
Life Stage		
Under 45 without Children (ref.)		
Parent of Child under 18	0.10	0.23
Over 45 without Children	0.54	0.28
Detailed Employment Status		
Employed (ref.)		
Unemployed - 2 to 5 Months	0.68	0.93
Unemployed - at ATUS & CPS	0.67	0.80
Out of Labor Force	0.04	0.45
State Economic Conditions		
Unemployment Rate	-0.01	0.04
Recessionary Time Period		
2003-2007 (ref.)		
2008	-0.02	0.47
2009	-0.45	0.51
2010	-0.43	0.49
Interactions		
*Unemployed - 2 to 5 Months*Parent of Child under 18*	-0.01	1.07
*Unemployed - at ATUS & CPS*Parent of Child under 18*	-0.29	0.88
*Out of Labor Force*Parent of Child under 18*	-0.16	0.48
*Unemployed - 2 to 5 Months*Older than 45 without Children*	-0.23	1.30
*Unemployed - at ATUS & CPS*Older than 45 without Children*	0.57	1.11
*Out of Labor Force*Older than 45 without Children*	0.33	0.56
*Unemployment Rate*Parent of Child under 18*	0.00	0.04
*Unemployment Rate*Older than 45 without Children*	-0.02	0.05
*2008*Parent of Child under 18*	-0.02	0.53
*2009*Parent of Child under 18*	0.19	0.57

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table D-7 cont. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.		SE
*2010*Parent of Child under 18*	-0.04		0.56
*2008*Older than 45 without Children*	-0.50		0.66
*2009*Older than 45 without Children*	0.00		0.71
*2010*Older than 45 without Children*	0.19		0.73
*Unemployed - 2 to 5 Months*Unemployment Rate*	-0.15		0.18
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.24		0.14
*Out of Labor Force*Unemployment Rate*	-0.01		0.08
*Unemployed - 2 to 5 Months*2008*	-1.24		0.79
*Unemployed - at ATUS & CPS*2008*	1.15		1.02
*Out of Labor Force*2008*	0.56		1.07
*Unemployed - 2 to 5 Months*2009*	2.03	**	0.71
*Unemployed - at ATUS & CPS*2009*	2.08	**	0.77
*Out of Labor Force*2009*	1.82	*	0.77
*Unemployed - 2 to 5 Months*2010*	0.53		0.35
*Unemployed - at ATUS & CPS*2010*	0.04		0.43
*Out of Labor Force*2010*	0.53		0.46
*2008*Unemployment Rate*	0.00		0.08
*2009*Unemployment Rate*	0.05		0.06
*2010*Unemployment Rate*	0.06		0.06
*Unemployed - 2 to 5 Months*Unemployment Rate*Parent of Child under 18*	0.03		0.20
*Unemployed - at ATUS & CPS*Unemployment Rate*Parent of Child under 18*	0.23		0.16
*Out of Labor Force*Unemployment Rate*Parent of Child under 18*	0.03		0.09
*Unemployed - 2 to 5 Months*Unemployment Rate*Older than 45 without Children*	0.09		0.24
*Unemployed - at ATUS & CPS*Unemployment Rate*Older than 45 without Children*	0.00		0.20
*Out of Labor Force*Unemployment Rate*Older than 45 without Children*	-0.05		0.10
*Unemployed - 2 to 5 Months*2008*Parent of Child under 18*	1.35		0.88
*Unemployed - 2 to 5 Months*2009*Parent of Child under 18*	-0.43		1.15

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table D-7 cont. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Coef.		SE
Unemployed - 2 to 5 Months*2010*Parent of Child under 18	0.67		1.21
Unemployed - at ATUS & CPS*2008*Parent of Child under 18	-2.28	**	0.79
Unemployed - at ATUS & CPS*2009*Parent of Child under 18	-2.30	**	0.85
Unemployed - at ATUS & CPS*2010*Parent of Child under 18	-1.83	*	0.86
Out of Labor Force*2008*Parent of Child under 18	-0.27		0.38
Out of Labor Force*2009*Parent of Child under 18	0.07		0.47
Out of Labor Force*2010*Parent of Child under 18	-0.27		0.51
Unemployed - 2 to 5 Months*2008*Older than 45 without Children	1.76		1.17
Unemployed - 2 to 5 Months*2009*Older than 45 without Children	-0.79		1.36
Unemployed - 2 to 5 Months*2010*Older than 45 without Children	0.53		1.53
Unemployed - at ATUS & CPS*2008*Older than 45 without Children	-1.39		1.17
Unemployed - at ATUS & CPS*2009*Older than 45 without Children	-1.07		1.05
Unemployed - at ATUS & CPS*2010*Older than 45 without Children	-0.92		1.10
Out of Labor Force*2008*Older than 45 without Children	-0.53		0.44
Out of Labor Force*2009*Older than 45 without Children	-0.04		0.54
Out of Labor Force*2010*Older than 45 without Children	0.10		0.58
2008*Unemployment Rate*Parent of Child under 18	0.02		0.09
2009*Unemployment Rate*Parent of Child under 18	-0.01		0.07
2010*Unemployment Rate*Parent of Child under 18	0.00		0.07
2008*Unemployment Rate*Older than 45 without Children	0.09		0.11
2009*Unemployment Rate*Older than 45 without Children	0.02		0.09
2010*Unemployment Rate*Older than 45 without Children	-0.04		0.08
Constant	-0.35		0.20

Notes: N=33,528. *p<.05. **p<.01. ***p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Table D-8. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Active Travel, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner is Not Employed (ref.)						
Spouse/Partner PTE	-0.77	*	0.36	-1.28	**	0.48
Spouse/Partner FTE	-0.21		0.26	-0.94	**	0.36
No Spouse or Partner	-0.94	***	0.27	-0.43		0.36
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	0.26		0.36	0.59	*	0.24
Unemployed - at ATUS & CPS	-0.76	**	0.29	0.65	*	0.31
Out of Labor Force	-0.30		0.18	0.28		0.36
State Economic Conditions						
Unemployment Rate	-0.06		0.04	-0.13		0.07
Time Period						
2003-2007 (ref.)						
2008	-0.35		0.18	0.66	*	0.32
2009	0.22		0.23	0.67		0.38
2010	0.13		0.24	0.67		0.38
Interactions						
*Unemployed - 2 to 5 Months*Spouse/Partner PTE*	-0.40		0.64	-1.66	***	0.39
*Unemployed - at ATUS & CPS*Spouse/Partner PTE*	0.79		0.61	-0.52		0.39
*Out of the Labor Force*Spouse/Partner PTE*	-0.14		0.32	0.26		0.48
*Unemployed - 2 to 5 Months*Spouse/Partner FTE*	-0.48		0.43	-0.27		0.34
*Unemployed - at ATUS & CPS*Spouse/Partner FTE*	0.01		0.34	-0.18		0.36
*Out of the Labor Force*Spouse/Partner FTE*	-0.15		0.20	0.17		0.37
*Unemployed - 2 to 5 Months*No Spouse or Partner*	-0.88	*	0.41	0.12		0.32
*Unemployed - at ATUS & CPS*No Spouse or Partner*	0.17		0.33	-0.01		0.35
*Out of the Labor Force*No Spouse or Partner*	-0.06		0.20	0.05		0.37
*Unemployment Rate*Spouse/Partner PTE*	0.15	*	0.07	0.24	*	0.10
*Unemployment Rate*Spouse/Partner FTE*	0.05		0.05	0.17	*	0.07
*Unemployment Rate*No Spouse or Partner*	0.08		0.05	0.12		0.07
*2008*Spouse/Partner PTE*	-0.01		0.33	-0.83		0.45
*2009*Spouse/Partner PTE*	-0.82	*	0.38	-0.77		0.52
*2010*Spouse/Partner PTE*	-0.70		0.39	-1.00		0.53
*2008*Spouse/Partner FTE*	0.32		0.21	-0.68	*	0.34
*2009*Spouse/Partner FTE*	-0.33		0.26	-0.68		0.41
*2010*Spouse/Partner FTE*	-0.37		0.27	-0.66		0.42
*2008*No Spouse or Partner*	0.36		0.21	-0.43		0.34

Notes: N=32,783. *p<.05. **p<.01. ***p<.001. 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 D-8 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent in Active Travel, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
*2009*No Spouse or Partner*	-0.38		0.27	-0.56		0.41
*2010*No Spouse or Partner*	-0.24		0.28	-0.70		0.41
Constant	2.45	***	0.24	3.73	***	0.32

Notes: N=32,783. *p<.05. **p<.01. ***p<.001. 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 D-9. Summary Table of Moderating Effects on Time with Family Members on Weekdays

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
Economic Climate						
Unemployed - 2 to 5 months*Unemployment Rate	-					-
Unemployed - at ATUS & CPS*Unemployment Rate					-	
Out of Labor Force*Unemployment Rate						
Unemployed - 2 to 5 months*2008						
Unemployed - 2 to 5 months*2009		+				+
Unemployed - 2 to 5 months*2010		+				+
Unemployed - at ATUS & CPS*2008						
Unemployed - at ATUS & CPS*2009			+		+	
Unemployed - at ATUS & CPS*2010					+	
Out of Labor Force*2008						
Out of Labor Force*2009						
Out of Labor Force*2010						
2008*Unemployment Rate					+	
2009*Unemployment Rate			+	+		
2010*Unemployment Rate						
Gender						
Unemployed - 2 to 5 months*Female			-			
Unemployed - at ATUS & CPS*Female	-	-				
Out of the Labor Force*Female		-	-	-		
Unemployment Rate*Female						
2008*Female						

Table D-9 cont. Summary Table of Moderating Effects on Time with Family Members on Weekdays

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
2009*Female						
2010*Female						
Life Stage						
Unemployed - 2 to 5 months*Parent					+	
Unemployed - 2 to 5 months*Over 45 no Child						
Unemployed - at ATUS & CPS*Parent		+				
Unemployed - at ATUS & CPS*Over 45 no child						
Out of Labor Force*Parent		+	-			-
Out of Labor Force*Over 45 no child						
Unemployment Rate*Parent						
Unemployment Rate*Over 45 no child						
2008*Parent						
2008*Over 40 no child						
2009*Parent						
2009*Over 40 no child						
2010*Parent						
2010*Over 40 no child						
Gendered Life Stage						
Unemployment Rate * Father						
Unemployment Rate * Men over 45						
Unemployment Rate * Women Under 45						
Unemployment Rate * Mother						
Unemployment Rate * Women over 45						
2008 * Father						

Table D-9 cont. Summary Table of Moderating Effects on Time with Family Members on Weekdays

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
2008 * Men over 45						
2008 * Women Under 45						
2008 * Mother						
2008 * Women over 45						
2009 * Father				-		
2009 * Men over 45				-		
2009 * Women Under 45				-	-	
2009 * Mother						
2009 * Women over 45	-					
2010 * Father						
2010 * Men over 40						
2010 * Women Under 45						
2010* Mother						
2010 * Women over 45						
Unemployed - 2 to 5 months * Father					+	
Unemployed - 2 to 5 months * Men over 45						
Unemployed - 2 to 5 months * Women Under 45						
Unemployed - 2 to 5 months * Mother						
Unemployed - 2 to 5 months * Women over 45	-	-				
Unemployed - at ATUS & CPS * Father						
Unemployed - at ATUS & CPS * Men over 45	-					
Unemployed - at ATUS & CPS * Women Under 45	-	-				-
Unemployed - at ATUS & CPS * Mother	-					
Unemployed - at ATUS & CPS * Women over 45	-			-		

Table D-9 cont. Summary Table of Moderating Effects on Time with Family Members on Weekdays

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
Out of Labor Force * Father						
Out of Labor Force * Men over 45						
Out of Labor Force * Women Under 45		-				
Out of Labor Force * Mother				-		
Out of Labor Force * Women over 45	-					
Spouse's Employment Status						
Unemployed - 2 to 5 months*Single						
Unemployed - at ATUS & CPS*Single		-				
Out of Labor Force*Single	-	-			+	+
Unemployed - 2 to 5 months*Partner FTE			-	-		
Unemployed - at ATUS & CPS*Partner FTE	-	-	-	-	-	
Out of Labor Force*Partner FTE			-	-		
Unemployed - 2 to 5 months*Partner PTE			-	-		
Unemployed - at ATUS & CPS*Partner PTE					-	
Out of Labor Force*Partner PTE			-	-		
Unemployment Rate*Single						
Unemployment Rate*Partner FTE						
Unemployment Rate*Partner PTE				+		
2008*Single						
2008*Partner FTE				+		
2008*Partner PTE						
2009*Single						
2009*Partner FTE						
2009*Partner PTE						

Table D-9 cont. Summary Table of Moderating Effects on Time with Family Members on Weekdays

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
2010*Single						
2010*Partner FTE						
2010*Partner PTE						
Education						
Unemployment Rate*High School						
Unemployment Rate*Associate's						
2008*High School					-	
2008*Associate's					-	
2009*High School						
2009*Associate's						
2010*High School						
2010*Associate's						
Unemployed - 2 to 5 months*High School					+	
Unemployed - at ATUS & CPS*High School						+
Out of the Labor Force*High School				+		+
Unemployed - 2 to 5 months*Associate's						
Unemployed - at ATUS & CPS*Associate's						
Out of the Labor Force*Associate's	-			+		

Table D-10. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spent with Children ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Female	-1.23	***	0.24	0.29	***	0.05
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	0.03		0.25	0.45	***	0.07
Unemployed - at ATUS & CPS	0.59	*	0.24	0.58	***	0.07
Out of Labor Force	0.05		0.18	0.53	***	0.04
State Economic Conditions						
Unemployment Rate	-0.05	*	0.03	0.00		0.01
Time Period						
2003-2007 (ref.)						
2008	-0.04		0.12	0.04		0.04
2009	0.37	*	0.16	0.07		0.05
2010	0.18		0.16	0.03		0.05
Interactions						
*Unemployed - 2 to 5 Months*Female*	-0.43		0.46	-0.03		0.08
*Unemployed - at ATUS & CPS*Female*	-0.60		0.35	-0.17	*	0.07
*Out of the Labor Force*Female*	-0.98	***	0.23	0.04		0.04
*Unemployment Rate*Female*	0.08		0.04	0.00		0.01
*2008*Female*	-0.32		0.21	-0.05		0.04
*2009*Female*	-0.37		0.25	-0.05		0.06
*2010*Female*	-0.49		0.26	-0.04		0.06
Constant	-1.44	***	0.14	5.40	***	0.04

Notes: N=20,200. * p<.05, ** p <.01, *** p<.001. 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 D-11. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spent with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Female	-1.20	*	0.51	0.42	***	0.07
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	0.44		0.40	0.57	***	0.07
Unemployed - at ATUS & CPS	0.75		0.49	0.72	***	0.07
Out of Labor Force	-0.30		0.38	0.66	***	0.05
State Economic Conditions						
Unemployment Rate	-0.09		0.05	0.00		0.01
Time Period						
2003-2007 (ref.)						
2008	-0.01		0.22	-0.01		0.06
2009	0.26		0.28	0.08		0.06
2010	0.05		0.29	-0.04		0.06
Interactions						
*Unemployed - 2 to 5 Months*Female*	-1.42		1.09	-0.18		0.10
*Unemployed - at ATUS & CPS*Female*	-0.08		0.66	-0.34	***	0.08
*Out of the Labor Force*Female*	-0.99	*	0.49	-0.14	*	0.06
*Unemployment Rate*Female*	-0.03		0.09	-0.01		0.01
*2008*Female*	-0.80		0.52	-0.01		0.06
*2009*Female*	0.23		0.49	-0.03		0.07
*2010*Female*	0.43		0.54	0.09		0.07
Constant	-1.67	***	0.26	5.49	***	0.05

Notes: N=9,210. * p<.05, ** p <.01, *** p<.001. 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 D-12. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adults Spent with Extended Family Members, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Female	-0.35	0.21	-0.17		0.18
Detailed Employment Status					
Employed (ref.)					
Unemployed - 2 to 5 Months	-0.17	0.66	1.10	**	0.35
Unemployed - at ATUS & CPS	-0.53	0.51	1.37	***	0.32
Out of Labor Force	0.12	0.34	0.14		0.24
State Economic Conditions					
Unemployment Rate	-0.03	0.03	-0.03		0.03
Recessionary Time Period					
2003-2007(ref.)					
2008	0.04	0.358	-0.77	*	0.34
2009	-0.88 *	0.404	-0.06		0.30
2010	0.15	0.394	-0.03		0.30
Interactions					
*Unemployed - 2 to 5 Months*Female*	1.12	0.968	-0.16		0.46
*Unemployed - at ATUS & CPS*Female*	0.15	0.657	-1.33	***	0.40
*Out of the Labor Force*Female*	-0.60	0.391	0.63	*	0.27
*Unemployment Rate*Female*	0.00	0.039	0.05		0.03
*2008*Female*	-0.65	0.468	0.81	*	0.41
*2009*Female*	0.79	0.513	-0.14		0.39
*2010*Female*	0.26	0.522	-0.12		0.41
*Unemployed - 2 to 5 Months*Unemployment Rate*	-0.07	0.117	-0.16	**	0.06
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.01	0.082	-0.14	**	0.06

Notes: N=33,525. * p<.05, ** p <.01, *** p<.001. 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 D-12 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adults Spent with Extended Family Members, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Out of the Labor Force*Unemployment Rate	-0.13 *	0.06	0.06	0.04
Unemployed - 2 to 5 Months*2008	0.96	0.506	-0.66 *	0.33
Unemployed - 2 to 5 Months*2009	0.54	0.664	0.56 *	0.28
Unemployed - 2 to 5 Months*2010	0.03	0.72	0.75 *	0.30
Unemployed - at ATUS & CPS*2008	0.78	0.576	-0.34	0.27
Unemployed - at ATUS & CPS*2009	-0.27	0.492	0.59 *	0.27
Unemployed - at ATUS & CPS*2010	-0.15	0.501	0.49	0.33
Out of the Labor Force*2008	0.11	0.3	-0.20	0.23
Out of the Labor Force*2009	0.54	0.38	-0.25	0.26
Out of the Labor Force*2010	-0.23	0.344	-0.19	0.22
2008*Unemployment Rate	0.00	0.062	0.12 *	0.06
2009*Unemployment Rate	0.11 *	0.05	0.02	0.04
2010*Unemployment Rate	0.00	0.046	0.01	0.04
Unemployed - 2 to 5 Months*Unemployment Rate*Female	-0.18	0.169	0.06	0.08
Unemployed - at ATUS & CPS*Unemployment Rate*Female	-0.01	0.109	0.20 **	0.07
Out of the Labor Force*Unemployment Rate*Female	0.14 *	0.07	-0.13 **	0.05
Unemployed - 2 to 5 Months*2008*Female	-0.83	0.741	0.66	0.46
Unemployed - 2 to 5 Months*2009*Female	1.01	0.937	-0.14	0.42
Unemployed - 2 to 5 Months*2010*Female	1.46	1.015	-0.13	0.43
Unemployed - at ATUS & CPS*2008*Female	-0.90	0.68	0.46	0.33
Unemployed - at ATUS & CPS*2009*Female	0.46	0.629	-0.88 *	0.37
Unemployed - at ATUS & CPS*2010*Female	0.10	0.651	-0.63	0.41
Out of the Labor Force*2008*Female	-0.12	0.336	0.27	0.25

Notes: N=33,525. * p<.05, ** p <.01, *** p<.001. 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 D-12 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Adults Spent with Extended Family Members, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
*Out of the Labor Force*2009*Female*	-0.54	0.428	0.54	0.29
*Out of the Labor Force*2010*Female*	0.28	0.407	0.61 *	0.27
*2008*Unemployment Rate*Female*	0.11	0.08	-0.13	0.07
*2009*Unemployment Rate*Female*	-0.10	0.063	-0.01	0.05
*2010*Unemployment Rate*Female*	-0.04	0.061	0.00	0.05
Constant	1.38 ***	0.16	5.31 ***	0.15

Notes: N=33,525. * p<.05, ** p <.01, *** p<.001. 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 D-13. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spend with Children Under 6, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Marital or Partner Status/Spouse's Employment Status					
Spouse/Partner is Not Employed (ref.)					
Spouse/Partner PTE	0.80	0.77	0.09		0.13
Spouse/Partner FTE	0.13	0.52	0.36	***	0.09
No Spouse or Partner	1.12	0.70	0.24		0.12
Economic Climate					
Detailed Employment Status					
Employed (ref.)					
Unemployed - 2 to 5 months	0.68	0.63	0.57	***	0.13
Unemployed - at ATUS & CPS	0.20	0.67	0.72	***	0.08
Out of Labor Force	-1.02	0.55	0.70	***	0.05
State Economic Conditions					
Unemployment Rate	-0.05	0.07	0.01		0.01
Time Period					
2003-2007 (ref.)					
2008	-0.01	0.32	0.04		0.09
2009	0.48	0.46	0.02		0.09
2010	-0.20	0.43	-0.07		0.08
Interactions					
*Unemployed - 2 to 5 Months*Spouse/Partner PTE*	-0.10	1.15	0.16		0.18
*Unemployed - at ATUS & CPS*Spouse/Partner PTE*	-33.40 ***	0.80	0.06		0.16
*Out of the Labor Force*Spouse/Partner PTE*	-32.46 ***	0.59	0.08		0.08
*Unemployed - 2 to 5 Months*Spouse/Partner FTE*	-0.81	0.97	-0.23		0.15
*Unemployed - at ATUS & CPS*Spouse/Partner FTE*	0.02	0.89	-0.20	*	0.09
*Out of the Labor Force*Spouse/Partner FTE*	-1.11	0.69	-0.05		0.06
*Unemployed - 2 to 5 Months*No Spouse or Partner*	-0.77	0.94	-0.06		0.15
*Unemployed - at ATUS & CPS*No Spouse or Partner*	-0.14	0.83	-0.35	***	0.10
*Out of the Labor Force*No Spouse or Partner*	-0.02	0.65	-0.24	**	0.07
*Unemployment Rate*Spouse/Partner PTE*	-0.16	0.144	-0.01		0.02
*Unemployment Rate*Spouse/Partner FTE*	-0.14	0.097	-0.02		0.02
*Unemployment Rate*No Spouse or Partner*	-0.03	0.128	0.01		0.02
*2008*Spouse/Partner PTE*	-1.09	0.71	0.07		0.19
*2009*Spouse/Partner PTE*	-1.02	0.86	0.12		0.14
*2010*Spouse/Partner PTE*	0.74	0.80	0.16		0.14
*2008*Spouse/Partner FTE*	0.01	0.51	-0.08		0.09
*2009*Spouse/Partner FTE*	0.44	0.58	0.06		0.09
*2010*Spouse/Partner FTE*	1.01	0.57	0.11		0.09

Notes: N=8,987. * p<.05, ** p <.01, *** p<.001. 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 D-13 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Parents Spend with Children Under 6, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
2008*No Spouse or Partner	-0.35	0.52	-0.03	0.11
2009*No Spouse or Partner	-1.09	0.71	0.04	0.12
2010*No Spouse or Partner	-0.31	0.77	0.16	0.12
Constant	-2.20 ***	0.40	5.45 ***	0.08

Notes: N=8,987. * p<.05, ** p <.01, *** p<.001. 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 D-14. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent Alone with a Spouse or Partner, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Marital or Partner Status/Spouse's Employment Status					
Spouse/Partner is Not Employed (ref.)					
Spouse/Partner PTE	0.07	0.27	-0.47	***	0.14
Spouse/Partner FTE	-0.06	0.18	-0.21	*	0.10
Economic Climate					
Detailed Employment Status					
Employed (ref.)					
Unemployed - 2 to 5 months	-0.67	0.35	0.70	***	0.12
Unemployed - at ATUS & CPS	-0.46	0.26	0.48	***	0.10
Out of Labor Force	-0.36 **	0.14	0.74	***	0.06
State Economic Conditions					
Unemployment Rate	0.01	0.03	-0.02		0.01
Time Period					
2003-2007 (ref.)					
2008	0.11	0.13	-0.12	*	0.06
2009	-0.04	0.16	0.08		0.08
2010	-0.09	0.17	0.08		0.09
Interactions					
*Unemployed - 2 to 5 Months*Spouse/Partner PTE*	0.30	0.55	-0.57	*	0.23
*Unemployed - at ATUS & CPS*Spouse/Partner PTE*	0.08	0.50	-0.12		0.17
*Out of the Labor Force*Spouse/Partner PTE*	0.35	0.24	-0.56	***	0.12
*Unemployed - 2 to 5 Months*Spouse/Partner FTE*	0.68	0.40	-0.36	*	0.15
*Unemployed - at ATUS & CPS*Spouse/Partner FTE*	0.20	0.30	-0.33	**	0.11
*Out of the Labor Force*Spouse/Partner FTE*	0.46 **	0.15	-0.69	***	0.07
*Unemployment Rate*Spouse/Partner PTE*	-0.02	0.05	0.06	*	0.03
*Unemployment Rate*Spouse/Partner FTE*	-0.01	0.03	0.02		0.02
*2008*Spouse/Partner PTE*	-0.03	0.22	0.07		0.11
*2009*Spouse/Partner PTE*	0.09	0.29	-0.06		0.15
*2010*Spouse/Partner PTE*	0.12	0.29	-0.19		0.16
*2008*Spouse/Partner FTE*	-0.02	0.15	0.15	*	0.07
*2009*Spouse/Partner FTE*	0.05	0.19	-0.05		0.10
*2010*Spouse/Partner FTE*	0.06	0.19	-0.03		0.11
Constant	-0.79 ***	0.16	5.21	***	0.08

Notes: N=21,082. * p<.05, ** p <.01, *** p<.001. 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 D-15. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent with Parents, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed (ref.)				
Spouse/Partner PTE	-0.83	0.77	-0.56	0.50
Spouse/Partner FTE	-0.42	0.45	-0.62	0.34
No Spouse or Partner	-1.84 ***	0.44	-0.48	0.34
Economic Climate				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 months	-0.36	0.60	0.13	0.19
Unemployed - at ATUS & CPS	0.21	0.50	1.01 ***	0.25
Out of Labor Force	-0.14	0.25	0.06	0.19
State Economic Conditions				
Unemployment Rate	-0.05	0.07	-0.07	0.05
Time Period				
2003-2007 (ref.)				
2008	0.02	0.32	-0.31	0.27
2009	0.06	0.40	-0.02	0.36
2010	0.06	0.40	0.31	0.35
Interactions				
*Unemployed - 2 to 5 Months*Spouse/Partner PTE*	-0.12	1.21	-3.18 ***	0.25
*Unemployed - at ATUS & CPS*Spouse/Partner PTE*	-0.92	0.82	-0.82 *	0.38
*Out of the Labor Force*Spouse/Partner PTE*	-0.22	0.46	0.70	0.39
*Unemployed - 2 to 5 Months*Spouse/Partner FTE*	0.55	0.70	0.51	0.38
*Unemployed - at ATUS & CPS*Spouse/Partner FTE*	-0.27	0.56	-0.71 *	0.28
*Out of the Labor Force*Spouse/Partner FTE*	-0.20	0.27	0.39	0.21
*Unemployed - 2 to 5 Months*No Spouse or Partner*	0.39	0.65	-0.06	0.27
*Unemployed - at ATUS & CPS*No Spouse or Partner*	-0.59	0.53	-0.51	0.28
*Out of the Labor Force*No Spouse or Partner*	-0.30	0.27	0.55 **	0.20
*Unemployment Rate*Spouse/Partner PTE*	0.18	0.15	0.08	0.09
*Unemployment Rate*Spouse/Partner FTE*	-0.01	0.08	0.09	0.06
*Unemployment Rate*No Spouse or Partner*	0.03	0.08	0.07	0.06
*2008*Spouse/Partner PTE*	-0.27	0.49	-0.05	0.38
*2009*Spouse/Partner PTE*	-0.87	0.82	-0.15	0.52
*2010*Spouse/Partner PTE*	-0.54	0.73	-0.88	0.68
*2008*Spouse/Partner FTE*	0.05	0.35	0.54	0.31
*2009*Spouse/Partner FTE*	-0.01	0.44	-0.10	0.39
*2010*Spouse/Partner FTE*	0.01	0.44	-0.31	0.39
*2008*No Spouse or Partner*	-0.07	0.34	0.12	0.29

Notes: N=32,788. * p<.05, ** p <.01, *** p<.001. 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 D-15 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent with Parents, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
2009*No Spouse or Partner	-0.15		0.43	-0.33		0.38
2010*No Spouse or Partner	-0.04		0.43	-0.29		0.38
Constant	3.48	***	0.42	5.50	***	0.30

Notes: N=32,788. * p<.05, ** p <.01, *** p<.001. 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 D-16. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent with Parents, ATUS 2003-2010.

	Binary[1]		Count[2]		
	Coef.	SE	Coef.		SE
Education					
College Degree or More (ref.)					
Some College or Associate's Degree	-0.44	0.26	-0.19		0.27
High School Degree or Less	-0.54 *	0.25	-0.11		0.25
Economic Climate					
Detailed Employment Status					
Employed (ref.)					
Unemployed - 2 to 5 months	-0.39	0.34	-0.44		0.25
Unemployed - at ATUS & CPS	-0.40	0.29	0.37		0.24
Out of Labor Force	-0.27 *	0.13	0.42	***	0.10
State Economic Conditions					
Unemployment Rate	-0.05	0.03	0.00		0.03
Time Period					
2003-2007 (ref.)					
2008	-0.17	0.14	0.18		0.14
2009	-0.18	0.18	-0.41	*	0.17
2010	-0.17	0.18	-0.16		0.22
Interactions					
*Unemployed - 2 to 5 Months*Associate's Degree*	0.26	0.51	0.61		0.36
*Unemployed - at ATUS & CPS*Associate's Degree*	-0.29	0.36	-0.19		0.28
*Out of the Labor Force*Associate's Degree*	-0.08	0.18	0.06		0.14
*Unemployed - 2 to 5 Months*High School Degree*	0.45	0.46	0.89	*	0.37
*Unemployed - at ATUS & CPS*High School Degree*	0.09	0.35	0.36		0.28
*Out of the Labor Force*High School Degree*	-0.13	0.16	0.20		0.13
*Unemployment Rate*Associate's Degree*	0.00	0.05	0.03		0.05
*Unemployment Rate*High School Degree*	0.06	0.04	0.00		0.04
*2008*Associate's Degree*	0.22	0.21	-0.40	*	0.19
*2009*Associate's Degree*	0.11	0.27	0.08		0.24
*2010*Associate's Degree*	0.14	0.26	0.18		0.28
*2008*High School Degree*	0.08	0.20	-0.39	*	0.18
*2009*High School Degree*	0.09	0.26	0.25		0.22
*2010*High School Degree*	0.14	0.25	0.22		0.28
Constant	2.77 ***	0.17	5.07	***	0.19

Notes: N=33,528. * p<.05, ** p <.01, *** p<.001. 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 D-17. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Spent with Extended Family Members, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Education				
College Degree or More (ref.)				
Some College or Associate's Degree	-0.42 *	0.17	-0.07	0.14
High School Degree or Less	-0.81 ***	0.16	0.08	0.13
Economic Climate				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 months	-0.49 *	0.23	0.16	0.14
Unemployed - at ATUS & CPS	-0.59 **	0.20	0.26	0.16
Out of Labor Force	-0.44 ***	0.08	0.35 ***	0.06
State Economic Conditions				
Unemployment Rate	-0.05 *	0.02	0.00	0.02
Time Period				
2003-2007 (ref.)				
2008	-0.08	0.09	0.01	0.08
2009	-0.04	0.12	-0.06	0.12
2010	-0.02	0.12	0.07	0.11
Interactions				
*Unemployed - 2 to 5 Months*Associate's Degree*	0.13	0.32	0.13	0.18
*Unemployed - at ATUS & CPS*Associate's Degree*	-0.17	0.25	-0.01	0.18
*Out of the Labor Force*Associate's Degree*	-0.09	0.11	0.05	0.08
*Unemployed - 2 to 5 Months*High School Degree*	0.35	0.28	0.21	0.18
*Unemployed - at ATUS & CPS*High School Degree*	0.17	0.24	0.35 *	0.17
*Out of the Labor Force*High School Degree*	-0.08	0.10	0.20 **	0.07
*Unemployment Rate*Associate's Degree*	0.00	0.03	0.02	0.03
*Unemployment Rate*High School Degree*	0.05	0.03	-0.01	0.02
*2008*Associate's Degree*	0.17	0.13	-0.02	0.11
*2009*Associate's Degree*	0.08	0.17	-0.06	0.15
*2010*Associate's Degree*	0.23	0.18	-0.12	0.15
*2008*High School Degree*	0.15	0.12	-0.05	0.10
*2009*High School Degree*	0.04	0.16	0.13	0.14
*2010*High School Degree*	-0.13	0.16	0.10	0.14
Constant	1.63 ***	0.12	5.20 ***	0.10

Notes: N=33,525. * p<.05, ** p <.01, *** p<.001. 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.

Appendix E. Figures Illustrating Sleep Patterns by Spouses'/Partners' Employment Status and Education

Figure E-1. Time Spent Sleeping
by Spouses'/Partners' Employment Status

Source: American Time Use Survey 2003-2010

Figure E-2. Sleep Issues
by Spouses'/Partners' Employment Status

Source: American Time Use Survey 2003-2010
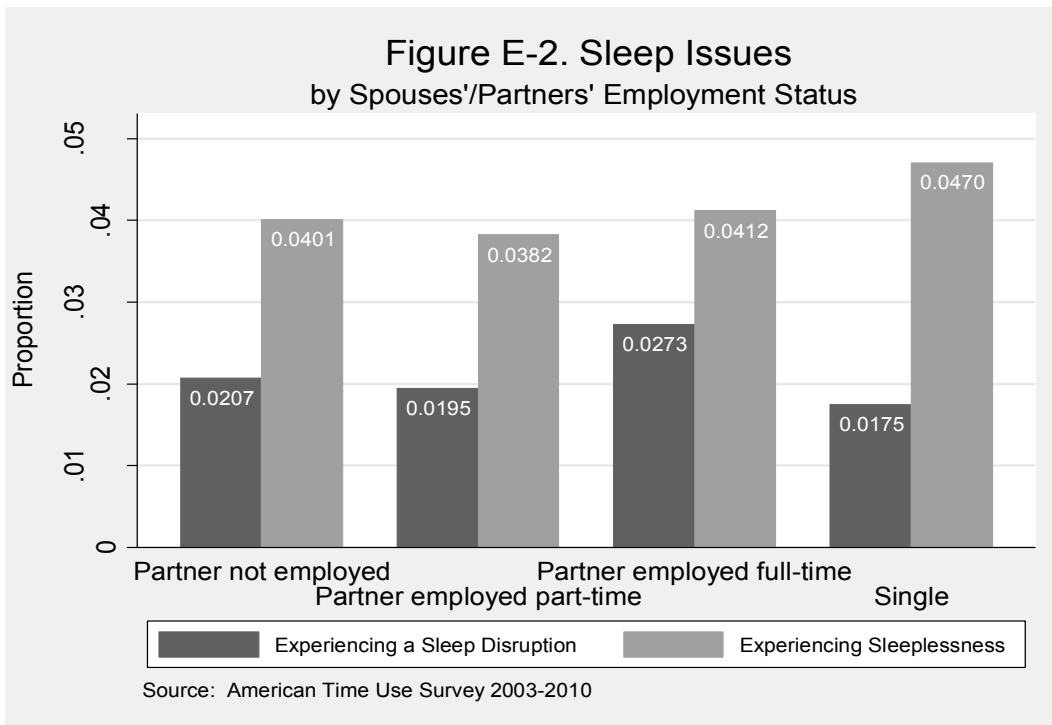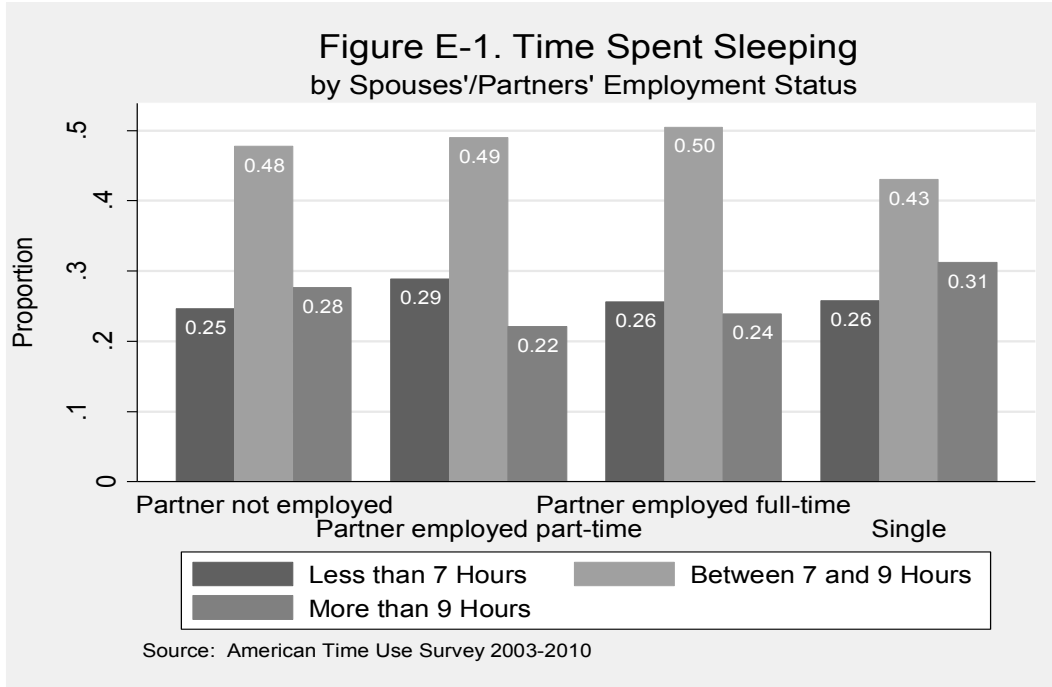
Figure E-3. Time Spent in Sleeplessness
by Spouses'/Partnerss Employment Status

Source: American Time Use Survey 2003-2010
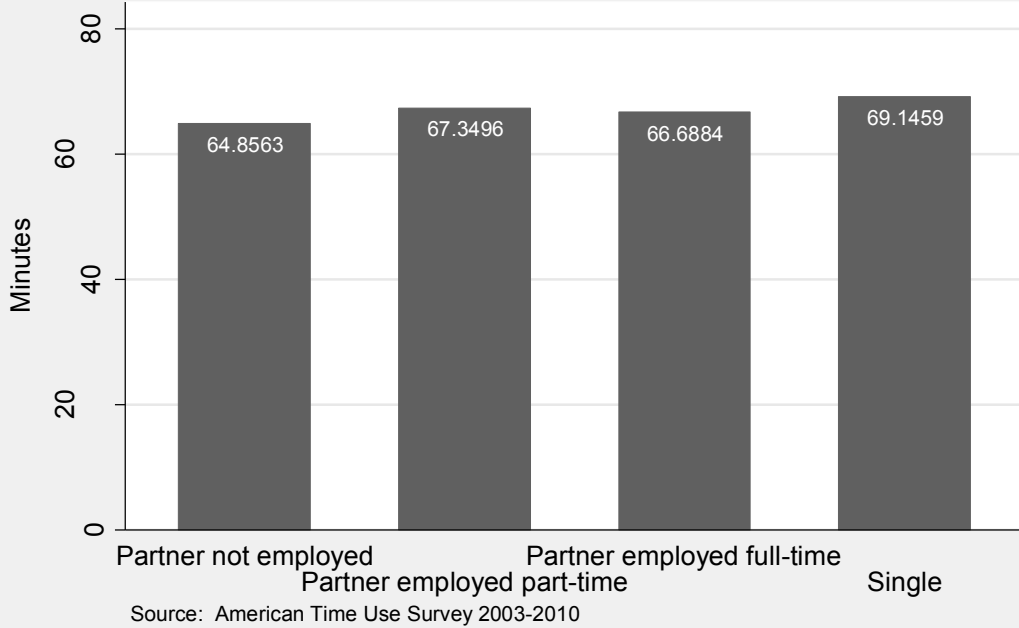
Figure E-4. Number of Sleep Disruptions
by Spouse/Partner's Employment Status

Source: American Time Use Survey 2003-2010
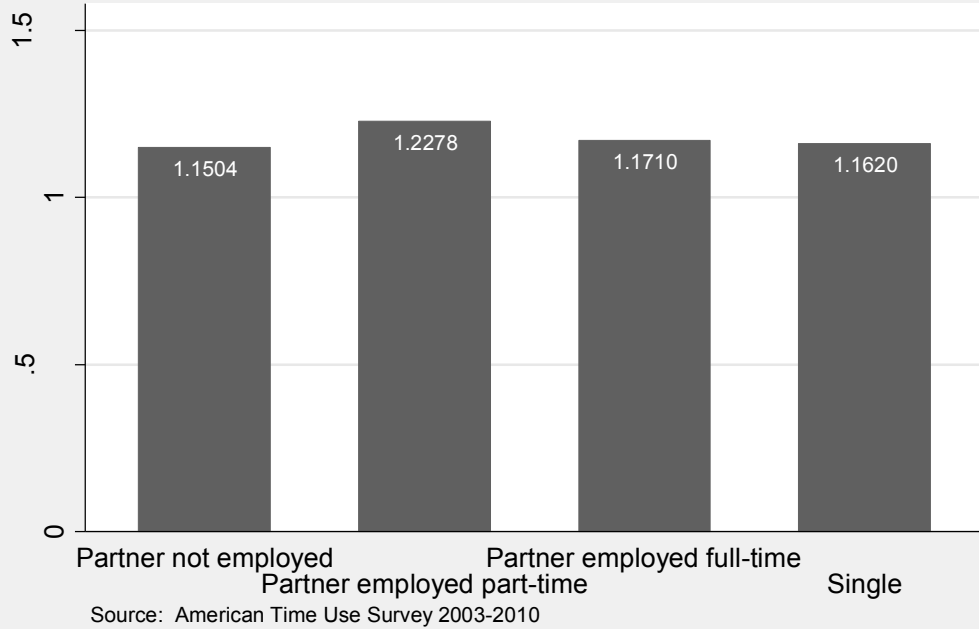
Figure E-5. Time Spent Sleeping
by Education
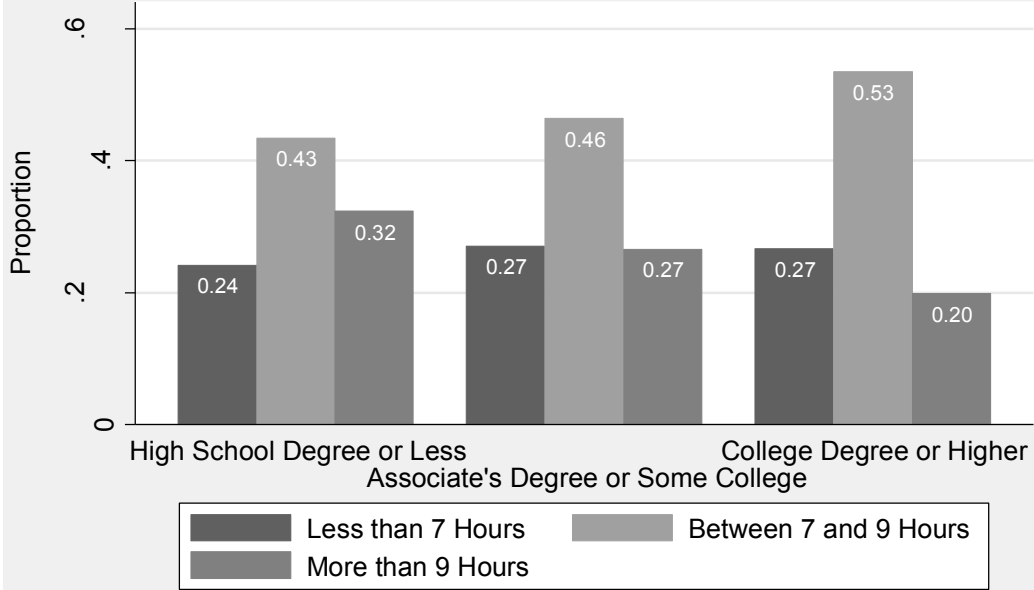
Source: American Time Use Survey 2003-2010

Figure E-6. Sleep Issues
by Education
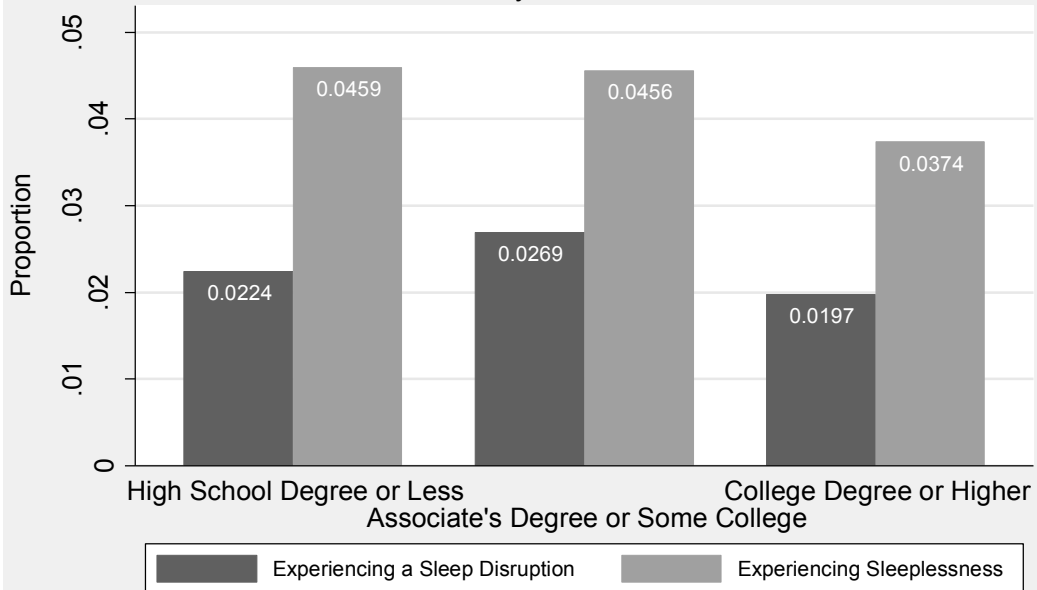
Source: American Time Use Survey 2003-2010

Figure E-7. Time Spent in Sleeplessness
by Education

72.9535

66.7388

60.5320

High School Degree or Less

Associate's Degree or Some College

College Degree or Higher

Source: American Time Use Survey 2003-2010
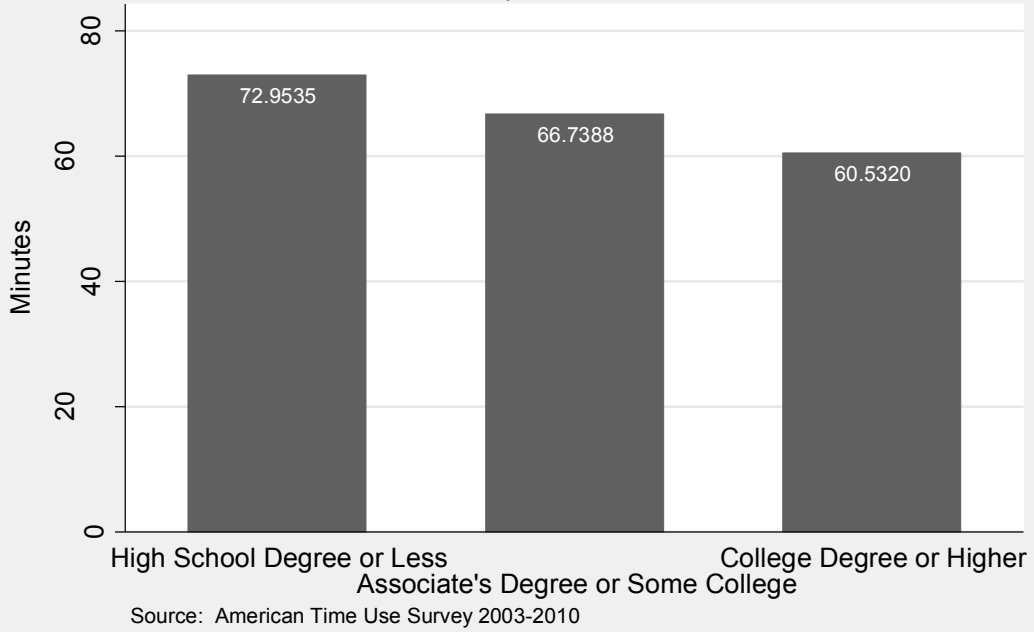
Figure E-8. Number of Sleep Disruptions
by Education

1.1911

1.1631

1.1529

High School Degree or Less

Associate's Degree or Some College

College Degree or Higher

Source: American Time Use Survey 2003-2010

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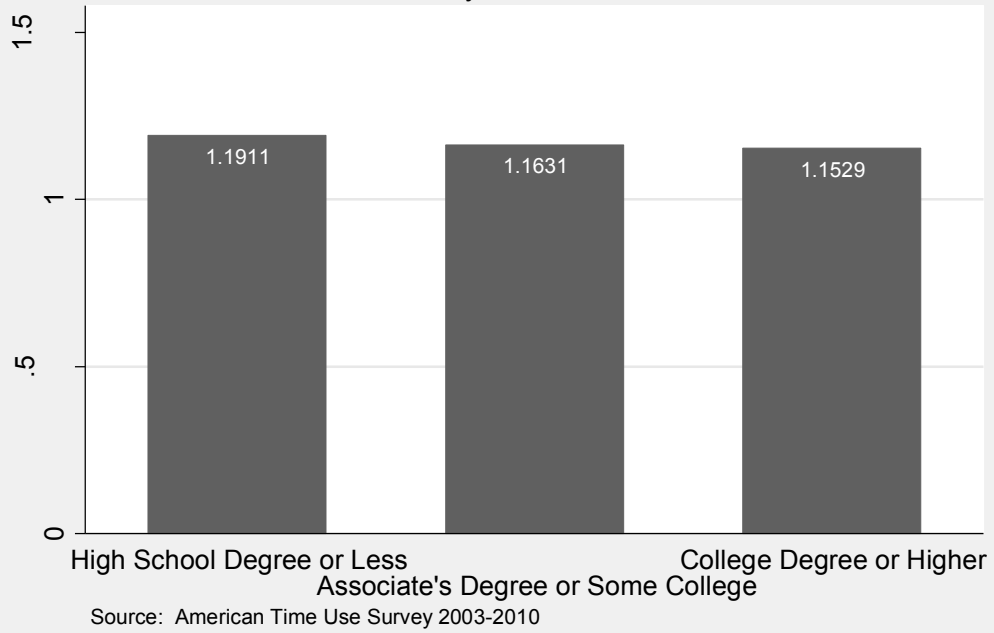
Appendix F. Activities Included in Exercise and Health-Related Self-Care

List of Activities Included in Exercise

Table F-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 Health-Related Self-Care

Table F-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

Appendix G. Comparison of Analytic Models Predicting Time Spent with Family Members

There is a great deal of variation in the distributions of the time use variables but overall it appears that the measures of time spent with family are truncated at zero. Figures G-1, G-2 and G-3 contain histograms illustrating the distribution of each of the time use measures. Figure G-1 illustrates the distribution of total time spent with all children and children under six on weekends and weekdays. Though the sample does appear to be truncated at zero, relatively small proportions of the sample spend no time with their children on the diary day. Only 10% of parents spend no time with children of all ages on weekdays and 9% spend no time on weekends. The percentage of parents with children under the age of 6 who spend no time with their children is even smaller – 6% on weekdays and 5% weekends. Similar trends are found when examining the distribution of total time spent with spouses or partners though the proportion of those spending no time with spouses/partners increases. Despite the competing demands of work and personal life, the great majority of married or partnered individuals spend some time with their spouses or partners during the diary day – at least while others are present (12% on weekdays and 8% on weekends spend no time with their spouses/partners). In contrast, nearly three times as many people spend no time alone with their spouse when compared to those who spend time with spouse while others are around. As the bottom panel of Figure G-2 shows, 30% of the sample spends no time alone with spouses or

Figure G-1. Time Spent with Children

Source: American Time Use Survey 2003-2010
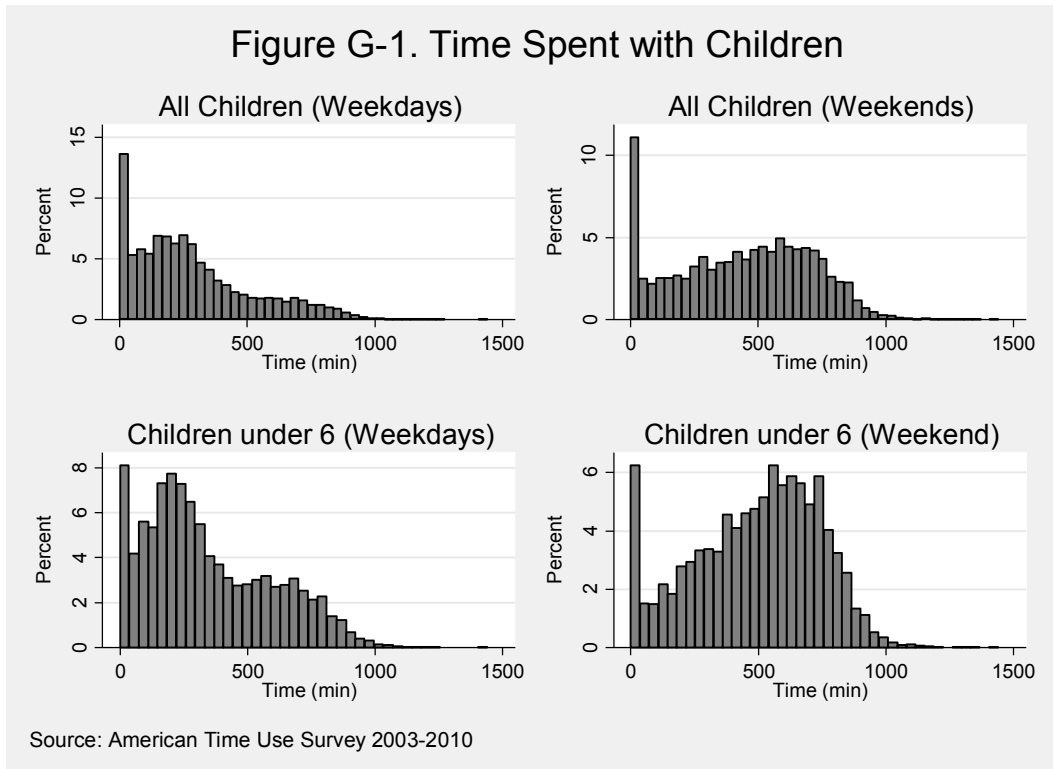
Figure G-2. Time Spent with Spouse/Partner

Spouse/Partner (Weekdays)

Spouse/Partner (Weekends)

Only Spouse/Partner (Weekdays)

Only Spouse/Partner (Weekend)
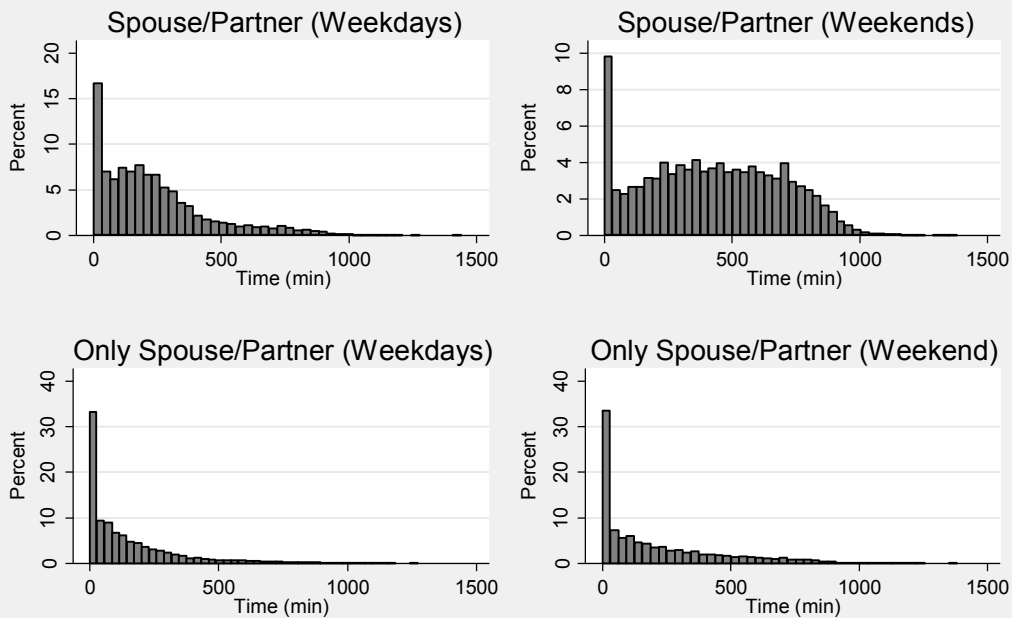
Source: American Time Use Survey 2003-2010

Figure G-3. Time Spent with Extended Family

Parent(s) (Weekdays)

Parent(s) (Weekends)

Extended Family (Weekdays)

Extended Family (Weekend)
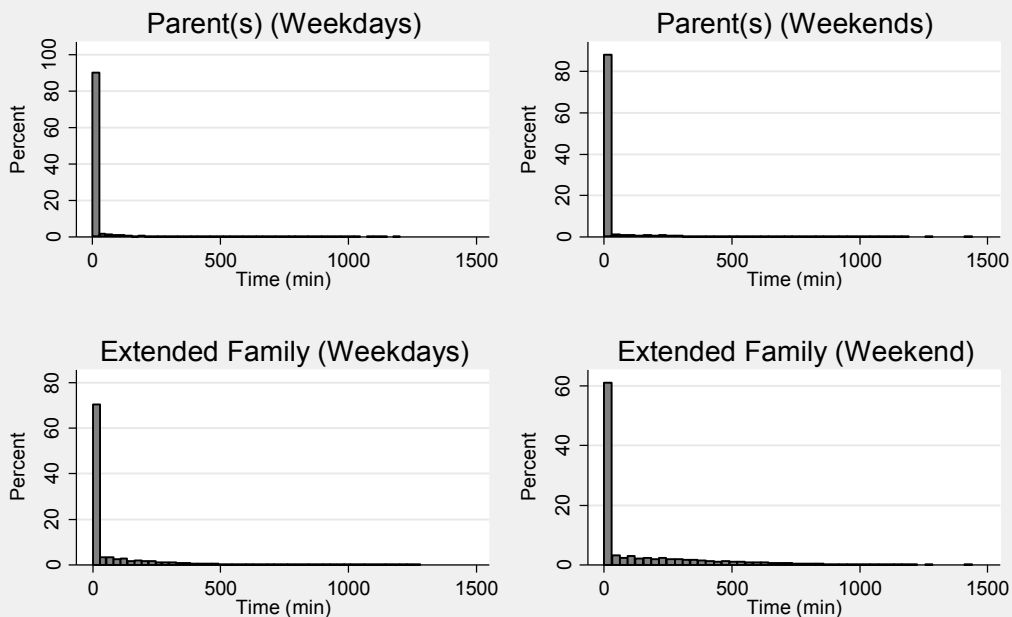
Source: American Time Use Survey 2003-2010

partners on weekdays and 28% spend no time alone with their spouses or partners on

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weekends. The percentage of the sample that spends no time with extended family members is even greater. Figure G-3 shows that 90% of the sample spends no time with their parent(s) on weekdays and 87% of the sample spends no time with their parent(s) on weekends. Similarly, 71% of the sample spends no time with any extended family members on weekdays and 60% spends no time with extended family on weekends.

Being that the data is truncated at zero and there are a high percentage of respondents who spend no time with a given type of family member (i.e. there is a high number of zeros for each outcome) there is some question about the appropriate statistical model to use. Ordinary Least Squares (OLS) regression models are beneficial because of straightforward interpretation (each coefficient represents the change in time for that variable) and the fewer numbers of assumptions made regarding the data. However, the truncated data and high proportion of zeros may bias the results. Many prior time use studies have used Tobit models to account for the left-censoring of time diary data (e.g. Pailhe and Solaz 2008; Sayer et al. 2004; Yeung et al. 2001). In addition, Tobit models are fairly simple to interpret (each coefficient represents the change in time for that variable). However, Stewart (2009) argues that Tobit models produce biased estimates in cases when the activity in question is rare in the data and instead suggest using OLS or two-stage models. The Poisson Hurdle model is a two-stage model that allows for different processes to lead to zeros and positive values. This is preferred because it is more reasonable to assume that the process determining the amount of time spent with a type of family member is likely to be substantially different than the process for spending no time (versus some time). That is, lacking the opportunity to spend time with ones' parents (for example living a long distance from them) is modeled separately from the amount of time spent while still maintaining the full analytic sample. The final estimation strategy that may be appropriate for this investigation is the Zero-Inflated Poisson regression models. Not only does this statistical technique account for the zero cut-off, it also allows for two separate processes for being zero in the sample (i.e. spending no time with family). For example, it is reasonable to imagine that a respondent may live a distance from family members like parents or they simply may not see their parents on the diary day due to competing time demands. In addition to additional assumptions made regarding the data, a drawback of the Poisson Hurdle model and the Zero-Inflated Poisson model is that they are not intuitive to interpret. In both sets of results, the coefficients are exponentiated to predict incidence-rate ratios rather than changes in minutes (or the unit of analysis). Also, the binary portion of the Zero-Inflated Poisson model predicts the odds of always being zero, which is in contrast to traditional Logistic regression models that predict the odds of being in a particular group.

In light of these concerns, I compare OLS, Tobit, and Poisson Hurdle and Zero-Inflated Poisson (ZIP) models[72] for the time spent with children, spouses/partners, and extended family members. Table G-1 shows the different models estimating the amount of

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[72] To aid in their comparability, 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. I exclude the binary portion of the Hurdle and Zip models to focus on the similar components to OLS and Tobit.

Table G-1. Comparison of Linear, Tobit, Zero-Inflated Poisson, and Hurdle Models Predicting Time (Minutes per Weekday) that Parents Spent with Children, ATUS 2003-2010.

	OLS			Tobit			Zero-Inflated Poisson				Hurdle			
Children under 18	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	140.50	***	16.26	147.01	***	17.61	139.48	0.46	***	0.04	144.68	0.46	***	0.04
Unemployed - at ATUS & CPS	141.82	***	12.83	144.16	***	14.37	134.91	0.48	***	0.03	154.31	0.48	***	0.03
Out of the Labor Force	204.04	***	5.84	208.69	***	6.13	181.37	0.55	***	0.01	181.96	0.55	***	0.01
State Economic Conditions														
Unemployment Rate	-2.17		1.33	-1.91		1.49	-1.72	-0.01		0.00	-2.63	-0.01		0.00
Time Period														
2003-2007 (ref.)														
2008	6.75		6.12	8.06		6.71	6.73	0.01		0.02	3.35	0.01		0.02
2009	11.81		7.53	8.99		8.50	9.34	0.06	*	0.03	19.04	0.06	*	0.03
2010	12.67		7.81	12.30		8.68	12.18	0.04		0.03	13.86	0.04		0.03
Children Under 6	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	158.89	***	23.84	159.93	***	25.64	156.32	0.47	***	0.05	174.38	0.47	***	0.05
Unemployed - at ATUS & CPS	171.14	***	19.50	171.55	***	21.28	161.00	0.49	***	0.04	181.05	0.49	***	0.04
Out of the Labor Force	233.00	***	7.61	234.51	***	7.80	204.79	0.53	***	0.02	199.69	0.53	***	0.02
State Economic Conditions														
Unemployment Rate	-1.33		1.92	-0.74		2.05	-0.80	-0.01		0.01	-2.78	-0.01		0.01
Time Period														
2003-2007 (ref.)														
2008	-0.17		9.83	0.90		10.39	-0.59	-0.01		0.03	-4.49	-0.01		0.03
2009	16.08		10.85	13.89		11.68	13.03	0.06	*	0.03	23.90	0.06	*	0.03
2010	13.38		11.48	13.04		12.26	13.46	0.04		0.03	16.07	0.04		0.03

Notes: *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) as well as living with an extended family member, race, immigrant status, 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. Binary portions of the Hurdle and Zip models are excluded to focus comparable results.

Table G-2. Comparison of Linear, Tobit, Zero-Inflated Poisson and Hurdle Models Predicting Time (Minutes per Weekday) that Adults Spent with Spouses/Partners, ATUS 2003-2010.

Spouses/Partners	OLS			Tobit			Zero-Inflated Poisson				Hurdle			
	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	112.59	***	16.79	118.39	***	18.06	122.43	0.42	***	0.05	127.86	0.42	***	0.05
Unemployed - at ATUS & CPS	87.13	***	10.88	93.93	***	11.83	97.44	0.33	***	0.04	96.39	0.33	***	0.04
Out of the Labor Force	72.27	***	5.48	76.82	***	5.99	83.22	0.30	***	0.02	86.69	0.30	***	0.02
State Economic Conditions														
Unemployment Rate	0.44		1.24	0.67		1.39	0.26	0.00		0.01	-0.35	0.00		0.01
Time Period														
2003-2007 (ref.)														
2008	-4.31		4.99	-4.75		5.65	-5.18	-0.02		0.02	-5.11	-0.02		0.02
2009	12.47		6.73	12.16		7.58	15.44	0.07	*	0.03	19.59	0.07	*	0.03
2010	12.68		7.41	12.08		8.29	15.87	0.07	*	0.03	20.56	0.07	*	0.03
Spouses/Partners Only	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	73.44	***	13.68	88.36	***	16.18	91.33	0.44	***	0.06	102.33	0.44	***	0.06
Unemployed - at ATUS & CPS	53.12	***	8.19	70.66	***	10.21	63.97	0.29	***	0.05	60.86	0.29	***	0.05
Out of the Labor Force	41.49	***	4.51	50.46	***	5.59	54.29	0.30	***	0.03	64.74	0.30	***	0.03
State Economic Conditions														
Unemployment Rate	0.58		0.95	0.77		1.25	0.48	0.00		0.01	0.19	0.00		0.01
Time Period														
2003-2007 (ref.)														
2008	-4.55		3.86	-8.26		5.26	-5.44	-0.01		0.03	-1.98	-0.01		0.03
2009	4.85		5.28	5.28		6.93	6.69	0.05		0.04	9.58	0.05		0.04
2010	6.21		5.92	7.86		7.62	9.92	0.06		0.04	12.89	0.06		0.04

Notes: *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) as well as living with an extended family member, race, immigrant status, 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. Binary portions of the Hurdle and Zip models are excluded to focus comparable results.

time spent with children under 18 and children under 6 on weekdays. There are few differences in the patterns of statistical significance and the time estimates are fairly similar across the models. Almost uniformly, the estimates are larger in the Tobit and Hurdle models while the ZIP appears to produce the most conservative estimates. The ZIP and Hurdle models show that respondents interviewed in 2009 are significantly different from respondents interviewed before the recession for time spent with children under 18 and children under 6. Table G-2 shows the models estimating time spent with spouses or partners on weekdays. Again we find similar patterns of significance to the models estimating time spent with children. The range of estimates continues to be fairly tight – the greatest range is a little less than 30 minutes for the time spent alone with spouses or partners for those who are unemployed two to five months. Table G-3 includes the estimates for time spent with extended family on weekdays. Though there is more variation in the pattern of significant coefficients, the importance of a respondent's employment status holds. More so than in the models predicting time spent with children or with spouses or partners, the models predicting time spent with extended family varies. The estimates produced by the Tobit and Hurdle models are consistently larger than the OLS and ZIP models. For example, the estimate for time spent with all extended family by the recently unemployed is nearly three times as large in the Hurdle model as it is the OLS model. In contrast, the ZIP estimates are more similar to the OLS estimates and differ by fewer than 7 minutes in all instances.

Tables G-4, G-5 and G-6 show the results for the weekend models and though the patterns are less consistent, similar results are evident. The models estimating time with children and with spouses or partners on weekend days are fairly similar with like patterns of significance and fairly small ranges of values. In contrast, the results of the different models estimating time spent with extended family members are more variable. The patterns of statistical significance, though similar in many ways, are less consistent, particularly in the Tobit models. Similar to the weekday models, the estimates are much higher in the Tobit and Hurdle models whereas the OLS and ZIP models differ by fewer than 3 minutes in all instances.

As expected, the estimates for the amount of time spent with family members who are seen on a more regular basis (such as children and spouses or partners) are less variable across the four types of models. However, estimates become less consistent as the event becomes rarer (e.g. time spent with extended family members). In line with Stewart's (2009) findings, the Tobit estimates were considerably larger for time spent with parents or with all extended family members. The estimates were similarly large for the Hurdle estimates while the OLS and ZIP estimates were more similar. Due to the consistency between the OLS and ZIP estimates, the high proportion of respondents that spend no time with family members (i.e. have zero values), the ability to explain who is in this group (results not shown in these tables) and the multiple processes accounting for spending no time with family members, the ZIP models appear to be the most appropriate choice for the following analyses.

Table G-3. Comparison of Linear, Tobit, Zero-Inflated Poisson and Hurdle Models Predicting Time (Minutes per Weekday) that Adults Spent with Extended Family, ATUS 2003-2010.

	OLS			Tobit			Zero-Inflated Poisson				Hurdle			
Parent(s)	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	1.41		3.82	3.98		32.08	1.47	0.22		0.17	36.45	0.22		0.17
Unemployed - at ATUS & CPS	14.46	**	4.86	58.51	*	23.18	9.44	0.52	***	0.10	100.56	0.52	***	0.10
Out of the Labor Force	17.74	***	2.25	84.89	***	11.40	13.46	0.53	***	0.05	102.47	0.53	***	0.05
State Economic Conditions														
Unemployment Rate	0.95	*	0.43	8.37	*	3.32	0.82	0.01		0.02	2.17	0.01		0.02
Time Period														
2003-2007 (ref.)														
2008	-1.06		1.78	-0.19		13.76	-0.26	-0.06		0.08	-11.18	-0.06		0.08
2009	-6.17	**	2.18	-22.12		17.91	-4.18	-0.31	**	0.10	-51.84	-0.31	**	0.10
2010	-2.36		2.49	-26.45		18.80	-2.58	0.00		0.11	-0.25	0.00		0.11
Extended Family	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	27.54	***	8.27	69.37	**	21.52	34.59	0.34	***	0.07	74.00	0.34	***	0.07
Unemployed - at ATUS & CPS	52.26	***	8.02	106.61	***	16.95	53.28	0.47	***	0.05	112.73	0.47	***	0.05
Out of the Labor Force	53.69	***	3.72	116.17	***	8.06	55.63	0.45	***	0.03	105.20	0.45	***	0.03
State Economic Conditions														
Unemployment Rate	1.47	*	0.73	7.26	***	2.17	1.75	-0.01		0.01	-1.68	-0.01		0.01
Time Period														
2003-2007 (ref.)														
2008	-4.90		3.02	-15.48		9.41	-6.01	-0.04		0.04	-8.41	-0.04		0.04
2009	-6.75		4.13	-23.84	*	12.13	-8.05	-0.04		0.05	-8.47	-0.04		0.05
2010	-0.41		4.50	-17.52		12.89	-1.32	0.10		0.06	22.64	0.10		0.06

Notes: *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) as well as living with an extended family member, race, immigrant status, 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. Binary portions of the Hurdle and Zip models are excluded to focus comparable results.

Table G-4. Comparison of Linear, Tobit, Zero-Inflated Poisson and Hurdle Models Predicting Time (Minutes per Weekend Day) that Parents Spent with Children, ATUS 2003-2010.

	OLS			Tobit			Zero-Inflated Poisson				Hurdle			
Child under 18	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	89.52	***	18.07	98.27	***	19.58	90.07	0.14	***	0.03	68.98	0.14	***	0.03
Unemployed - at ATUS & CPS	85.09	***	14.76	91.29	***	16.26	87.39	0.16	***	0.02	77.01	0.16	***	0.02
Out of the Labor Force	75.06	***	6.26	77.57	***	6.77	76.10	0.14	***	0.01	68.47	0.14	***	0.01
State Economic Conditions														
Unemployment Rate	-4.59	**	1.69	-4.78	*	1.87	-4.62	-0.01	**	0.00	-4.55	-0.01	**	0.00
Time Period														
2003-2007 (ref.)														
2008	4.88		6.91	5.39		7.62	5.49	0.01		0.01	2.94	0.01		0.01
2009	24.30	*	9.58	24.61	*	10.67	24.43	0.06	**	0.02	26.68	0.06	**	0.02
2010	27.93	**	10.26	28.51	*	11.41	28.58	0.07	***	0.02	31.67	0.07	***	0.02
Child under 6	Coef		SE	Coef		SE	Marginals	Coef		SE	Marginals	Coef		SE
Individual Employment Status														
Employed (ref.)														
Unemployed - 2 to 5 months	88.22	***	20.29	93.34	***	21.05	88.38	0.14	***	0.04	72.00	0.14	***	0.04
Unemployed - at ATUS & CPS	96.98	***	17.03	101.38	***	17.70	96.58	0.16	***	0.03	82.46	0.16	***	0.03
Out of the Labor Force	74.16	***	7.75	75.33	***	8.08	76.93	0.13	***	0.01	66.85	0.13	***	0.01
State Economic Conditions														
Unemployment Rate	-0.17		2.30	-0.39		2.47	-0.45	0.00		0.00	0.77	0.00		0.00
Time Period														
2003-2007 (ref.)														
2008	16.97		9.44	17.81		9.98	16.68	0.03		0.02	13.70	0.03		0.02
2009	17.88		13.05	18.73		14.01	18.99	0.03		0.02	15.68	0.03		0.02
2010	15.41		13.87	17.64		14.74	16.76	0.01		0.03	6.38	0.01		0.03

Notes: *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) as well as living with an extended family member, race, immigrant status, 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. Binary portions of the Hurdle and Zip models are excluded to focus comparable results.

Table G-5. Comparison of Linear, Tobit, Zero-Inflated Poisson and Hurdle Models Predicting Time (Minutes per Weekend Day) that Adults Spent with Spouses/Partners, ATUS 2003-2010.

	OLS		Tobit		Zero-Inflated Poisson			Hurdle		
Spouses/Partners	Coef	SE	Coef	SE	Marginals	Coef	SE	Marginals	Coef	SE
Individual Employment Status										
Employed (ref.)										
Unemployed - 2 to 5 months	46.91 **	17.89	49.66 **	19.25	49.47	0.10 **	0.04	45.65	0.10 **	0.04
Unemployed - at ATUS & CPS	33.24 *	14.40	37.80 *	15.38	34.93	0.05	0.03	23.20	0.05	0.03
Out of the Labor Force	34.34 ***	6.44	36.29 ***	6.94	37.22	0.07 ***	0.01	34.23	0.07 ***	0.01
State Economic Conditions										
Unemployment Rate	-4.30 *	1.74	-4.58 *	1.88	-4.48	-0.01 *	0.00	-3.98	-0.01 *	0.00
Time Period										
2003-2007 (ref.)										
2008	4.98	7.01	5.34	7.55	4.92	0.01	0.02	4.16	0.01	0.02
2009	29.40 **	9.80	30.77 **	10.62	30.81	0.06 **	0.02	29.67	0.06 **	0.02
2010	29.38 **	10.43	29.69 **	11.27	30.35	0.07 **	0.02	33.59	0.07 **	0.02
Spouses/Partners Only	Coef	SE	Coef	SE	Marginals	Coef	SE	Marginals	Coef	SE
Individual Employment Status										
Employed (ref.)										
Unemployed - 2 to 5 months	27.70	14.58	37.02 *	18.20	30.61	0.09	0.07	26.97	0.09	0.07
Unemployed - at ATUS & CPS	22.18 *	11.02	28.94 *	14.59	29.03	0.11 *	0.05	30.80	0.11 *	0.05
Out of the Labor Force	12.93 *	5.04	15.29 *	6.55	15.20	0.06 *	0.03	17.49	0.06 *	0.03
State Economic Conditions										
Unemployment Rate	-0.19	1.34	-0.20	1.72	0.17	0.00	0.01	0.445	0.00	0.01
Time Period										
2003-2007 (ref.)										
2008	3.64	5.38	6.63	6.84	4.75	0.01	0.03	2.22	0.01	0.03
2009	4.03	7.55	3.52	9.73	4.89	0.03	0.04	7.18	0.03	0.04
2010	11.66	7.84	9.77	10.10	13.58	0.07 *	0.04	21.33	0.07 *	0.04

Notes: *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) as well as living with an extended family member, race, immigrant status, 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. Binary portions of the Hurdle and Zip models are excluded to focus comparable results.

Table G-6. Comparison of Linear, Tobit, Zero-Inflated Poisson and Hurdle Models Predicting Time (Minutes per Weekend Day) that Adults Spent with Extended Family, ATUS 2003-2010.

	OLS		Tobit		Zero-Inflated Poisson			Hurdle			
Parent(s)	Coef	SE	Coef	SE	Marginals	Coef	SE	Marginals	Coef		SE
Individual Employment Status											
Employed (ref.)											
Unemployed - 2 to 5 months	4.40	6.93	24.67	39.29	3.18	0.09	0.12	21.66	0.09		0.12
Unemployed - at ATUS & CPS	9.27	6.50	13.45	30.23	5.81	0.30 ***	0.09	79.23	0.30	***	0.09
Out of the Labor Force	6.74 *	2.88	19.04	15.02	4.87	0.16 **	0.05	39.06	0.16	**	0.05
State Economic Conditions											
Unemployment Rate	0.60	0.64	5.80	3.86	0.50	-0.01	0.01	-1.98	-0.01		0.01
Time Period											
2003-2007 (ref.)											
2008	-0.42	2.31	2.32	16.18	-0.54	-0.05	0.06	-11.16	-0.05		0.06
2009	3.23	3.59	34.19	21.10	3.08	-0.02	0.08	-4.26	-0.02		0.08
2010	7.70	4.15	40.25	22.83	5.62	0.07	0.08	16.92	0.07		0.08
Extended Family	Coef	SE	Coef	SE	Marginals	Coef	SE	Marginals	Coef		SE
Individual Employment Status											
Employed (ref.)											
Unemployed - 2 to 5 months	29.89 *	11.85	64.74 **	23.48	32.79	0.08	0.05	24.64	0.08		0.05
Unemployed - at ATUS & CPS	29.04 **	9.90	37.50 *	18.97	27.16	0.18 ***	0.04	60.00	0.18	***	0.04
Out of the Labor Force	11.54 *	4.48	11.53	9.42	10.65	0.09 ***	0.02	30.39	0.09	***	0.02
State Economic Conditions											
Unemployment Rate	-0.51	1.13	0.65	2.54	-0.37	-0.01	0.01	-2.76	-0.01		0.01
Time Period											
2003-2007 (ref.)											
2008	3.22	4.49	7.27	10.44	3.54	0.01	0.03	3.54	0.01		0.03
2009	11.73	6.34	21.41	14.23	12.26	0.05	0.04	16.22	0.05		0.04
2010	3.15	6.77	-2.46	14.97	1.99	0.04	0.04	13.60	0.04		0.04

Notes: *p<.05. **p<.01. ***p<.001. Socio-demographic characteristics (gender, life stage, spouses' employment status, and education) as well as living with an extended family member, race, immigrant status, 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. Binary portions of the Hurdle and Zip models are excluded to focus comparable results.

Appendix H. Bivariate Relationships between Employment Uncertainty and

Time with Family Members

I examine the bivariate relationships between being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession and each of the time with family variables in Tables H-1, H-2, and H-3. Table H-1 shows the relationships between time spent with family and the detailed employment status measure. As expected, respondents who are out of the labor force are more likely to spend time with their children and spend more time on average than the employed and, in some cases, the unemployed. Average time spent with spouses is different (as is the proportion spending time with spouses/partners). Here I find that respondents who are recently unemployed (in the last two to five months) are most likely to spend time and spend the most time with their spouses/partners including time when others are present and time alone on weekdays. Average time spent with parents and with extended family members is greatest for the long-term unemployed and respondents who are not in the labor force (the long-term unemployed and those not in the labor force have the largest proportion of respondents that spend any time with their parents as well). In general, respondents who are not working spend more time with children and with extended family members. Those respondents who are recently unemployed spend the most time with spouses or partners.

Table H-2 shows the relationships between time with family and state economic conditions captured by unemployment rates. In order to examine differences across different levels of the unemployment rate I construct three groups of respondents: (1) respondents whose state-level unemployment rate is more than one standard deviation below the average unemployment rate (referred to as living in low unemployment states), (2) respondents whose state-level unemployment rate is within one standard deviation of the average unemployment rate (referred to as living in average unemployment states), and (3) respondents whose state-level unemployment rate is more than one standard deviation above the mean (referred to as living in high unemployment states). There are few statistically significant patterns. Respondents who live in low unemployment areas are more likely to spend time with their parents as well as they spend more time on average with children under age 6 and with their parents.

Table H-3 shows the relationships between time with family members and the time period during which the respondent was interviewed. In general we see that a larger proportion of respondents interviewed in 2009 and 2010 spend time with family members than those interviewed before the recession or in 2008. Two exceptions to this general finding is the percentage of respondents spending time with children under 18 and the amount of time spent on average with parents. In these cases we see that a larger proportion of respondents interviewed in 2010 spend time with children under 18 and spend more time on average with their parents than do respondents interviewed in 2009. These findings raise the possibility that respondents spend more time with family members during the recessionary years of 2009 and 2010 than in more stable economic years.

Table H-1. Bivariate Relationships between Time with Family Members and Employment Status on Weekdays, ATUS 2003-2010.

	Employed[a]		Unemployed - 2 to 5 months[b]		Unemployed - at ATUS & CPS[c]		Out of the Labor Force[d]	
	Rate	SE	Rate	SE	Rate	SE	Rate	SE
Children								
% Spending Time with Children under 18	88.47%[d]	0.00	89.48%[d]	0.02	86.93%[d]	0.02	95.51%[abc]	0.00
Time with All Children under 18	225.76[bcd]	1.87	351.78[ad]	16.30	371.68[ad]	12.85	475.99[abc]	5.35
% Spending Time with Children under 6	92.85%[d]	0.00	91.17%[d]	0.03	90.88%[d]	0.03	98.66%[abc]	0.00
Time with Children under 6	267.14[bcd]	3.10	425.90[ad]	24.07	463.03[ad]	19.61	575.05[abc]	5.88
Spouses/Partners								
% Spending Time with Spouses/Partners	87.26%[d]	0.00	88.73%	0.02	89.64%	0.02	88.76%[a]	0.01
Time with Spouse or Partner	191.05[bcd]	1.63	312.04[ad]	17.99	275.73[a]	11.41	253.35[ab]	5.00
% Spending Time Alone with Spouses/Partners	69.53%[c]	0.00	72.91%	0.03	75.50%[ad]	0.02	69.45%[c]	0.01
Time with Only Spouse or Partner	106.92[bcd]	1.32	181.49[ad]	14.98	152.59[a]	8.74	134.41[ab]	4.41
Extended Family								
% Spending Time with Parent(s)	9.52%[cd]	0.00	10.64%	0.02	14.86%[a]	0.02	13.22%[a]	0.01
Time with Parent(s)	13.77[cd]	0.56	18.47[cd]	3.76	34.62[ab]	5.01	32.87[ab]	2.22
% Spending Time with All Extended Family	26.40%[abc]	0.00	33.49%[abd]	0.02	40.65%[ab]	0.02	38.70%[ab]	0.01
Time with All Extended Family	48.06[abc]	1.02	82.71[acd]	8.48	118.04[ab]	8.31	113.69[ab]	3.64

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table H-2. Bivariate Relationships between Time with Family Members and Rolling Average of Unemployment Rate on Weekdays, ATUS 2003-2010.

	Low Unemployment (> 1 St. Dev. below than the Mean)[a]		Average Unemployment (Within One St. Dev. of the Mean)[b]		High Unemployment (> 1 St. Dev. above than the Mean)[c]	
	Rate	SE	Rate	SE	Rate	SE
Children						
% Spending Time with Children under 18	89.27%	0.01	89.71%	0.00	89.19%	0.01
Time with All Children under 18	276.25	4.82	273.85	2.23	266.65	6.16
% Spending Time with Children under 6	95.41% [b]	0.01	93.60% [a]	0.00	93.39%	0.01
Time with Children under 6	347.17	7.57	333.16	3.57	335.79	9.94
Spouses/Partners						
% Spending Time with Spouses/Partners	88.53%	0.01	87.31%	0.00	87.83%	0.01
Time with Spouse or Partner	223.60 [bc]	4.49	200.53 [a]	1.80	202.09 [a]	4.93
% Spending Time Alone with Spouses/Partners	71.11%	0.01	69.50%	0.00	68.99%	0.01
Time with Only Spouse or Partner	124.83 [bc]	3.68	111.20 [a]	1.47	110.82 [a]	4.11
Extended Family						
% Spending Time with Parent(s)	11.57% [bc]	0.01	10.20% [ac]	0.00	8.18% [ab]	0.01
Time with Parent(s)	19.42 [c]	1.52	17.18	0.67	14.15 [a]	1.77
% Spending Time with All Extended Family	30.74% [bc]	0.01	28.69% [ac]	0.00	25.74% [bc]	0.01
Time with All Extended Family	66.65 [bc]	2.64	59.69 [a]	1.21	54.71 [a]	3.20

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table H-3. Bivariate Relationships between Time with Family Members and Recessionary Time Period on Weekdays, ATUS 2003-2010.

	Before the Recession[a]		2008[b]			2009[c]			2010[d]		
	Rate	SE	Rate		SE	Rate		SE	Rate		SE
Children											
% Spending Time with Children under 18	89.56%	0.00	90.72%	c	0.01	87.98%	bd	0.01	90.24%	c	0.01
Time with All Children under 18	272.20	2.37	275.06		5.92	275.16		5.67	277.15		5.44
% Spending Time with Children under 6	93.57%	0.00	94.32%		0.01	93.98%		0.01	94.81%		0.01
Time with Children under 6	334.57	3.78	323.57	c	9.83	350.42	b	8.76	338.86		8.43
Spouses/Partners											
% Spending Time with Spouses/Partners	87.43%	0.00	87.62%		0.01	87.84%		0.01	87.94%		0.01
Time with Spouse or Partner	200.26 cd	1.89	195.87	cd	4.71	219.96	ab	4.99	219.40	ab	5.11
% Spending Time Alone with Spouses/Partners	69.70%	0.00	68.05%	d	0.01	70.09%		0.01	71.09%	b	0.01
Time with Only Spouse or Partner	111.49 cd	1.55	106.96	cd	3.85	120.68	ab	4.06	122.53	ab	4.28
Extended Family											
% Spending Time with Parent(s)	9.71% cd	0.00	10.37%		0.01	11.64%	a	0.01	11.31%	a	0.01
Time with Parent(s)	16.93	0.73	16.65		1.67	15.86	d	1.28	20.94	c	1.99
% Spending Time with All Extended Family	28.20% cd	0.00	27.85%	d	0.01	30.34%	a	0.01	30.83%	ab	0.01
Time with All Extended Family	58.79 d	1.26	57.22	d	3.24	61.97		2.84	69.83	ab	3.27

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Appendix I. Time Spent with Family Members on Weekends

Table I-1 shows the descriptive statistics for time spent with family members on weekend diary days. In general, there are many similarities across the weekday and weekend diary days though respondents tend to spend more time on average with their family members on weekend days than weekdays. The majority of parents spend some time with their children on the weekend (91% spend time with children under 18 and 95% spend time with children under 6) and they spend a substantial amount of time with them. Parents spend on average 7 hours and 10 minutes with children under 18 and 8 hours 7 minutes with children under 6 on weekend days. The majority of married or partnered respondents also spend time with their spouse (92% spend some time and 72% spend some time alone with their spouses/partners). Respondents spend 6 hours 51 minutes with their spouses/partners when others are present and 3 hours alone with their spouses/partners on weekend days. Respondents are less likely to spend time with their parents or extended family members as only 13% spend time with their parents and 40% spend time with extended family members on weekend days (more than weekdays on average). Respondents spend 32 minutes on average with their parents and 2 hours and 2 minutes with extended family members on weekend days.

Bivariate Relationships

Table I-2 shows the bivariate relationships between the detailed employment status and time spent with family members on weekends. In general we see that even on weekend days, those not working (unemployed and out of the labor force) are more likely to and spend more time on average with family members than the employed and these results are similar to what was found for weekday diaries. In contrast to the weekday diaries, employed respondents interviewed on a weekend day spent more time with their spouses/partners than those not in the labor force. Similar to the weekday diaries, long-term unemployed respondents (those unemployed at the CPS and ATUS) and those not in the labor force were more likely to and spent more time with extended family members than the employed or recently unemployed (unemployed in the last 2 to 5 months).

Table I-3 shows the bivariate relationships between state economic conditions (as captured by the unemployment rate) and time spent with family members. Here there are few statistically significant relationships and the patterns are relatively similar to the bivariate relationships on weekday diaries. Time with children under 6, the percentage of respondents spending time with parents, and the amount of time spent with parents was each greater for those living in low unemployment states rather than high or average unemployment states.

Table I-4 shows the bivariate relationships between historical time period when respondents were interviewed and time spent with family members. In general, the significant differences found here are similar to the patterns found in the bivariate relationships between state economic conditions and time spent with family members. The only notable difference for time spent with children in Table I-4 is the amount of time spent with children under 6. Here we see that parents interviewed in 2009 spent more time on average with children under 6 than did parents interviewed before the

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Table I-1. Descriptive statistics: Sample limited to respondents aged 24 to 55 from weekend diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Dependent Variables				
Time Spent with Children per Weekday				
% Spending Time with Children under 18	90.53%	0.003	19,065	50,992,233,782
Time with All Children under 18	430.69	2.207	20,880	56,329,392,438
% Spending Time with Children under 6	94.68%	0.003	9,208	24,806,977,160
Time with Children under 6	487.44	2.958	9,688	26,199,950,612
Time Spent with Spouses/Partners per Weekday				
% Spending Time with Spouses/Partners	91.85%	0.002	20,701	70,716,190,946
Time with Spouse or Partner	411.43	2.192	22,418	76,993,339,171
% Spending Time Alone with Spouses/Partners	71.67%	0.004	15,491	55,178,984,663
Time with Only Spouse or Partner	180.54	1.890	22,418	76,993,339,171
Time Spent with Extended Family per Weekday				
% Spending Time with Parent(s)	12.82%	0.003	3,701	14,619,135,854
Time with Parent(s)	31.94	0.847	34,475	114,043,270,449
% Spending Time with All Extended Family	39.61%	0.003	12,919	45,172,678,214
Time with All Extended Family	122.90	1.488	34,475	114,043,270,449
Independent Variables				
Employment Uncertainty				
Detailed Employment Status				
Employed	80.32%	0.003	27,618	91,604,052,395
Unemployed - 2 to 5 months	1.75%	0.001	563	2,000,622,433
Unemployed - at ATUS & CPS	3.17%	0.001	1,022	3,617,942,690
Out of Labor Force	14.75%	0.002	5,272	16,820,652,931
State-Level Unemployment Rate	6.33	0.016	34,475	114,043,270,449
Year Interviewed				
Before the Recession (2003-2007)	62.45%	0.003	22,608	71,223,291,346
2008	12.44%	0.002	3,943	14,191,251,161
2009	12.59%	0.002	3,960	14,353,417,896
2010	12.52%	0.002	3,964	14,275,310,046
Socio-Demographic Characteristics				
Female	50.82%	0.003	19,302	57,952,959,337
Life Stage				
45 or Younger without Children	28.95%	0.003	7,173	33,018,971,608
Parent of Child under 18	49.39%	0.003	20,880	56,329,392,437
Older than 45 without Children	21.65%	0.003	6,422	24,694,906,403
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed	14.48%	0.002	4,468	16,188,098,404
Spouse/Partner Employed Part-Time	7.33%	0.002	2,425	8,196,628,961
Spouse/Partner Employed Full-Time	45.05%	0.003	14,813	50,357,251,900
No Spouse or Partner	33.14%	0.003	12,057	37,049,931,278

Notes: Time is estimated in minutes. Time spent with children is limited to respondents with children under 18. Time spent with spouses/partners is limited to respondents with a spouse or partner. Estimates are weighted using the wt06 variable.

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

	Rate	SE	Obs	Weighted Count
Education				
College Degree or More	32.69%	0.003	12,438	37,275,686,482
Some College or Associates	26.53%	0.003	10,033	30,254,216,568
High School Diploma or Less	40.79%	0.003	12,004	46,513,367,398
Controls				
Living with Extended Family Members	16.38%	0.003	3,492	18,680,134,405
Race				
White	67.62%	0.003	23,549	77,110,679,426
African American	11.85%	0.002	4,168	13,519,737,798
Hispanic	15.01%	0.002	4,988	17,112,853,034
Other	5.52%	0.002	1,770	6,300,000,190
Immigrant	16.29%	0.003	5,235	18,580,184,805
Region				
Northeast	17.73%	0.003	6,112	20,222,406,713
Midwest	25.08%	0.003	8,826	28,606,606,638
South	34.78%	0.003	11,953	39,662,577,640
West	22.41%	0.003	7,584	25,551,679,455
Metropolitan Area				
Suburban	57.80%	0.003	19,858	65,508,959,506
Urban	25.53%	0.003	8,591	28,934,508,362
Rural	16.67%	0.003	5,828	18,896,480,859
Season				
Summer	25.42%	0.003	8,593	28,994,585,732
Fall	25.81%	0.003	8,577	29,430,848,459
Winter	23.98%	0.003	8,805	27,348,205,688
Spring	24.79%	0.003	8,500	28,269,630,568
Holiday Diary Day	1.92%	0.001	609	2,187,294,795

Notes: Time is estimated in minutes. Time spent with children is limited to respondents with children under 18. Time spent with spouses/partners is limited to respondents with a spouse or partner. Estimates are weighted using the wt06 variable.

recession. Time spent with spouses/partners was not as clear. Respondents spent more time with spouses/partners in 2009 than before the recession (which was similar to weekday diaries) whereas the percentage of respondents spending time alone with spouses/partners was higher in 2008 than when compared to 2010. The percentage of respondents spending time with parents and the amount of time spent on average was greater for respondents interviewed in 2009 or 2010 when compared to those interviewed before the recession or in 2008.

Table I-2. Bivariate Relationships between Time with Family Members and Employment Status on Weekends, ATUS 2003-2010.

	Employed[a]		Unemployed - 2 to 5 months[b]		Unemployed - at ATUS & CPS[c]		Out of the Labor Force[d]	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Children								
% Spending Time with Children under 18	89.68% [d]	0.00	92.89%	0.02	91.85%	0.02	94.19% [a]	0.01
Time with All Children under 18	410.81 [bcd]	2.44	484.28 [a]	17.19	489.41 [a]	14.04	510.89 [a]	5.40
% Spending Time with Children under 6	93.78% [cd]	0.00	96.02%	0.01	96.35% [a]	0.01	97.85% [a]	0.00
Time with Children under 6	461.60 [bcd]	3.41	532.17 [ad]	19.33	552.36 [a]	15.75	573.60 [ab]	5.90
Spouses/Partners								
% Spending Time with Spouses/Partners	91.73%	0.00	92.64%	0.02	92.45%	0.01	92.34%	0.01
Time with Spouse or Partner	407.76 [bd]	2.44	454.77 [a]	17.59	419.30	14.10	426.33 [a]	5.53
% Spending Time Alone with Spouses/Partners	72.25% [d]	0.00	72.93%	0.03	69.13%	0.02	68.67% [a]	0.01
Time with Only Spouse or Partner	182.33 [d]	2.10	200.72	16.64	180.91	11.70	168.28 [a]	4.90
Extended Family								
% Spending Time with Parent(s)	12.46% [c]	0.00	15.53%	0.02	16.52% [a]	0.02	13.68%	0.01
Time with Parent(s)	29.68 [cd]	0.88	40.1	6.60	51.21 [a]	6.61	39.13 [a]	2.69
% Spending Time with All Extended Family	38.69% [bcd]	0.00	48.12% [ad]	0.03	45.94% [a]	0.02	42.25% [ab]	0.01
Time with All Extended Family	116.52 [bcd]	1.61	160.41 [a]	12.95	171.68 [ad]	10.29	142.71 [ac]	4.18

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table I-3. Bivariate Relationships between Time with Family Members and Rolling Average of Unemployment Rate on Weekends, ATUS 2003-2010.

	Low Unemployment (> 1 St. Dev. below than the Mean)[a]		Average Unemployment (Within One St. Dev. of the Mean)[b]		High Unemployment (> 1 St. Dev. above than the Mean)[c]	
	Rate	SE	Rate	SE	Rate	SE
Children						
% Spending Time with Children under 18	90.52%	0.01	90.53%	0.00	90.48%	0.01
Time with All Children under 18	436.58	5.64	429.60	2.53	429.00	7.40
% Spending Time with Children under 6	94.84%	0.01	94.69%	0.00	94.40%	0.01
Time with Children under 6	503.89 [bc]	7.79	485.28 [a]	3.39	476.25 [a]	9.49
Spouses/Partners						
% Spending Time with Spouses/Partners	91.59%	0.01	91.78%	0.00	92.78%	0.01
Time with Spouse or Partner	417.65	5.76	410.17	2.51	410.49	7.18
% Spending Time Alone with Spouses/Partners	71.00%	0.01	71.69%	0.00	72.61%	0.01
Time with Only Spouse or Partner	184.87	5.15	179.54	2.13	180.86	6.42
Extended Family						
% Spending Time with Parent(s)	15.48% [bc]	0.01	12.30% [a]	0.00	12.17% [a]	0.01
Time with Parent(s)	39.63 [bc]	2.50	30.47 [a]	0.94	29.78 [a]	2.62
% Spending Time with All Extended Family	41.05%	0.01	39.40%	0.00	38.65%	0.01
Time with All Extended Family	127.89	4.01	122.14	1.68	119.98	4.99

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Table I-4. Bivariate Relationships between Time with Family Members and Historical Time Period on Weekends, ATUS 2003-2010.

	Before the Recession[a]		2008[b]		2009[c]		2010[d]	
	Rate	SE	Rate	SE	Rate	SE	Rate	SE
Children								
% Spending Time with Children under 18	90.49%	0.00	90.74%	0.01	90.64%	0.01	90.35%	0.01
Time with All Children under 18	427.38	2.72	429.28	6.49	439.95	6.41	439.81	6.65
% Spending Time with Children under 6	94.50%	0.00	94.94%	0.01	94.70%	0.01	95.33%	0.01
Time with Children under 6	481.18 [c]	3.61	495.69	8.77	504.36 [a]	8.66	495.22	9.13
Spouses/Partners								
% Spending Time with Spouses/Partners	91.94%	0.00	91.66%	0.01	92.19%	0.01	91.20%	0.01
Time with Spouse or Partner	407.91 [c]	2.67	408.62	6.43	423.59 [a]	6.46	420.15	6.78
% Spending Time Alone with Spouses/Partners	71.77%	0.00	73.24% [d]	0.01	71.44%	0.01	69.75% [b]	0.01
Time with Only Spouse or Partner	178.22	2.29	183.25	5.54	184.13	5.64	186.11	5.96
Extended Family								
% Spending Time with Parent(s)	11.94% [cd]	0.00	12.30% [cd]	0.01	14.65% [ab]	0.01	15.86% [ab]	0.01
Time with Parent(s)	29.62 [cd]	1.00	29.54 [d]	2.31	35.58 [a]	2.53	42.22 [ab]	3.02
% Spending Time with All Extended Family	39.22%	0.00	39.49%	0.01	41.12%	0.01	40.17%	0.01
Time with All Extended Family	120.75	1.80	122.30	4.32	130.02	4.53	127.05	4.65

Note: Superscript denotes significant difference of P<.05 or smaller. Estimates are weighted using wt06 variable. Cases with missing data are excluded from the estimates.

Multivariate Models Predicting the Time and Odds of Spending Time with Family

Members on Weekend Days

Table I-5 shows the Zero-Inflated Poisson regression models predicting time spent with children under 18 on weekend days. Few economic climate variables were significant in the binary portion of the model. Those unemployed in the last two to five months had 50% lower odds of spending no time with children under 18 on weekends (that is they were more likely to spend time with children on weekend days than were the employed). In the portion of the model predicting the amount of time we see that being unemployed (both recently and long-term), living in states with poor economic conditions, and being interviewed during the recessionary time period were related to the amount of time spent with children under 18. The recently unemployed and the long-term unemployed spend 90 and 87 minutes more with children than the employed respectively while respondents interviewed in 2009 and 2010 spent 24 and 29 minutes more than those interviewed before the recession respectively. In contrast, respondents living in states with higher unemployment rates spent less time with children under 18 on the weekend days. Each additional percentage point of the unemployment rate was related to 5 fewer minutes with children under 18 on weekend days. Though the general patterns were similar to the models predicting time spent with children under 18 on weekday diaries, there were more statistically significant relationships in the weekend model including being recently unemployed predicting the odds of spending time and the unemployment rate and being interviewed in 2010 predicting the amount of time spent. Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during the recessionary time period for time spent with children under 18 on weekend days were not informative and are therefore not included.

Table I-6 shows the models predicting the time and odds of spending time with children under 6 on weekend days. Here few of the measures of employment uncertainty are significant. In the binary portion of the model being recently and long-term unemployed are related to increased odds of spending no time with children under 6, whereas in the count portion of the model only being out of the labor force is significantly related to spending more time with children under 6 on weekend days. When comparing the findings from the weekday and weekend diary models the coefficients though different are similar in direction and relative magnitude. The most notable differences are the statistical significance of being unemployed for predicting the odds of spending any time with children under 6 and the lack of significance of being unemployed, living in states with poor economic conditions, and being interviewed during the historical time period marked by a recession found in the weekend model compared to the weekday model.

Interaction models testing the two- and three-way interactions showed significant interactions between being interviewed during the recessionary time period and being unemployed for time spent with children under 6 on weekend days. Figure I-1 shows

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Table I-5. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spent with Children Under 18, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.50	-0.70	*	0.28	90.07	0.14	***	0.03
Unemployed - at ATUS & CPS	0.66	-0.42		0.23	87.39	0.16	***	0.02
Out of the Labor Force	0.72	-0.33	**	0.10	76.10	0.14	***	0.01
State Economic Conditions								
Unemployment Rate	1.01	0.01		0.02	-4.62	-0.01	**	0.00
Time Period								
2003-2007 (ref.)								
2008	0.94	-0.07		0.10	5.49	0.01		0.01
2009	0.99	-0.01		0.14	24.43	0.06	**	0.02
2010	0.99	-0.01		0.14	28.58	0.07	***	0.02
Socio-Demographic Characteristics								
Female	0.35	-1.06	***	0.08	75.39	0.07	***	0.01
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	0.96	-0.04		0.12	-6.70	-0.02		0.02
Spouse/Partner FTE	1.31	0.27	**	0.09	-17.57	-0.02		0.01
No Spouse or Partner	4.33	1.47	***	0.11	-93.54	-0.06	**	0.02
Education								
College Degree or More (ref.)								
Some College or Associates	1.36	0.31	***	0.08	-35.26	-0.05	***	0.01
High School Diploma or Less	1.56	0.44	***	0.08	-49.68	-0.07	***	0.01
Living with Extended Family Members	1.20	0.18		0.11	-31.66	-0.06	**	0.02
Constant		-2.39	***	0.17		6.19	***	0.02

Notes: N=20,232. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.

[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 I-6. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spent with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	OR	Coef.	SE	Marginals	Coef.	SE
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	1.15	0.14	*** 0.04	88.38	-0.46	0.34
Unemployed - at ATUS & CPS	1.17	0.16	*** 0.03	96.58	-0.55	0.29
Out of the Labor Force	1.14	0.13	*** 0.01	76.93	-1.11	*** 0.20
State Economic Conditions						
Unemployment Rate	1.00	0.00	0.00	-0.45	0.01	0.05
Time Period						
2003-2007 (ref.)						
2008	1.03	0.03	0.02	16.68	-0.10	0.19
2009	1.03	0.03	0.02	18.99	-0.07	0.28
2010	1.01	0.01	0.03	16.76	-0.21	0.28
Socio-Demographic Characteristics						
Female	0.20	-1.59	*** 0.16	88.19	0.09	*** 0.01
Marital or Partner Status/Spouse's Employment Status						
Spouse/Partner Not Employed (ref.)						
Spouse/Partner PTE	0.88	-0.13	0.20	3.73	0.00	0.02
Spouse/Partner FTE	1.17	0.15	0.15	-2.06	0.00	0.02
No Spouse or Partner	4.94	1.60	*** 0.21	-56.76	-0.01	0.02
Education						
College Degree or More (ref.)						
Some College or Associates	1.77	0.57	*** 0.15	-36.96	-0.05	*** 0.01
High School Diploma or Less	1.78	0.58	*** 0.15	-43.34	-0.06	*** 0.01
Living with Extended Family Members	1.33	0.29	0.20	-29.76	-0.05	0.02
Constant		-3.02	*** 0.33		6.18	*** 0.03

Notes: N=9,393. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.
[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.

the predicted amount of time spent on weekend days and the reference group (the employed before the recession) is the solid bar on the left. Here we see that the recently and long-term unemployed spend more time with children before the recession than the employed (403 minutes and 375 minutes versus 261 minutes). Those interviewed during the recessionary years of 2009 and 2010 who are long-term unemployed spent more time with children under 6. The long-term unemployed spend 496 minutes in 2009 and 520 minutes in 2010.

Figure I-1. Moderating Effects of Being Unemployed and Historical Time Period for Time Spent with Children Under 6 on Weekend Days

Table I-7 shows the Zero-Inflated Poisson regression models predicting the time and odds of spending time with the respondents' spouses/partners on weekend days regardless of whom else is present. In the binary portion of the equation we see that none of the employment uncertainty variables are related to spending at least some time with spouses or partners on weekend days. In the count portion of the model we see that becoming unemployed in the last two to five months is related to spending 49 more minutes with spouses or partners on weekend days when compared to the employed. State economic conditions are also important and each additional percentage point in the unemployment rate is related to spending 4 minutes less with spouses/partners. The historical time period, specifically being interviewed in 2009 or 2010, is also related to spending more time with spouses or partners. Respondents interviewed in 2009 spent 31 minutes more on average and respondents interviewed in 2010 spent 30 minutes more on average with spouses or partners on weekend days when compared to respondents interviewed before the recession. In general these patterns are similar to the weekday diaries. Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during the recessionary time period for time spent with spouses or partners on weekend days were not informative and are therefore not included.
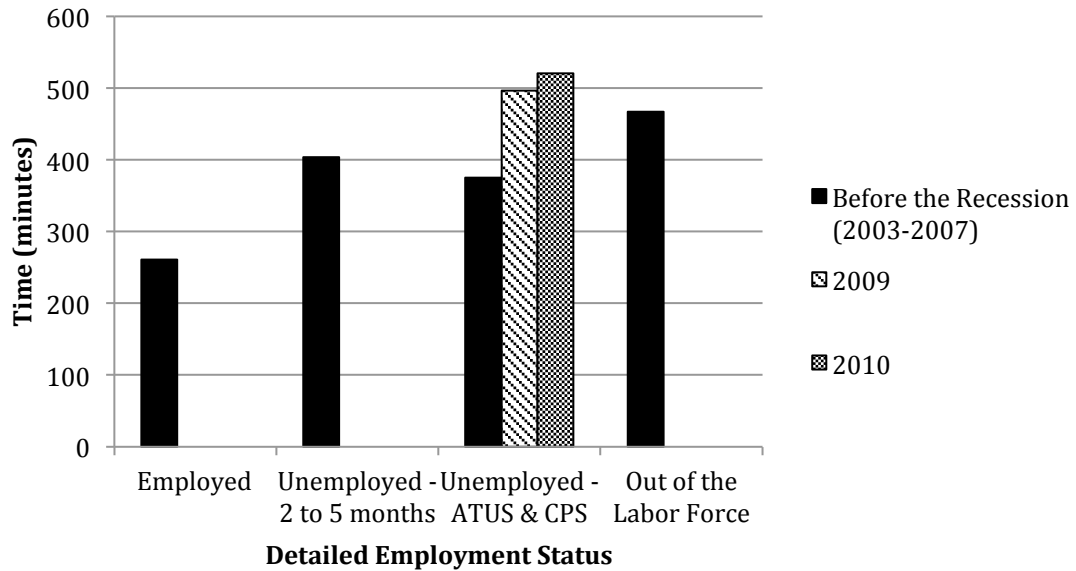
Table I-8 shows the Zero-Inflated Poisson regression model predicting the time and odds of spending time alone with spouses or partners on weekend days. Again, there are no statistically significant effects in the binary portion of the model predicting time

Table I-7. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Adults Spent with a Spouse/Partner, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.81	-0.21		0.27	49.47	0.10	**	0.04
Unemployed - at ATUS & CPS	0.65	-0.43		0.22	34.93	0.05		0.03
Out of the Labor Force	0.85	-0.16		0.10	37.22	0.07	***	0.01
State Economic Conditions								
Unemployment Rate	1.02	0.02		0.02	-4.48	-0.01	*	0.00
Time Period								
2003-2007 (ref.)								
2008	0.97	-0.03		0.10	4.92	0.01		0.02
2009	0.90	-0.10		0.15	30.81	0.06	**	0.02
2010	1.01	0.01		0.14	30.35	0.07	**	0.02
Socio-Demographic Characteristics								
Female	1.00	0.00		0.07	-28.17	-0.07	***	0.01
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	0.78	-0.25	**	0.09	-45.27	-0.13	***	0.01
Older than 45 without Children	0.92	-0.09		0.12	-37.22	-0.09	***	0.02
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	1.10	0.10		0.13	-36.72	-0.08	***	0.02
Spouse/Partner FTE	1.13	0.12		0.09	-25.29	-0.05	***	0.01
No Spouse or Partner								
Education								
College Degree or More (ref.)								
Some College or Associates	1.25	0.22	**	0.08	-22.77	-0.04	**	0.01
High School Diploma or Less	1.41	0.34	***	0.08	-26.80	-0.04	**	0.01
Living with Extended Family Members	1.58	0.46	***	0.12	-22.21	-0.01		0.02
Constant		-2.77	***	0.20		6.34	***	0.03

Notes: N=21,571. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.
[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.

spent alone with spouses or partners on weekend days. In the count portion of the model we see that both the detailed employment status and the historical time period when respondents were interviewed are significant predictors of time spent alone with spouses or partners on weekend days. The long-term unemployed spend 29 more minutes alone

Table I-8. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Adults Spent Alone with a Spouse/Partner, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.81	-0.21		0.15	30.61	0.09		0.07
Unemployed - at ATUS & CPS	0.90	-0.10		0.12	29.03	0.11	*	0.05
Out of the Labor Force	0.97	-0.03		0.05	15.20	0.06	*	0.03
State Economic Conditions								
Unemployment Rate	1.00	0.00		0.01	0.17	0.00		0.01
Time Period								
2003-2007 (ref.)								
2008	0.93	-0.07		0.06	4.75	0.01		0.03
2009	1.02	0.02		0.08	4.89	0.03		0.04
2010	1.08	0.07		0.08	13.58	0.07	*	0.04
Socio-Demographic Characteristics								
Female	0.99	-0.01		0.04	-19.41	-0.09	***	0.02
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	4.14	1.42	***	0.08	-216.67	-0.81	***	0.02
Older than 45 without Children	1.01	0.01		0.10	-21.93	-0.07	**	0.02
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	1.11	0.11		0.07	-23.36	-0.08	**	0.03
Spouse/Partner FTE	0.98	-0.02		0.05	-0.96	-0.01		0.02
No Spouse or Partner								
Education								
College Degree or More (ref.)								
Some College or Associates	1.23	0.21	***	0.05	-2.53	0.03		0.02
High School Diploma or Less	1.46	0.38	***	0.05	-1.78	0.06	**	0.02
Living with Extended Family Members	1.36	0.31	***	0.08	-48.37	-0.16	***	0.04
Constant		-2.42	***	0.13		5.92	***	0.05

Notes: N=21,571. *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.
[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.

with their spouse or partner on average than the employed while respondents interviewed in 2010 spend 14 more minutes on average alone with their spouse or partner compared to respondents interviewed before the recession. When comparing the models predicting time spent alone with spouses/partners on weekdays versus weekend days, the general

Table I-9. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Adults Spent with Extended Family, ATUS 2003-2010.

	Binary[1]				Count[2]		
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.96	-0.04		0.18	3.18	0.09		0.12
Unemployed - at ATUS & CPS	1.10	0.09		0.14	5.81	0.30	***	0.09
Out of the Labor Force	0.97	-0.03		0.07	4.87	0.16	**	0.05
State Economic Conditions								
Unemployment Rate	0.97	-0.03		0.02	0.50	-0.01		0.01
Time Period								
2003-2007 (ref.)								
2008	0.97	-0.03		0.08	-0.54	-0.05		0.06
2009	0.86	-0.15		0.10	3.08	-0.02		0.08
2010	0.86	-0.16		0.11	5.62	0.07		0.08
Socio-Demographic Characteristics								
Female	0.67	-0.39	***	0.05	12.93	0.16	***	0.04
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	1.08	0.08		0.06	-7.05	-0.15	***	0.04
Older than 45 without Children	1.94	0.66	***	0.08	-19.66	-0.18	**	0.06
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	0.60	-0.52	***	0.12	11.03	0.03		0.09
Spouse/Partner FTE	0.72	-0.33	***	0.09	5.62	-0.01		0.06
No Spouse or Partner	0.45	-0.80	***	0.09	15.43	-0.07		0.07
Education								
College Degree or More (ref.)								
Some College or Associates	1.01	0.01		0.06	-2.86	-0.10	*	0.04
High School Diploma or Less	1.16	0.15	*	0.06	-3.13	0.01		0.05
Living with Extended Family Members	0.15	-1.87	***	0.06	45.87	0.14	**	0.04
Constant		3.02	***	0.15		5.45	***	0.11

Notes: N=33,568 . *p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.
[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.

patterns are similar. The main differences are the lack of statistical significance for the long-term unemployed in the binary portion of the model and the statistical significance of being interviewed in 2010. Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions,

Table I-10. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Adults Spent with All Extended Family Members, ATUS 2003-2010.

	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Economic Climate								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.76	-0.27	*	0.11	32.79	0.08		0.05
Unemployed - at ATUS & CPS	0.98	-0.02		0.09	27.16	0.18	***	0.04
Out of the Labor Force	1.03	0.03		0.04	10.65	0.09	***	0.02
State Economic Conditions								
Unemployment Rate	0.99	-0.01		0.01	-0.37	-0.01		0.01
Time Period								
2003-2007 (ref.)								
2008	0.97	-0.03		0.05	3.54	0.01		0.03
2009	0.94	-0.07		0.06	12.26	0.05		0.04
2010	1.05	0.05		0.07	1.99	0.04		0.04
Socio-Demographic Characteristics								
Female	0.65	-0.43	***	0.03	40.95	0.06	**	0.02
Life Stage								
45 or Younger without Children (ref.)								
Parent of Child under 18	0.94	-0.06		0.04	-15.22	-0.15	***	0.02
Older than 45 without Children	0.91	-0.10	*	0.05	7.28	0.00		0.03
Marital or Partner Status/Spouse's Employment Status								
Spouse/Partner Not Employed (ref.)								
Spouse/Partner PTE	0.86	-0.15	*	0.07	0.40	-0.08		0.04
Spouse/Partner FTE	1.02	0.02		0.05	-9.83	-0.06	*	0.03
No Spouse or Partner	1.13	0.13	*	0.05	-18.11	-0.06	*	0.03
Education								
College Degree or More (ref.)								
Some College or Associates	0.87	-0.14	***	0.04	2.71	-0.06	**	0.02
High School Diploma or Less	0.82	-0.20	***	0.04	17.32	0.01		0.02
Living with Extended Family Members	0.18	-1.72	***	0.05	152.59	0.14	***	0.02
Constant		1.07	***	0.09		5.78	***	0.05

Notes: N=33,568.*p<.05. **p<.01. ***p<.001. Additional controls included in the model are race, immigrant status, 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. Part-time employed is abbreviated to PTE. Full-time employed is abbreviated to FTE.
[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.

and being interviewed during the recessionary time period for time spent alone with spouses or partners on weekend days were not informative and are therefore not included.

Table I-9 shows the Zero-Inflated Poisson regression models predicting the time and odds of spending time with parents on weekend days. None of the employment

uncertainty measures are statistically significant in the binary portion of the model and few of the employment uncertainty measures are statistically significant predictors of the time adults spend with their parents. Those unemployed at the ATUS and CPS spend 5 more minutes on average with their parent(s) on weekend days than the employed. In comparison, the models predicting time spent with parents on weekdays found statistically significant relationships between state economic conditions as captured by the unemployment rate (for the binary portion of the model) and being interviewed in 2009 (for the count portion of the model). Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during the recessionary time period for time spent with parents on weekend days were not informative and are therefore not included.

Table I-10 shows the predicted amount of time and odds of spending time with all extended family members on weekend days. In the binary portion of the model we see that the recently unemployed have 24% lower odds of spending no time with extended family. In the count portion of the model we see that the long-term unemployed spend 27 minutes more with extended family members than do the employed (on weekend days) while the unemployment rate or historical time period (when interviewed) are not statistically significant predictors. When compared to the model predicting time spent with extended family members on weekdays, the weekend model has fewer statistically significant coefficients including the long-term unemployed, those living in states with higher unemployment rates, and being interviewed in 2010 in the binary portion of the model and the recently unemployed in the count portion of the model. Interaction models testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during the recessionary time period for time spent with extended family on weekend days were not informative and are therefore not included.

Moderating Influence of Socio-Demographic Characteristics

Socio-demographic characteristics were expected to moderate the relationships between employment uncertainty and time spent with family members. Figures I-2 through I-5 illustrate the moderating effect of gender and spouses'/partners' employment status for the relationships between employment uncertainty and time spent with family members. Figure I-2 shows the moderating effects of gender, being unemployed, and being interviewed during the historical time period marked by a recession for time spent with children under 18 on weekend days. Women who were recently unemployed in 2010 spent more than 10 hours with their children while men who were recently unemployed in 2010 spend just over 6 and a half hours with their children. This is only slightly larger than the employed men before the recession (6 hours and 24 minutes). Similarly, Figure I-3 shows the moderating effects of gender and historical time period (when interviewed) for time spent with children under 6 on weekend days. Here we see that both fathers and mothers interviewed in 2009 spend more time with children under 6 but that mothers spend more time than fathers (8 hours and 42 minutes versus 8 hours and 7 minutes). These results are similar to those found for the weekday diaries. Women spend

Figure I-2. Moderating Effects of Gender, Being Unemployed, and Historical Time Period for Time Spent with Children Under 18 on Weekend Days
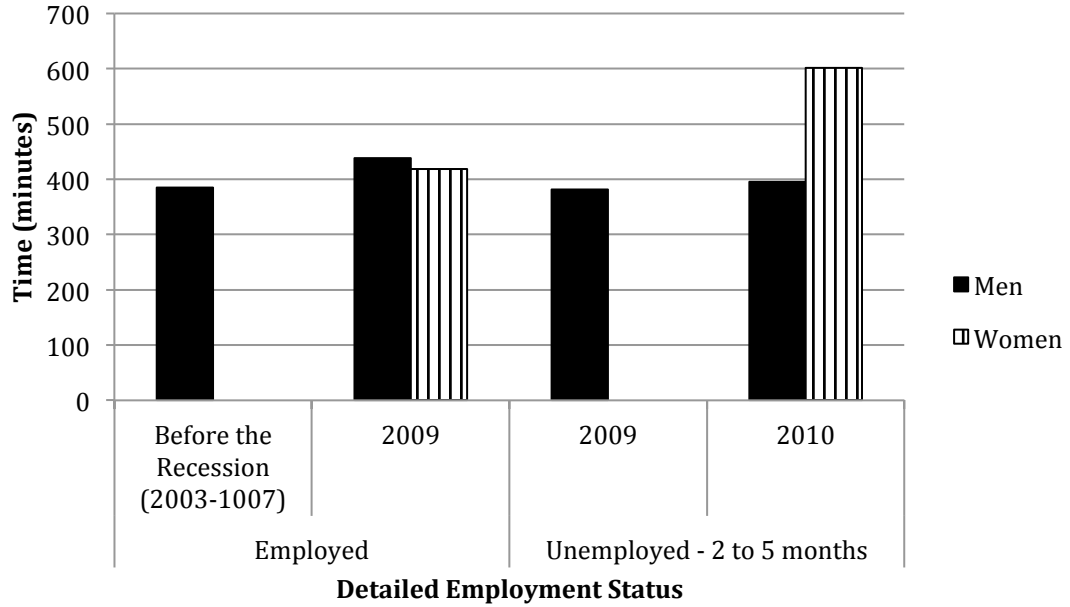
Figure I-3. Moderating Effects of Gender and Historical Time Period for Time Spent with Children Under 6 on Weekend Days
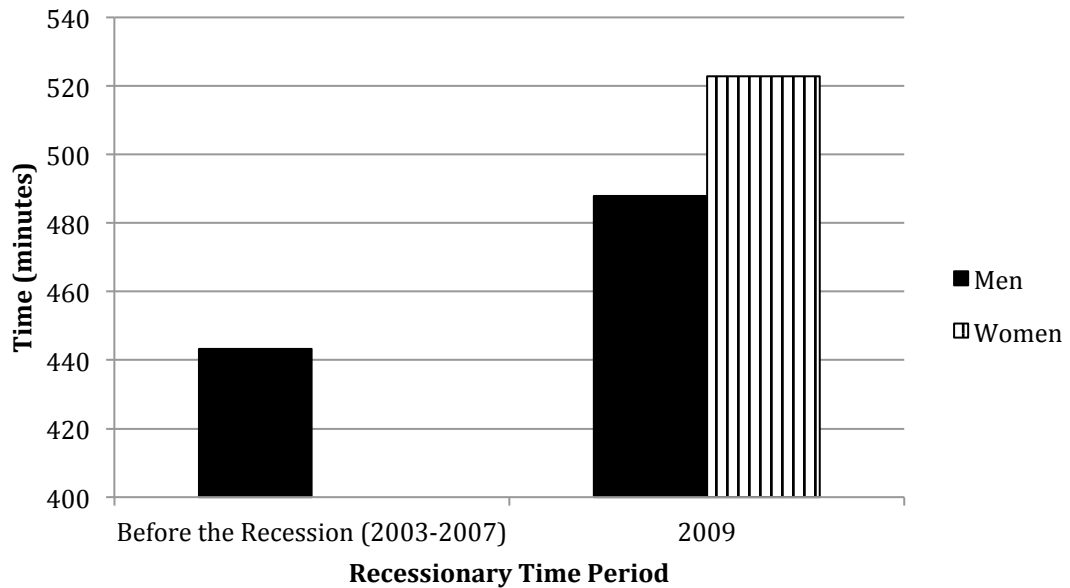
Figure I-4. Moderating Effects of Spouse/Partner Employment Status and Being Unemployed for Time Spent with Children under 18 on Weekends

more time with children when they are unemployed or if they are interviewed during the recession than do men.

Figure I-4 shows the moderating effects of spouses' or partners' employment status and being unemployed for time spent with children on weekends. This figure shows that the long-term unemployed – both those with full-time employed spouses/partners or those who are single spend about 8 hours and 15 minutes with their children. In contrast, employed respondents whose spouses/partners are not working spend 7 hours and 11 minutes with their children on weekend days. A statistically significant relationship between spouses' or partners' employment status and being unemployed for time spent with children on weekdays was not found.

Figure I-5 shows the moderating effects of spouses' or partners' employment status, being unemployed, and the year when the respondent was interviewed on the time adults spend alone with their spouses/partners. This figure shows that the unemployed (either recently or longer-term) interviewed in 2008 who have an employed spouse spent more time alone with their spouses/partners. In contrast, the recently unemployed in 2009 the whose spouses/partners were not working spent more time alone with their spouse or partner. Such findings may demonstrate the role of the time period during which the interview took place for shaping the experience of being unemployed. That is, the unemployed whose spouses/partners who are not employed may be able to allocate their extra time together during peak years of the recession, whereas this may be less possible or, potentially, more stressful before the recession has really taken hold (in 2008).

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Figure I-5. Moderating Effects of Spouses'/Partners' Employment Status, Being Unemployed, and Historical Time Period for Time Spent Alone with Spouses/Partners on Weekend Days
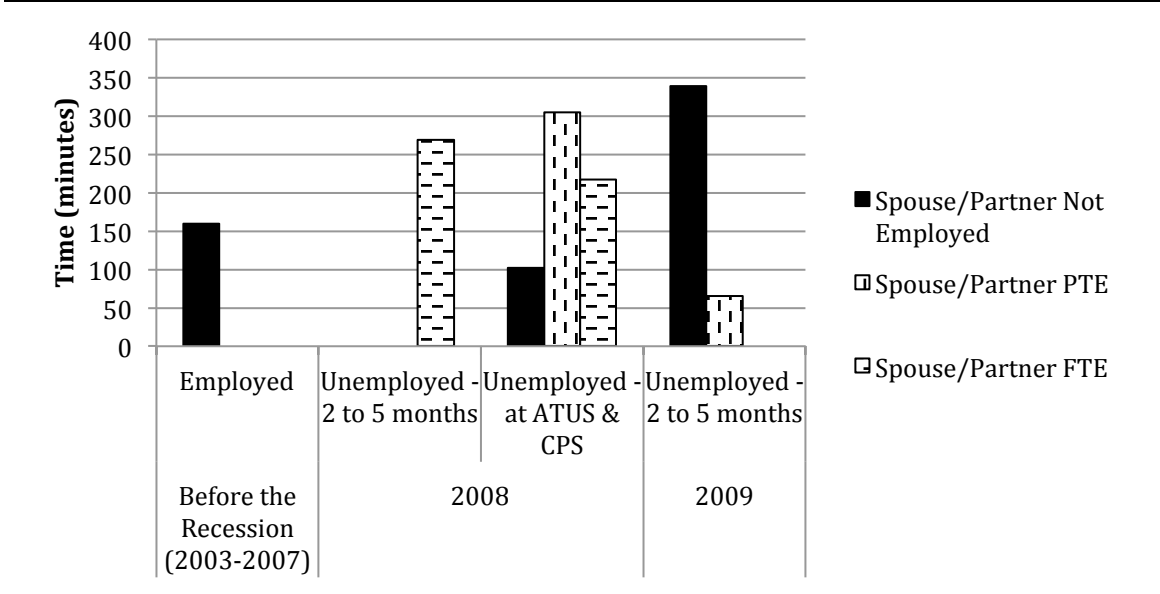
In general, weekend and weekday diaries are more similar than different. I find that being unemployed reduces the odds of spending no time with children and extended family members and increases the time spent with children, spouses/partners, and extended family members on weekends. During weekend days, poor state economic conditions (as captured by the unemployment rate) is related to less time spent with children under 6 but is not related to other outcomes. In addition, being interviewed during the recessionary years is related to spending more time with children under 18 and spouses/partners (regardless of who else may be present). The primary differences between the models predicting time spent on weekdays versus weekends are the more consistent importance of state economic conditions and historical period during which the interview took place for the weekday models as well as the reverse role of the historical time period for time spent with extended family members. The state economic conditions were statistically significant in the models predicting time spent with parents and extended family members and the historical time period when the interview took place was statistically significant in the models predicting time spent with children under 18, parents, and extended family members on weekdays. In addition, being interviewed in 2009 or 2010 was negatively related to odds of spending time with all extended family members and the time spent with parents on weekdays. This finding in particular raises questions about the role of extended family interactions on weekdays versus weekends and illustrates the possibility that extended family relationships may have maintained their presence on weekend days but that time with extended family may have been reduced on weekdays either to save time or money or both.

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Table I-11. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Days) Parents Spent with Children Under 6, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Economic Climate				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 months	-2.69	2.00	0.16	0.14
Unemployed - at ATUS & CPS	2.27	1.26	0.10	0.10
Out of Labor Force	0.42	0.77	0.18 ***	0.05
State Economic Conditions				
Unemployment Rate	0.09	0.07	-0.01	0.01
Time Period				
2003-2007 (ref.)				
2008	0.47	1.01	-0.07	0.08
2009	0.34	1.04	0.07	0.08
2010	-1.32	1.41	-0.15	0.08
Social Context				
Female	-1.62 ***	0.16	0.09 ***	0.01
Life Stage				
45 or Younger without Children (ref.)				
Parent of Child under 18	-0.13	0.20	0.00	0.02
Older than 45 without Children	0.16	0.15	0.00	0.02
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed (ref.)				
Spouse/Partner Employed Part-Time				
Spouse/Partner Employed Full-Time	0.55 ***	0.15	-0.05 ***	0.01
No Spouse or Partner	0.57 ***	0.15	-0.06 ***	0.01
Education				
College Degree or More (ref.)				
Some College or Associates				
High School Diploma or Less	0.33	0.19	-0.03	0.02
Living with Extended Family	-0.12	0.21	0.03	0.02
Interactions				
*Unemployed - 2 to 5 months*Unemployment Rate*	0.43	0.34	0.00	0.02
*Unemployed - at ATUS & CPS*Unemployment Rate*	-0.59 *	0.25	0.01	0.02
*Out of Labor Force*Unemployment Rate*	-0.16	0.13	-0.01	0.01
*Unemployed - 2 to 5 months*2008*	-0.78	1.24	0.12	0.08
*Unemployed - 2 to 5 months*2009*	-3.10	1.65	-0.18	0.13
*Unemployed - 2 to 5 months*2010*	-36.20 ***	2.28	-0.09	0.18
*Unemployed - at ATUS & CPS*2008*	-32.54 ***	0.58	-0.01	0.09

Notes: N=9,393. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 I-11 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Days) Parents Spent with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
*Unemployed - at ATUS & CPS*2009*	3.76	**	1.28	-0.04		0.11
*Unemployed - at ATUS & CPS*2010*	-31.05	***	1.13	-0.08		0.13
*Out of Labor Force*2008*	-1.89		1.04	-0.04		0.04
*Out of Labor Force*2009*	0.47		0.78	-0.03		0.05
*Out of Labor Force*2010*	0.86		0.81	0.01		0.06
*2008*Unemployment Rate*	-0.09		0.18	0.02		0.01
*2009*Unemployment Rate*	-0.08		0.13	0.00		0.01
*2010*Unemployment Rate*	0.08		0.15	0.02	*	0.01
Constant	-3.25	***	0.43	6.21	***	0.04

Notes: N=9,393. * p<.05, ** p <.01, *** p<.001. Controls include living with an extended family member, race, immigrant status, region, metropolitan area, and season.
[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 I-12. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spent with Children Under 18, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Female	-0.99	**	0.38	0.07		0.06
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	-2.07		1.15	0.00		0.15
Unemployed - at ATUS & CPS	0.18		0.95	-0.09		0.19
Out of Labor Force	1.68	*	0.67	0.05		0.16
State Economic Conditions						
Unemployment Rate	-0.01		0.05	-0.01		0.01
Time Period						
2003-2007 (ref.)						
2008	0.08		0.58	0.00		0.10
2009	0.10		0.66	0.22	*	0.10
2010	0.45		0.63	0.03		0.11

Notes: N=20,880. * p<.05, ** p <.01, *** p<.001. 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 I-12 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spent with Children Under 18, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Interactions				
Unemployed - 2 to 5 Months*Female	2.02	1.55	0.35	0.26
Unemployed - at ATUS & CPS*Female	-0.21	1.44	0.19	0.22
Out of the Labor Force*Female	-2.43 **	0.87	0.13	0.17
Unemployment Rate*Female	0.09	0.07	-0.01	0.01
2008*Female	0.49	0.93	0.02	0.13
2009*Female	1.12	0.98	-0.29 *	0.13
2010*Female	-0.92	0.94	-0.09	0.14
Unemployed - 2 to 5 Months*Unemployment Rate	0.11	0.19	0.05	0.03
Unemployed - at ATUS & CPS*Unemployment Rate	-0.07	0.17	0.04	0.03
Out of the Labor Force*Unemployment Rate	-0.23 *	0.12	-0.01	0.03
Unemployed - 2 to 5 Months*2008	-0.59	1.20	-0.10	0.14
Unemployed - 2 to 5 Months*2009	1.53	1.08	-0.41 **	0.14
Unemployed - 2 to 5 Months*2010	1.35	1.05	-0.31 *	0.14
Unemployed - at ATUS & CPS*2008	0.00	0.00	0.00	0.00
Unemployed - at ATUS & CPS*2009	-1.11	1.16	0.18	0.15
Unemployed - at ATUS & CPS*2010	1.03	1.06	-0.22	0.19
Out of the Labor Force*2008	1.29	1.11	-0.24	0.20
Out of the Labor Force*2009	0.00	0.00	0.00	0.00
Out of the Labor Force*2010	0.32	0.47	0.04	0.13
2008*Unemployment Rate	-0.01	0.10	0.00	0.02
2009*Unemployment Rate	-0.01	0.08	-0.01	0.01
2010*Unemployment Rate	-0.06	0.08	0.00	0.01
Unemployed - 2 to 5 Months*Unemployment Rate*Female	-0.12	0.26	-0.10 *	0.05
Unemployed - at ATUS & CPS*Unemployment Rate*Female	-0.03	0.26	-0.03	0.04
Out of the Labor Force*Unemployment Rate*Female	0.20	0.15	0.01	0.03
Unemployed - 2 to 5 Months*2008*Female	-0.23	1.65	0.33	0.17
Unemployed - 2 to 5 Months*2009*Female	-2.73	1.60	0.30	0.27
Unemployed - 2 to 5 Months*2010*Female	-1.81	1.52	0.55 *	0.25
Unemployed - at ATUS & CPS*2008*Female	0.18	1.58	-0.18	0.18
Unemployed - at ATUS & CPS*2009*Female	-1.09	1.52	0.19	0.22
Unemployed - at ATUS & CPS*2010*Female	0.23	1.48	0.24	0.22
Out of the Labor Force*2008*Female	-0.02	0.60	-0.02	0.13
Out of the Labor Force*2009*Female	-0.09	0.78	0.06	0.16
Out of the Labor Force*2010*Female	-0.75	0.84	-0.16	0.16

Notes: N=20,880. * p<.05, ** p <.01, *** p<.001. 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 I-12 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spent with Children Under 18, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
2008*Unemployment Rate*Female	-0.11		0.16	-0.01		0.02
2009*Unemployment Rate*Female	-0.16		0.12	0.03		0.02
2010*Unemployment Rate*Female	0.07		0.11	0.01		0.02
Constant	-1.89	***	0.27	6.12	***	0.05

Notes: N=20,880. * p<.05, ** p <.01, *** p<.001. 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 I-13. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spent with Children Under 6, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
Female	-1.17		0.60	0.06		0.04
Economic Climate						
Detailed Employment Status						
Employed (ref.)						
Unemployed - 2 to 5 months	-1.18	*	0.54	0.14	**	0.05
Unemployed - at ATUS & CPS	-0.10		0.41	0.12	*	0.06
Out of Labor Force	0.46		0.29	0.16	***	0.04
State Economic Conditions						
Unemployment Rate	-0.01		0.06	0.00		0.01
Time Period						
2003-2007 (ref.)						
2008	-0.21		0.23	0.03		0.03
2009	0.01		0.33	0.10	**	0.04
2010	-0.36		0.35	0.03		0.04
Interactions						
Unemployed - 2 to 5 Months*Female	1.74	*	0.71	-0.04		0.07
Unemployed - at ATUS & CPS*Female	-0.31		0.60	0.00		0.07
Out of the Labor Force*Female	-1.72	***	0.40	-0.03		0.05
Unemployment Rate*Female	0.02		0.12	0.01		0.01
2008*Female	0.41		0.40	0.00		0.04
2009*Female	-0.07		0.63	-0.12	*	0.05
2010*Female	0.63		0.61	-0.05		0.05
Constant	-2.28	***	0.31	6.15	***	0.04

Notes: N=9,688. * p<.05, ** p <.01, *** p<.001. 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 I-14. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spend with Children Under 18, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed (ref.)				
Spouse/Partner PTE	0.70	0.57	-0.03	0.07
Spouse/Partner FTE	0.27	0.37	0.06	0.05
No Spouse or Partner	1.38 ***	0.38	-0.08	0.07
Economic Climate				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 months	-0.91	0.84	0.06	0.07
Unemployed - at ATUS & CPS	-0.82	0.54	0.02	0.07
Out of Labor Force	0.20	0.26	0.05	0.04
State Economic Conditions				
Unemployment Rate	0.04	0.06	0.00	0.01
Time Period				
2003-2007 (ref.)				
2008	0.10	0.23	0.00	0.04
2009	-0.11	0.37	0.04	0.04
2010	-0.45	0.35	0.00	0.05
Interactions				
Unemployed - 2 to 5 Months*Spouse/Partner PTE	-30.61 ***	0.88	0.13	0.11
Unemployed - at ATUS & CPS*Spouse/Partner PTE	0.74	0.97	0.09	0.11
Out of the Labor Force*Spouse/Partner PTE	0.14	0.42	0.04	0.07
Unemployed - 2 to 5 Months*Spouse/Partner FTE	0.83	0.97	0.05	0.08
Unemployed - at ATUS & CPS*Spouse/Partner FTE	0.92	0.63	0.15 *	0.07
Out of the Labor Force*Spouse/Partner FTE	-1.35 ***	0.30	0.14 **	0.04
Unemployed - 2 to 5 Months*No Spouse or Partner	0.23	0.90	0.18 *	0.09
Unemployed - at ATUS & CPS*No Spouse or Partner	-0.19	0.59	0.21 *	0.09
Out of the Labor Force*No Spouse or Partner	-0.61 *	0.30	0.12 *	0.05
Unemployment Rate*Spouse/Partner PTE	-0.11	0.107	0.00	0.01
Unemployment Rate*Spouse/Partner FTE	-0.05	0.069	-0.01	0.01
Unemployment Rate*No Spouse or Partner	-0.04	0.07	0.00	0.01
2008*Spouse/Partner PTE	-0.79	0.43	0.02	0.05
2009*Spouse/Partner PTE	0.12	0.59	0.08	0.07
2010*Spouse/Partner PTE	0.48	0.62	0.05	0.08
2008*Spouse/Partner FTE	-0.02	0.27	0.00	0.04

Notes: N=20,358. * p<.05, ** p <.01, *** p<.001. 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 I-14 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Parents Spend with Children Under 18, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
2009*Spouse/Partner FTE	0.14	0.42	0.02	0.05
2010*Spouse/Partner FTE	0.62	0.42	0.07	0.05
2008*No Spouse or Partner	-0.19	0.30	0.03	0.05
2009*No Spouse or Partner	0.19	0.43	-0.04	0.07
2010*No Spouse or Partner	0.56	0.42	0.07	0.07
Constant	-2.63 ***	0.31	6.14 ***	0.04

Notes: N=20,358. * p<.05, ** p <.01, *** p<.001. 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 I-15. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Spent Alone with a Spouse or Partner, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed (ref.)				
Spouse/Partner PTE	0.53	0.41	-0.04	0.21
Spouse/Partner FTE	-0.17	0.28	-0.06	0.15
Economic Climate				
Detailed Employment Status				
Employed (ref.)				
Unemployed - 2 to 5 months	-1.05	1.28	-0.17	0.30
Unemployed - at ATUS & CPS	-1.15	0.87	-0.58	0.35
Out of Labor Force	-0.46	0.49	0.05	0.26
State Economic Conditions				
Unemployment Rate	0.05	0.05	-0.02	0.02
Time Period				
2003-2007 (ref.)				
2008	0.00	0.56	-0.14	0.37
2009	0.06	0.59	0.31	0.30
2010	0.09	0.56	0.14	0.30
Interactions				
*Unemployed - 2 to 5 Months*Spouse/Partner PTE*	4.33	2.87	-2.18 *	0.92
*Unemployed - at ATUS & CPS*Spouse/Partner PTE*	4.25	2.22	1.24	0.82
*Out of Labor Force*Spouse/Partner PTE*	-0.29	0.90	-0.10	0.49
*Unemployed - 2 to 5 Months*Spouse/Partner FTE*	1.57	1.51	0.37	0.45
*Unemployed - at ATUS & CPS*Spouse/Partner FTE*	2.26 *	1.03	0.33	0.45

Notes: N=21,706. * p<.05, ** p <.01, *** p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

1The 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.

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

Table I-15 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Spent Alone with a Spouse or Partner, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Out of Labor Force*Spouse/Partner FTE	0.43	0.54	-0.14	0.29
Unemployment Rate*Spouse/Partner PTE	-0.11	0.08	-0.01	0.04
Unemployment Rate*Spouse/Partner FTE	-0.02	0.05	0.02	0.03
2008*Spouse/Partner PTE	-1.37	0.94	-0.32	0.55
2009*Spouse/Partner PTE	-0.37	1.01	0.03	0.60
2010*Spouse/Partner PTE	1.18	1.04	-0.55	0.61
2008*Spouse/Partner FTE	0.00	0.65	-0.04	0.40
2009*Spouse/Partner FTE	0.24	0.68	-0.20	0.34
2010*Spouse/Partner FTE	0.26	0.66	-0.21	0.34
Unemployed - 2 to 5 Months*2008	-2.36 *	1.13	-0.44	0.28
Unemployed - 2 to 5 Months*2009	0.63	1.02	0.79 **	0.28
Unemployed - 2 to 5 Months*2010	-0.05	1.25	0.36	0.45
Unemployed - at ATUS & CPS*2008	-0.21	0.85	-0.60 *	0.28
Unemployed - at ATUS & CPS*2009	-1.15	0.86	-0.26	0.38
Unemployed - at ATUS & CPS*2010	-0.66	0.85	-0.28	0.38
Out of the Labor Force*2008	-0.25	0.41	0.10	0.20
Out of the Labor Force*2009	-0.05	0.48	-0.11	0.23
Out of the Labor Force*2010	0.38	0.53	-0.05	0.26
Unemployed - 2 to 5 Months*Unemployment Rate	0.14	0.22	0.01	0.05
Unemployed - at ATUS & CPS*Unemployment Rate	0.22	0.14	0.10	0.06
Out of the Labor Force*Unemployment Rate	0.05	0.09	0.03	0.05
2008*Unemployment Rate	-0.01	0.09	0.04	0.06
2009*Unemployment Rate	-0.04	0.07	-0.03	0.04

Notes: N=21,706. * p<.05, ** p <.01, *** p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

1The 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.

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

Table I-15 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Spent Alone with a Spouse or Partner, ATUS 2003-2010.

	Binary[1]			Count[2]		
	Coef.		SE	Coef.		SE
2010*Unemployment Rate	-0.04		0.07	0.00		0.04
Unemployed - 2 to 5 Months*Unemployment Rate*Spouse/Partner PTE	-0.61		0.50	0.41	**	0.15
Unemployed - at ATUS & CPS*Unemployment Rate*Spouse/Partner PTE	-0.83	*	0.39	-0.18		0.12
Out of the Labor Force*Unemployment Rate*Spouse/Partner PTE	0.11		0.16	0.05		0.09
Unemployed - 2 to 5 Months*Unemployment Rate*Spouse/Partner FTE	-0.26		0.27	-0.05		0.08
Unemployed - at ATUS & CPS*Unemployment Rate*Spouse/Partner FTE	-0.36	*	0.17	-0.06		0.08
Out of the Labor Force*Unemployment Rate*Spouse/Partner FTE	0.00		0.10	-0.04		0.05
Unemployed - 2 to 5 Months*2008*Spouse/Partner PTE	1.421		1.619	-0.084		0.441
Unemployed - 2 to 5 Months*2009*Spouse/Partner PTE	-32.1	***	1.833	-2.60	***	0.74
Unemployed - 2 to 5 Months*2010*Spouse/Partner PTE	3.21		2.17	-1.19		0.70
Unemployed - at ATUS & CPS*2008*Spouse/Partner PTE	-0.41		1.55	1.02	*	0.40
Unemployed - at ATUS & CPS*2009*Spouse/Partner PTE	4.07	*	1.96	0.69		0.63
Unemployed - at ATUS & CPS*2010*Spouse/Partner PTE	1.07		1.70	0.43		0.55
Out of the Labor Force*2008*Spouse/Partner PTE	0.81		0.80	0.11		0.33
Out of the Labor Force*2009*Spouse/Partner PTE	-0.15		0.91	-0.35		0.49
Out of the Labor Force*2010*Spouse/Partner PTE	-0.42		0.90	-0.50		0.49
Unemployed - 2 to 5 Months*2008*Spouse/Partner FTE	2.93	*	1.29	0.83	*	0.39
Unemployed - 2 to 5 Months*2009*Spouse/Partner FTE	-0.56		1.39	-0.80		0.46
Unemployed - 2 to 5 Months*2010*Spouse/Partner FTE	0.91		1.53	0.12		0.58
Unemployed - at ATUS & CPS*2008*Spouse/Partner FTE	0.32		0.95	0.78	*	0.36
Unemployed - at ATUS & CPS*2009*Spouse/Partner FTE	1.85		1.01	0.17		0.47
Unemployed - at ATUS & CPS*2010*Spouse/Partner FTE	0.55		1.01	0.22		0.49
Out of the Labor Force*2008*Spouse/Partner FTE	0.30		0.44	-0.10		0.23

Notes: N=21,706. * p<.05, ** p <.01, *** p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

1The 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.

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

Table I-15 cont. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekend Day) Spent Alone with a Spouse or Partner, ATUS 2003-2010.

	Binary[1]		Count[2]	
	Coef.	SE	Coef.	SE
Out of the Labor Force*2009*Spouse/Partner FTE	-0.15	0.54	0.34	0.26
Out of the Labor Force*2010*Spouse/Partner FTE	-0.69	0.59	0.03	0.30
2008*Unemployment Rate*Spouse/Partner PTE	0.26	0.16	0.02	0.09
2009*Unemployment Rate*Spouse/Partner PTE	0.10	0.12	0.02	0.07
2010*Unemployment Rate*Spouse/Partner PTE	-0.07	0.12	0.04	0.07
2008*Unemployment Rate*Spouse/Partner FTE	-0.02	0.11	0.00	0.07
2009*Unemployment Rate*Spouse/Partner FTE	0.00	0.08	0.02	0.04
2010*Unemployment Rate*Spouse/Partner FTE	0.00	0.08	0.01	0.04
Constant	-1.06 *** 0.25		5.60 *** 0.13	

Notes: N=21,706. * p<.05, ** p <.01, *** p<.001. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

1The 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.

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

Table I-16. Summary Table of Moderating Effects on Time Spent with Family Members on Weekend Days

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
Economic Climate						
Unemployed - 2 to 5 months*Unemployment Rate						
Unemployed - at ATUS & CPS*Unemployment Rate			+			
Out of Labor Force*Unemployment Rate						
Unemployed - 2 to 5 months*2008						
Unemployed - 2 to 5 months*2009						
Unemployed - 2 to 5 months*2010						
Unemployed - at ATUS & CPS*2008						
Unemployed - at ATUS & CPS*2009						
Unemployed - at ATUS & CPS*2010						
Out of Labor Force*2008						
Out of Labor Force*2009						
Out of Labor Force*2010						
2008*Unemployment Rate						
2009*Unemployment Rate						
2010*Unemployment Rate		+				
Gender						
Unemployed - 2 to 5 months*Female						
Unemployed - at ATUS & CPS*Female						
Out of the Labor Force*Female	+			-		
Unemployment Rate*Female						
2008*Female						
2009*Female		-				

Table I-16 cont. Summary Table of Moderating Effects on Time Spent with Family Members on Weekend Days

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
2010*Female						
Life Stage						
Unemployed - 2 to 5 months*Parent						
Unemployed - 2 to 5 months*Over 40 no Child						
Unemployed - at ATUS & CPS*Parent	-					
Unemployed - at ATUS & CPS*Over 40 no child						
Out of Labor Force*Parent	-	-				
Out of Labor Force*Over 40 no child	-					-
Unemployment Rate*Parent						
Unemployment Rate*Over 40 no child						
2008*Parent						
2008*Over 40 no child						
2009*Parent						
2009*Over 40 no child						
2010*Parent						
2010*Over 40 no child						
Gendered Life Stage						
Unemployment Rate * Father						
Unemployment Rate * Men over 40						
Unemployment Rate * Women Under 40						
Unemployment Rate * Mother						
Unemployment Rate * Women over 40						
2008 * Father						-

Table I-16 cont. Summary Table of Moderating Effects on Time Spent with Family Members on Weekend Days

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
2008 * Men over 40						-
2008 * Women Under 40						-
2008 * Mother						-
2008 * Women over 40			-			-
2009 * Father						
2009 * Men over 40						
2009 * Women Under 40	-					
2009 * Mother						
2009 * Women over 40						
2010 * Father						
2010 * Men over 40						
2010 * Women Under 40						
2010* Mother						
2010 * Women over 40						
Unemployed - 2 to 5 months * Father						
Unemployed - 2 to 5 months * Men over 40						
Unemployed - 2 to 5 months * Women Under 40						
Unemployed - 2 to 5 months * Mother	-					
Unemployed - 2 to 5 months * Women over 40						
Unemployed - at ATUS & CPS * Father						
Unemployed - at ATUS & CPS * Men over 40						+
Unemployed - at ATUS & CPS * Women Under 40						
Unemployed - at ATUS & CPS * Mother						

Table I-16 cont. Summary Table of Moderating Effects on Time Spent with Family Members on Weekend Days

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
Unemployed - at ATUS & CPS * Women over 40						
Out of Labor Force * Father				+		
Out of Labor Force * Men over 40						-
Out of Labor Force * Women Under 40						
Out of Labor Force * Mother						
Out of Labor Force * Women over 40						
Spouse's Employment Status						
Unemployed - 2 to 5 months*Single	+					
Unemployed - at ATUS & CPS*Single	+	+				
Out of Labor Force*Single	+				+	
Unemployed - 2 to 5 months*Partner FTE						
Unemployed - at ATUS & CPS*Partner FTE	+					
Out of Labor Force*Partner FTE	+			-		
Unemployed - 2 to 5 months*Partner PTE		+				
Unemployed - at ATUS & CPS*Partner PTE						
Out of Labor Force*Partner PTE					+	
Unemployment Rate*Single						
Unemployment Rate*Partner FTE						
Unemployment Rate*Partner PTE						
2008*Single						
2008*Partner FTE						
2008*Partner PTE						
2009*Single						

Table I-16 cont. Summary Table of Moderating Effects on Time Spent with Family Members on Weekend Days

	Children		Partner		Extended Family	
	Under 18	Under 6	All Time	Alone	Parent(s)	All
2009*Partner FTE						
2009*Partner PTE						
2010*Single						
2010*Partner FTE						
2010*Partner PTE						
Education						
Unemployment Rate*High School						
Unemployment Rate*Associate's						
2008*High School						
2008*Associate's					-	
2009*High School						
2009*Associate's						
2010*High School						
2010*Associate's						
Unemployed - 2 to 5 months*High School	+					
Unemployed - at ATUS & CPS*High School				-		
Out of the Labor Force*High School		+		+		
Unemployed - 2 to 5 months*Associate's						+
Unemployed - at ATUS & CPS*Associate's					+	
Out of the Labor Force*Associate's		+				

Appendix J. Figures Illustrating Time Spent with Family by Selected Characteristics

Figure J-1. Time Spent with Children by Age of Respondent

Figure J-2. Time Spent with Spouse/Partner by Age of Respondent
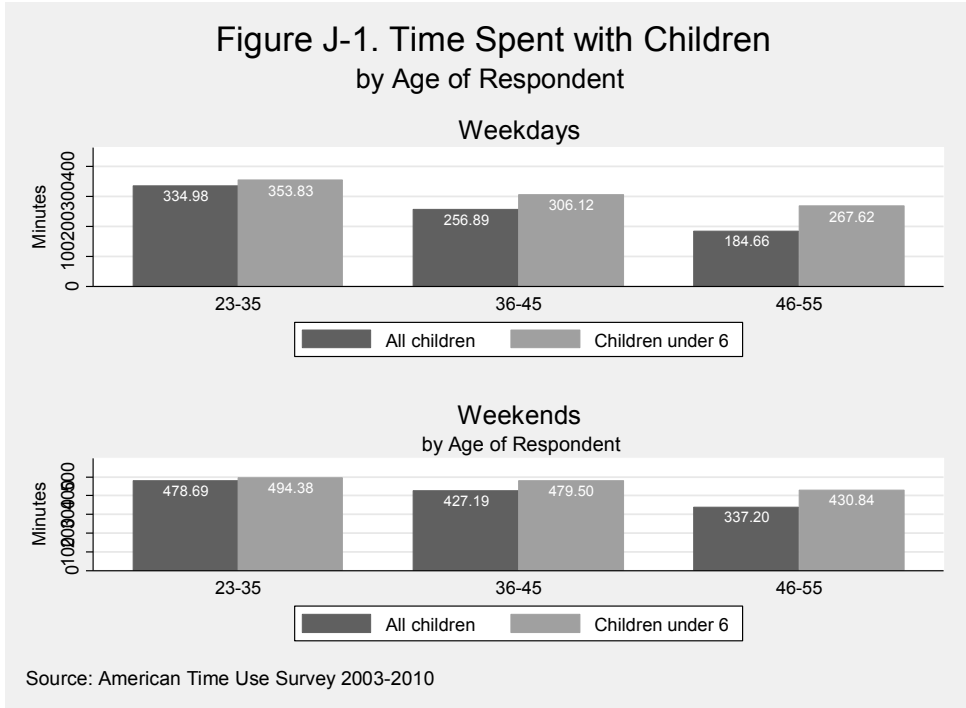
Figure J-3. Time Spent with Extended Family Members
by Age of Respondent

Weekdays

Weekends
by Age of Respondent
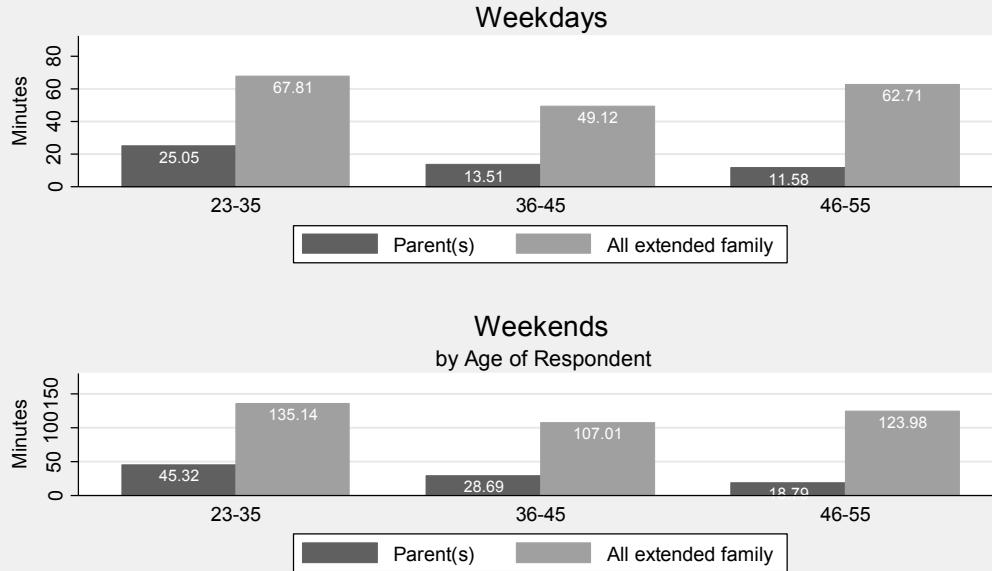
Source: American Time Use Survey 2003-2010

Figure J-4. Time Spent with Children
by Gender

Weekdays

Weekends
by Age of Respondent
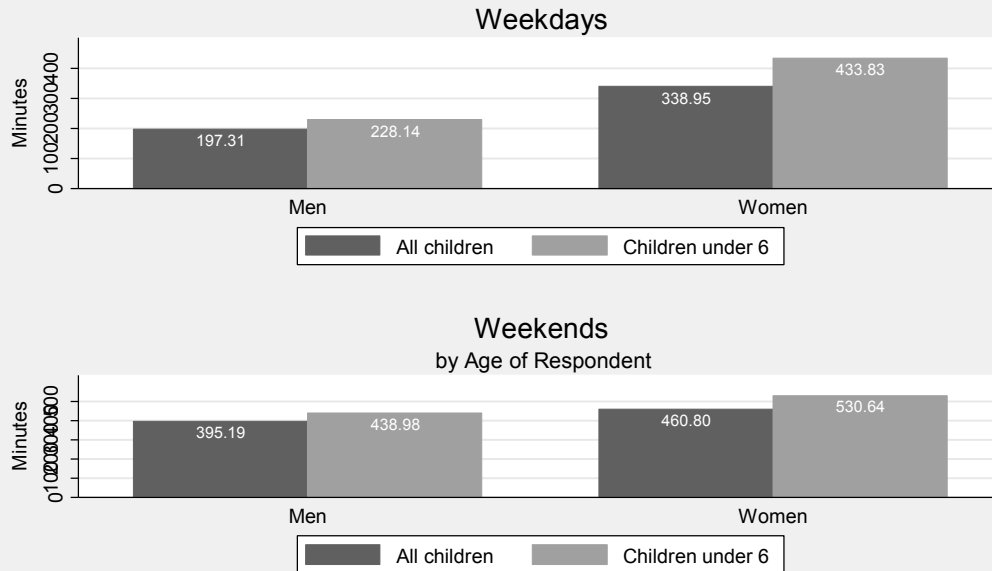
Source: American Time Use Survey 2003-2010

Figure J-5. Time Spent with Spouse/Partner
by Gender

Weekdays

Weekends
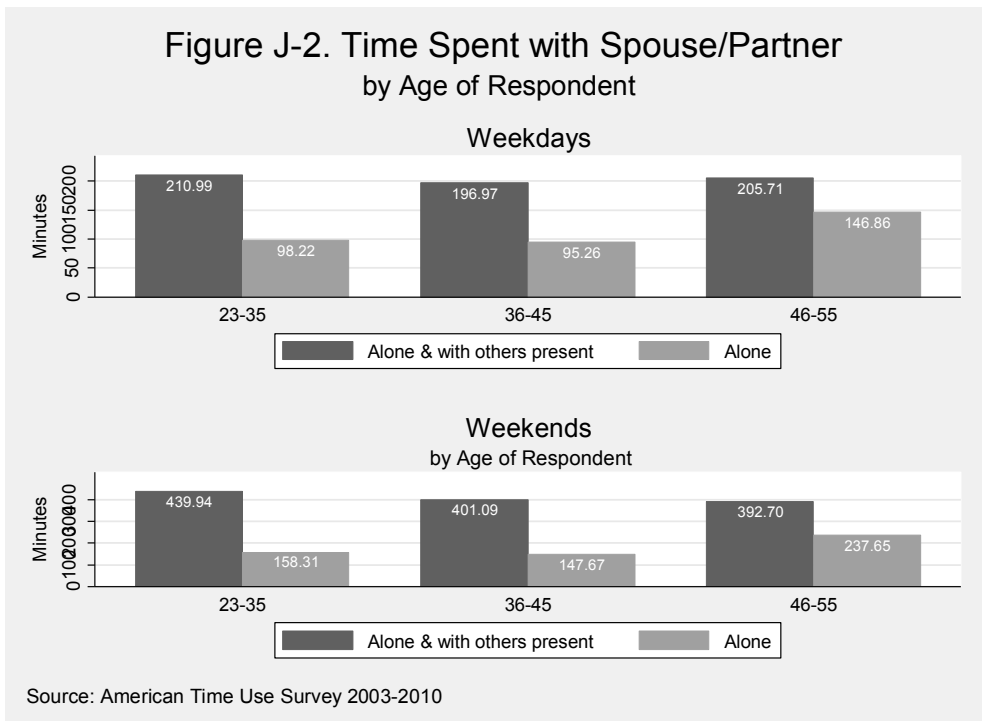### by Age of Respondent
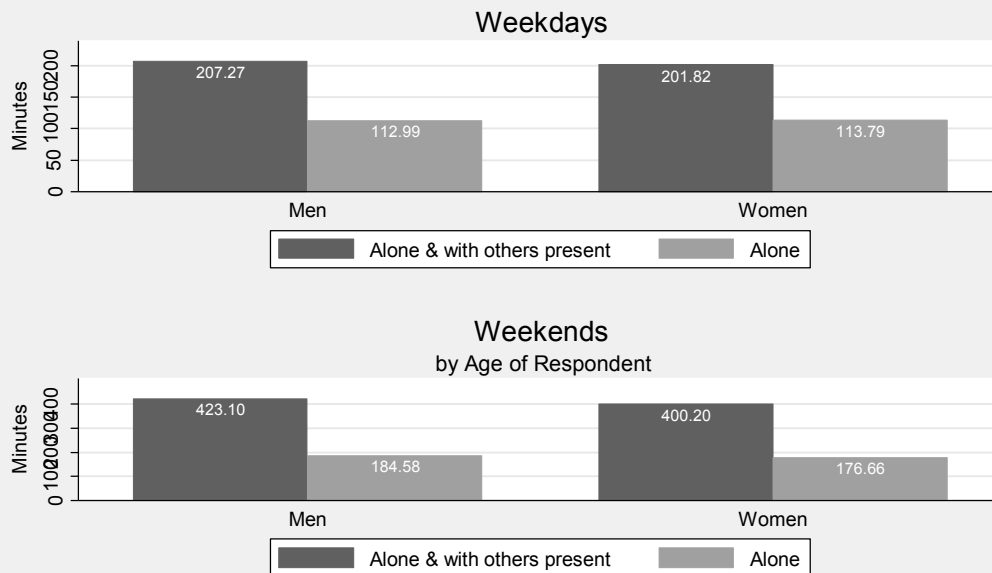
Source: American Time Use Survey 2003-2010

Figure J-6. Time Spent with Extended Family Members
by Gender

Weekdays

Weekends
by Age of Respondent
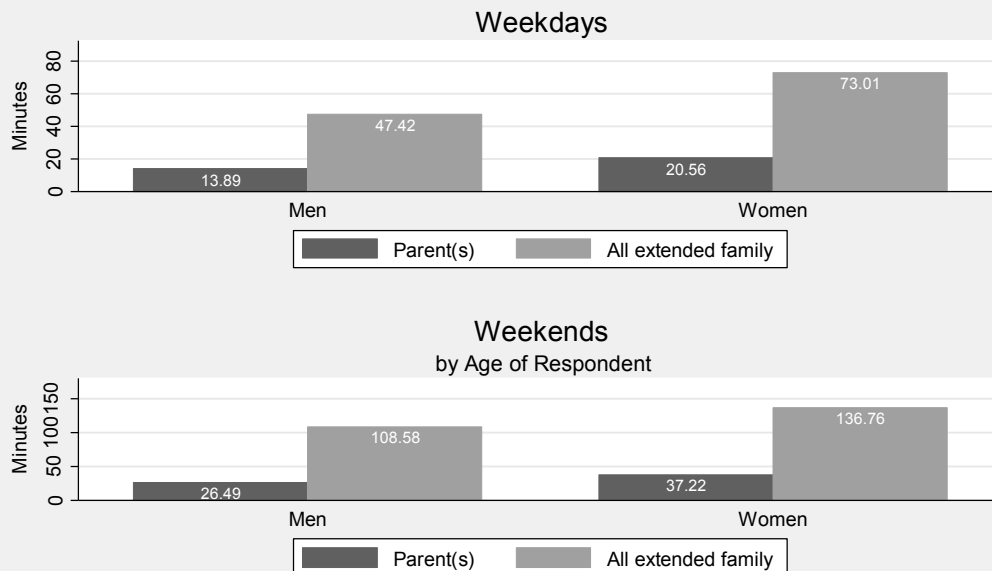
Source: American Time Use Survey 2003-2010

Figure J-7. Time Spent with Spouse/Partner
by Parental Status

Weekdays

	Respondents without Children	Respondents with Children
Alone & with others present	219.16	194.98
Alone	180.68	70.50

Legend: Alone & with others present | Alone

Weekends
by Age of Respondent

	Respondents without Children	Respondents with Children
Alone & with others present	423.59	403.94
Alone	308.35	100.58

Legend: Alone & with others present | Alone
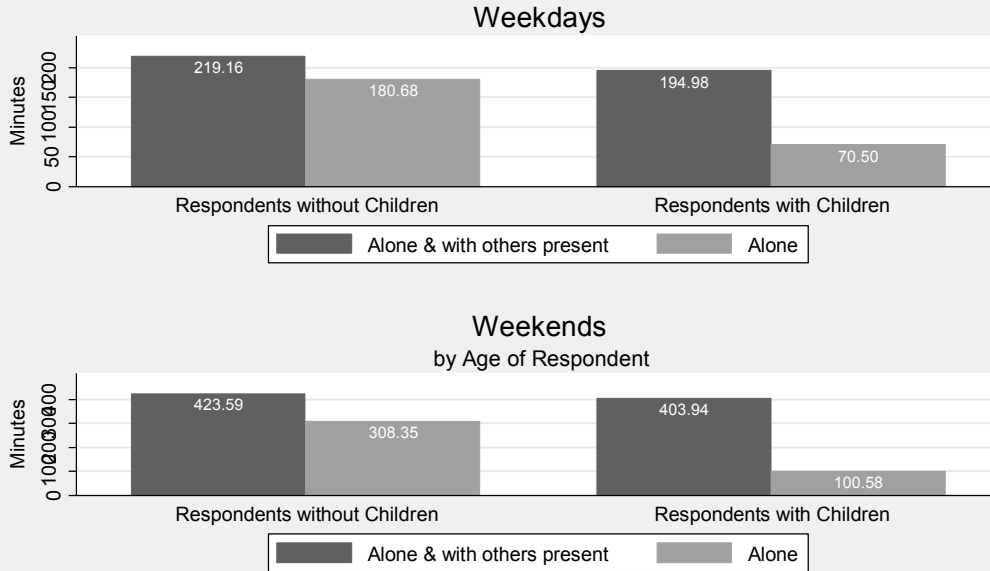
Source: American Time Use Survey 2003-2010

Figure J-8. Time Spent with Extended Family Members
by Parental Status

Weekdays

	Respondents without Children	Respondents with Children
Parent(s)	21.07	12.96
All extended family	70.10	50.03

Legend: Parent(s) | All extended family

Weekends
by Age of Respondent

	Respondents without Children	Respondents with Children
Parent(s)	37.93	25.53
All extended family	137.66	107.70

Legend: Parent(s) | All extended family

Source: American Time Use Survey 2003-2010

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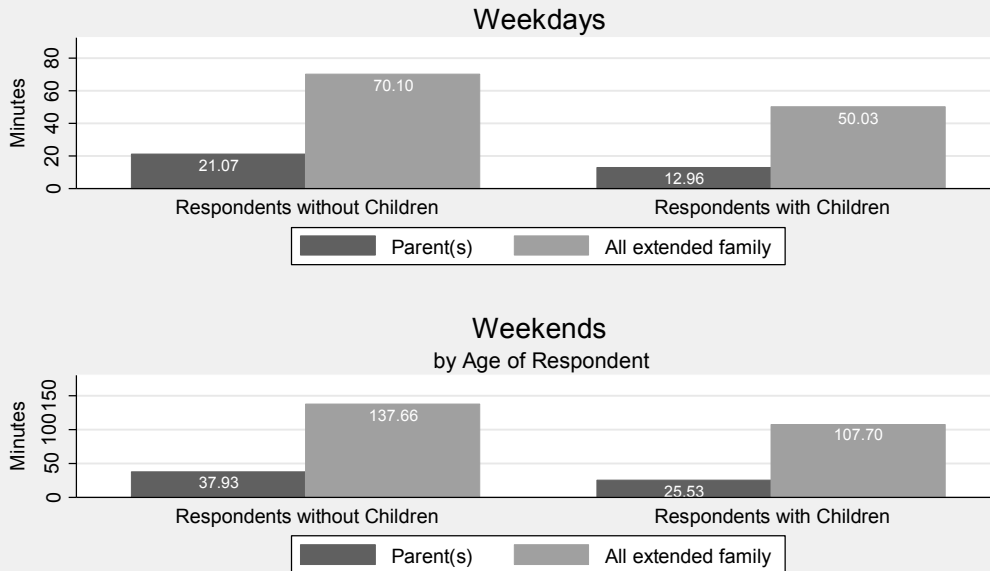
Figure J-9. Time Spent with Children
by Spouses' Employment Status

Weekdays

	Partner not employed	Partner employed part-time	Partner employed full-time	Single
All children	226.58	233.59	302.48	249.89
Children under 6	248.29	275.95	384.47	329.64

Weekends
by Age of Respondent

	Partner not employed	Partner employed part-time	Partner employed full-time	Single
All children	435.01	423.32	448.69	367.84
Children under 6	461.29	471.32	509.08	447.75
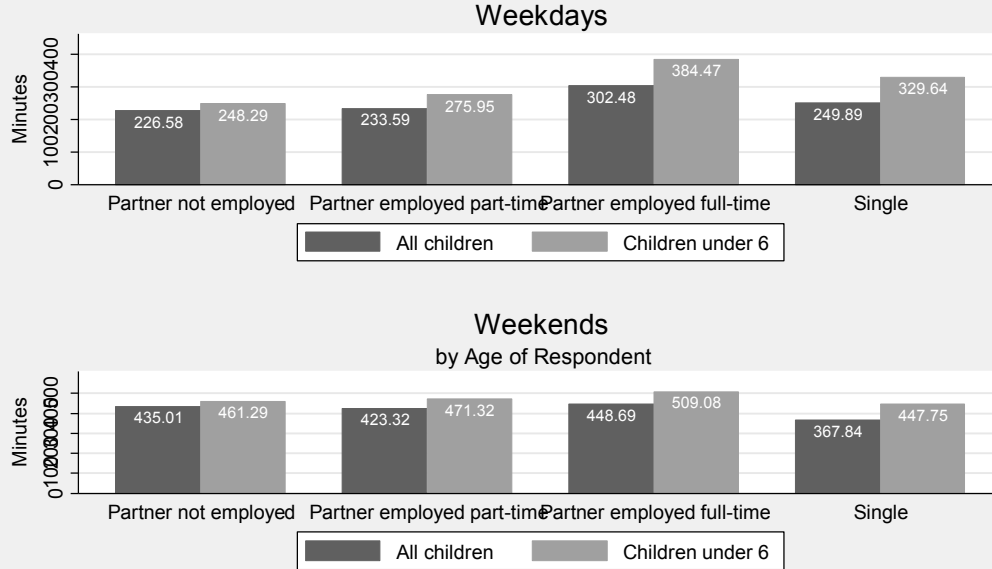
Source: American Time Use Survey 2003-2010

Figure J-10. Time Spent with Spouse/Partner
by Spouses' Employment Status

Weekdays

	Partner not employed	Partner employed part-time	Partner employed full-time	Single
Alone & with others present	250.26	208.55	189.96	
Alone	134.19	107.47	107.82	

Weekends
by Age of Respondent

	Partner not employed	Partner employed part-time	Partner employed full-time	Single
Alone & with others present	435.56	404.66	407.84	
Alone	176.41	157.83	186.74	

Source: American Time Use Survey 2003-2010

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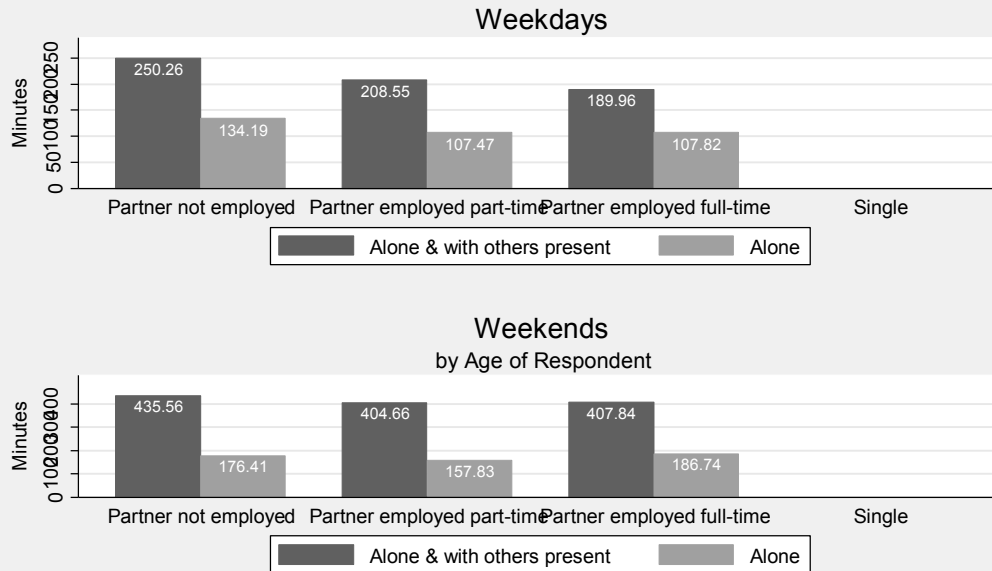
Figure J-11. Time Spent with Extended Family Members
by Spouses' Employment Status

Weekdays

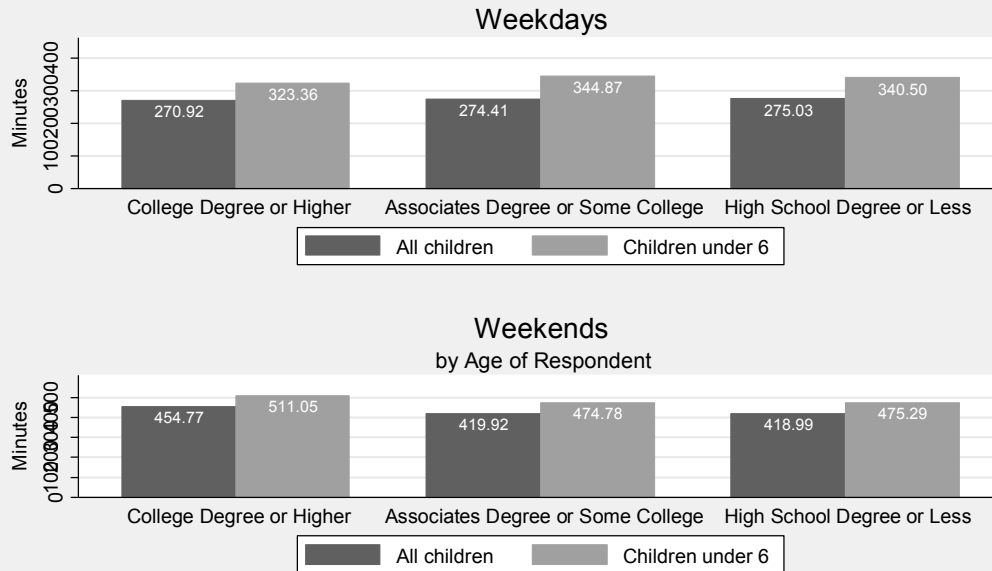|		
Partner not employed	Partner employed part-time	Partner employed full-time	Single

Parent(s): 6.65, 5.49, 11.18, 33.24
All extended family: 48.94, 40.11, 50.85, 82.49

Legend: Parent(s) | All extended family

Weekends
by Age of Respondent

Parent(s): 15.23, 23.14, 22.13, 54.86
All extended family: 114.90, 104.73, 110.75, 147.02

| Partner not employed | Partner employed part-time | Partner employed full-time | Single |

Legend: Parent(s) | All extended family

Source: American Time Use Survey 2003-2010

Figure J-12. Time Spent with Children
by Education of Respondent

Weekdays

All children: 270.92, 274.41, 275.03
Children under 6: 323.36, 344.87, 340.50

| College Degree or Higher | Associates Degree or Some College | High School Degree or Less |

Legend: All children | Children under 6

Weekends
by Age of Respondent

All children: 454.77, 419.92, 418.99
Children under 6: 511.05, 474.78, 475.29

| College Degree or Higher | Associates Degree or Some College | High School Degree or Less |

Legend: All children | Children under 6

Source: American Time Use Survey 2003-2010

Figure J-13. Time Spent with Spouse/Partner
by Education of Respondent

Weekdays

Weekends
by Age of Respondent
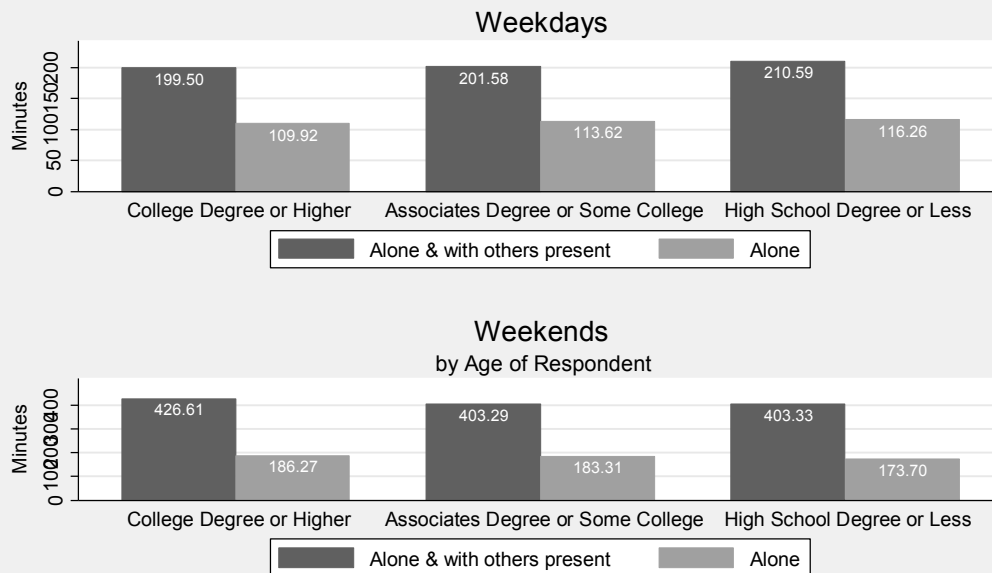
Source: American Time Use Survey 2003-2010

Figure J-14. Time Spent with Extended Family Members
by Education of Respondent

Weekdays

Weekends
by Age of Respondent

Source: American Time Use Survey 2003-2010

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