4-2016

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DOI: https://doi.org/10.1037/a0039896

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Published in ***Journal of Occupational Health Psychology***, 2016 April, 21 (2), 235-249.
http://dx.doi.org/10.1037/a0039896

Abstract: Recent management research has indicated the importance of family, sleep, and recreation as non-work activities of employees. Drawing from entrainment theory, we develop an expanded model of work-life conflict to contend that macro-level business cycles influence the amount of time employees spend on both work and non-work activities. Focusing solely on working adults, we test this model in a large nationally representative dataset from the Bureau of Labor Statistics that spans an 8-year period, which includes the "Great Recession" from 2007-2009. We find that during economic booms, employees work more, and therefore spend less time with family, sleeping, and recreating. In contrast, in recessionary economies, employees spend less time working, and therefore more time with family, sleeping, and recreating. Thus, we extend the theory on time-based work-to-family conflict, showing that there are potential personal and relational benefits for employees in recessionary economies.

Key words: business cycles, entrainment, work-life conflict, work-family conflict, sleep, recovery activites

During difficult economic conditions when job security is tenuous, employees are understandably unsettled at work. Mounting evidence indicates that what happens at work influences virtually all domains of employees' lives (Eby, Maher, & Butts, 2010; Ilies, Wilson, & Wagner, 2009) and, although attributable to many different mechanisms, one major factor in these relations is the way in which work influences employees' allocation of their time to various activities. Recent research has revealed that work and non-work activities compete for the scarce time of employees in what is often referred to as time-based conflict (Greenhaus & Beutell, 1985). A primary contention of this literature is that time spent working cannot be allocated to non-work activities, such as time with family, time spent recreating, or time spent sleeping (Barnes et al., 2012; Edwards & Rothbard, 2000). The fact that individual employees make choices in their time allocation between work and non-work activities (or what economists call the labor-leisure trade-off) is integral in this reasoning. Both individual factors (e.g., number of dependents) and organizational factors (e.g., flexible work practices) influence employees' time allocation choices (c.f. Eby et al., 2010; Kelly et al., 2008), and are thus proximal influencers of time-based conflict. However, both employees and organizations are nested within a greater macro-level factor – the economy – that can also exert an influence on workers' time allocation decisions. This sizable influence has largely been ignored in work-family research and investigating the impact of economic conditions on employees' time allocation promises insight and value to organizations and policy makers because human behavior is entrained to macro-level forces such as the state of the economy (c.f. Ancona & Chong, 1996).

Macroeconomic business cycles – periods of economic decline (recessions) followed by periods of sustained growth (expansions) – fundamentally influence employees' work and non-work behaviors. Macroeconomic business cycles influence a host of work, life, and family

outcomes such as workplace absenteeism (Shoss & Penney, 2012), criminal activity (Freeman, 1999; Mocan & Rees, 2005), violent behavior (Catalano, Novaco, & McConnell, 1997), marriage (Kondo, 2012; Schaller, 2013), and fertility (Macunovich, 1996; Sobotka, Skirbekk, & Philipov, 2011). Despite perceptions and data suggesting that recessions have adverse outcomes, there is some evidence that recessions may also have unexpected beneficial effects. For example, previous research has indicated that workplace injuries move procyclically with business cycles, a finding that may be explained by the fact that both work intensity and the share of inexperienced workers in the labor force decrease when the economy is weak (Asfaw, Pana-Cryan, & Rosa, 2011; Boden & Ruser, 2003; Hines, Hoynes, & Krueger, 2001). With regard to relational outcomes, recessions have been shown to lead to reduced divorce rates (Amato & Beattie, 2011; Hellerstein & Morrill, 2011). Finally, a few studies have provided empirical evidence supporting the idea that recessions may lead to positive education and health outcomes because the opportunity cost of attending school or engaging in health-related behaviors is lower in times of an economic downturn (Card & Lemieux, 2001; Ruhm, 2000).

Despite these studies that hint at some beneficial aspects to negative macroeconomic forces, work psychology research currently provides limited insight into how these business cycles influence employee choices in time allocation, and operates under the implicit assumption that such macroeconomic forces are inconsequential. In one of the few studies to consider such forces, Barnes and Wagner (2009) refuted this assumption, showing that the manner in which people allocate their time to sleep is in part driven by national policies linked to time (e.g., daylight saving time). Their findings attest to the prevalence of entrainment processes – the harmonic coupling of the pace and state of two or more activities within a system (Ancona & Chong, 1996; McGrath, Kelly, & Machatka, 1984).

In a similar vein, drawing on entrainment theory and building upon the notion of time-based tradeoffs related to work and other life domains, we contend that macroeconomic business cycles will influence the amount of time people spend on work and non-work activities. These arguments align with economic theories of labor adjustment (Varian, 2010), which propose that in weak economies a lower demand for products and services will drive organizations to utilize less human capital. Although the effects of such labor adjustments may be felt most acutely by those who are unemployed, we contend that business cycles will also influence the employed. Specifically, we posit that in recessionary economies, employed individuals will spend less time working, and as a result, more time on non-work activities such as time with family, time spent sleeping, and time spent recreating. In other words, recessionary economies yield a number of unexpected benefits for employees. By contrast, strong economies come at an expense. Namely, employees' scarce time resources are no longer available for activities that bolster their personal (e.g., sleep, recreation) and relational (e.g., family) well-being. In sum, these unexpected benefits, which have been largely overlooked in the management literature, shape employees' work and home lives in fundamental ways, and represent an avenue for organizations to more carefully craft their interventions targeted to help employee recovery and retention.

In addition to highlighting several interesting benefits of recessions, our study contributes to the literature in two other important ways. First, by examining the effects of macroeconomic business cycles on employees' work and non-work activities, we build a bridge between the micro and macro research domains and address calls for work-life conflict research that spans levels of analysis (Hammer, Kossek, Zimmerman, & Daniels, 2007; Kelly et al., 2008). By looking beyond past determinants of work-life conflict, we expand work-life theory to include factors that are outside of employees' control, but that have a substantial impact on the way in

which employees manage demands in various domains. The implication is that, contrary to popular opinion and in contrast to much of the extant research, employees' decisions about how to allocate their time to work and other life domains do not always rest entirely with them. Rather, entrainment theory suggests that these decisions are sometimes driven by macro-level forces over which employees have little control but that still influence their allocation of time resources. By adding this new antecedent at a new level of analysis, we also show that what was previously considered random noise is actually variance that is systematically related to the business cycle.

Additionally, whereas the work-life literature currently assumes that any potential interventions aimed to help employees manage work-life conflict occur at the individual, group, or organization level of analysis, we present a new approach. By extending this literature to include macroeconomic forces, we open the possibility for this literature to consider macroeconomic interventions that could also play an important role. By taking the first step into this level of analysis, we help future researchers to examine other factors at that level.

WORK – LIFE CONFLICT AND ENTRAINMENT

Time-based conflict can arise when time allotted to one domain expends time necessary for performance in another domain (Edwards & Rothbard, 2000; Greenhaus & Beutell, 1985). Initially, much of the work-life conflict literature focused on conflict between work and family (c.f. Eby et al., 2010), with evidence clearly indicating that work-family conflict hampers employee well-being and work attitudes (Bhave, Kramer, & Glomb, 2010; Carlson, Grzywacz, Ferguson, Hunter, Clinch, & Arcury, 2011; Greenhaus, Collins, & Shaw, 2003; Kossek & Ozeki, 1998). However, recent research has extended the domain to also include non-family activities including time spent sleeping and time spent on recreation activities. This extension is notable,

given the importance of both sleep and recreation to employee well-being and effectiveness (Barnes & Hollenbeck, 2009; Sonnentag, 2003; Sonnentag, Binnewies, & Mojza, 2008; Sonnentag & Zijlstra, 2006; Wagner et al., 2012).

Building from previous research showing that time spent at work is associated with work-family conflict (Ilies, Schwind, Wagner, Johnson, DeRue, & Ilgen, 2007), Barnes et al. (2012) report that time spent working, with family, and sleeping are negatively correlated with one another. More importantly, they found a curvilinear effect suggesting that time-based conflict among work, family, and sleep, is especially strong when employees spend a larger proportion of their time working. This suggests that the manner in which employees spend their time is a complex system driven both by individual choice and by macroeconomic forces. Although both individual choice and macroeconomic factors are relevant in determining how people allocate their time, this paper focuses on macroeconomic forces.

Because time spent at work is a powerful factor influencing other life domains, previous research has examined several job, work group, and organization-related antecedents of work-life conflict, as well as associated factors such as commute times (Bohen & Viveros-Long, 1981; Keith & Schafer, 1980) and work schedules (Basner et al., 2008; Pleck, Staines, & Lang, 1980). Similarly, role conflict and role overload are clearly linked to time-based conflict between work and family (Greenhaus, Parasuraman, Granrose, Rabinowitz, & Beutell, 1989; Wilson & Baumann, 2015), with organizational and supervisory norms and policies influencing conflict between work and non-work domains (Hammer, Kossek, Anger, Bodner, & Zimmerman, 2011; Kossek, Pichler, Bodner, & Hammer, 2011). In addition to these work-related antecedents, research has also considered characteristics of family life that influence time-based conflict. These family-related variables include marital status (Herman & Gyllstrom, 1997), presence of

younger children in the home (Bohen & Viveros-Long, 1981), family size (Cartwright, 1978), and spousal work involvement and work schedules (Beutell & Greenhaus, 1982; Hall & Gordon, 1973).

In summary, work-family conflict research has focused on determinants at the individual, family, workgroup, and organization levels, producing substantial knowledge about the interface between work and other life domains. However, this research has largely overlooked macroeconomic factors that may influence time-based conflict, even though employees and their organizations and families are nested within the larger economic context. The implication of this is that work-life conflict research has implicitly assumed that macroeconomic forces are either irrelevant or represent error to be ignored rather than meaningful variance to be explained. Given the explosive growth in research addressing the within-individual variance in employee behavior, which previously had been ignored in work-family research, it may be wise to likewise consider macro-level variance components that mold employee behavior.

To this end, we use the lens of entrainment theory to articulate how macro-level factors such as the economy can influence individual behavior. Entrainment theory depicts a cyclical view of time (Ancona, Okhuysen, & Perlow, 2001), in which entrainment is the adjustment of the pace or cycle of one activity to match or synchronize with that of another activity (Ancona & Chong, 1996). Activities following their own cycle can be captured into cycles driven by external pacers; when this occurs, the activities in the captured cycle follow the phase, periodicity, or magnitude of the dominant cycle (Ancona & Chong, 1996). Thus, the rhythm of the external pacers driving the dominant cycle creates a dominant temporal ordering that coordinates both cycles. For instance, McGrath and Rotchford (1983) illustrate that if a focal employee has a particular work schedule (e.g., a night shift), the employee is entrained to the job,

and the employee's family is also entrained to the same work schedule impacting their recreation and family life. Other examples provided by Ancona and Chong include the fiscal year in public firms and the semester in academic institutions. These forces influence the timing of important activities such as planning phases, personnel changes, budgeting, and execution of tasks in markedly different ways than in organizations that align with a calendar year. Thus, life in all types of organizations is yoked to a fundamental external pacer: the calendar, academic, or fiscal year. Perez-Nordtvedt, Payne, Short, and Kedia (2008) provide several more examples of entrainment. Accounting organizations increase and decrease the number of person-hours spent working in response to the cyclical nature of the tax season. Sony and Microsoft tend to release the next generations of their gaming consoles to coincide with the holiday season in order to align with increases in consumer spending. Suppliers align their delivery schedules to the flow of customer purchasing activity.

A sizable and potentially influential external cycle that has been largely ignored in micro-organizational behavior research is the macroeconomic cycle of the economy. When talking about the economy, we specifically refer to the aggregation of human activities concerned with the production and distribution of goods, which has clear implications for work schedules in organizations. Blount and Janacik (2001) note that paces and rhythms in organizations drive work schedules. Given the importance of the demand for products and services on work schedules, and the importance of work schedules in time allocation across different domains, we contend that business cycles are an important pacer of activity in organizations and thus provide the basis for a meaningful extension to theory regarding the interface between work and the rest of employees' lives.

BUSINESS CYCLES AND WORK-LIFE CONFLICT

Business Cycles and Time Spent Working

Economic growth rates vary over time and result in business cycles that are characterized by expansionary and recessionary phases. During expansions, the demand for goods and services increases, which in turn causes the demand for labor to rise. In other words, the demand for labor is a *derived demand* in that organizations use the labor services of workers because consumers want to purchase the goods and services that the workers produce (Borjas, 2000). Conversely, during recessions, the demand for goods and services decreases, which in turn causes the demand for labor to fall. One consequence of this is an increase in the unemployment rate, which is defined as the ratio of the number of unemployed individuals to the number of individuals who are in the labor force (Bureau of Labor Statistics, 2006).

However, when confronted with a decline in the demand for its products, an organization can respond in one of at least two ways: the first, as noted above, is to reduce the size of its initial workforce through layoffs, which leads to an increase in the unemployment rate; the second is to reduce the amount of work allocated to its remaining workforce, which leads to a decrease in the hours of work per employee (Ehrenberg & Smith, 2003). Economists refer to these two options as adjustment on the *extensive margin* and adjustment on the *intensive margin*, respectively (Burda & Hamermesh, 2010; Burda, Hamermesh, & Stewart, 2013; Varian, 2010). Macroeconomic studies reveal that a significant part of labor adjustment happens along the intensive margin (see Hamermesh, 2002; Ohanian & Raffo, 2012; van Rens, 2012); estimates suggest that about one third of the labor adjustment in the U.S. occurs through such reductions in hours of work (Elsby, Hobijn, & Sahin, 2010).

Organizations choose between the two types of labor adjustment based on several factors such as the fixed costs associated with hiring additional workers (e.g., hiring and training costs,

employee benefits, etc.), the overtime premium that may need to be paid for extra hours that non-exempt employees may need to work, and the increases (or decreases) in employee productivity associated with longer hours of work (Ehrenberg & Smith, 2003). Although layoffs (i.e., adjustments on the extensive margin) have the advantage of reducing the fixed labor costs, and thus may seem the logical strategy in the short run, in the long run they may not be beneficial because they also result in the loss of hiring and training investments (Hoynes, 2000; Hoynes, Miller, & Schaller, 2012). For this reason, depending on their expectations regarding the future state of the economy, many organizations may find the option of reducing hours of work more attractive because it enables them to retain their employees and minimize human capital losses. Accordingly, recent data suggest that organizations adopt the strategy of adjustments on the intensive margin: the average workweek in the U.S. decreased by about 0.9 hours during the "Great Recession" of 2007-2009 (Kroll, 2011). Important in these data is the implication that such labor adjustments on the intensive margin are indicative of how individual employees' work hours are entrained to macroeconomic business cycles.

The upshot of the above discussion is that as business cycles move through expansionary and recessionary phases, demands for goods and services that are inherently linked to these business cycles will lead organizations to require more or less labor from their employees. In essence, these business cycles function as external pacers that directly influence how organizations make labor adjustments, which adjustments subsequently affect employees' allocations of time to various life domains, particularly when labor adjustments are made along the intensive margin. Furthermore, Shoss & Penney's (2013) findings on unemployment rate and workplace absenteeism are also supportive of our expectation that the unemployment rate is

associated with a reduction in time spent at work. These observations and the conceptual development above lead us to the following prediction:

> *Hypothesis 1: Macroeconomic business cycles influence the amount of time employed individuals spend working, such that employees will spend less time working in recessionary economies than in strong economies.*

Business Cycles and Time Spent on Non-Work Activities

Previous research indicates that time spent on non-work domains is frequently beneficial. Sleep is a topic that is new to management research, but there is a large body of research in sleep physiology to indicate that sleep has a litany of beneficial outcomes (Harrison & Horne, 2000; Lim & Dinges, 2010). Time spent with family is negatively associated with work-family conflict, and low work-family conflict has been linked to a number of beneficial outcomes (Kossek & Ozeki, 1998; Kossek, Pichler, Bodner, & Hammer, 2011). Time spent recreating will often be devoted to activities that fit with the recovery literature (especially relaxation and mastery experiences), and recovery activities have been linked to several beneficial outcomes (Sonnentag, 2003; Sonnentag, Binnewies, & Mojza, 2008; Sonnentag & Zijlstra, 2006). Thus, on average, previous research indicates that employees gain benefits from time spent sleeping, time spent with family, and time spent recreating.

Previous research has linked sleep, recreation, and family activities to separate external cycles (Barnes & Wagner, 2009; Eeckels, Filis, & Leon, 2012; Sobotka, Skirbekk, & Philipov, 2011), indicating that these activities can indeed be entrained to macro-level cycles. Moreover, non-work activities – such as time spent with family – can become entrained to time spent working (Forsyth & Cauthier, 1991). The salience of these temporal elements is emphasized in the resource drain model of time-based work-life conflict (Edwards & Rothbard, 2000).

The resource drain model suggests that different domains compete for time, and that time devoted to one activity leaves less available time to allocate to another. For example, an employee working until 11pm to meet an important deadline may miss taking his or her family for a walk in the park. Many executives work so many hours that they have very little time left over for sleep. Indeed, reducing time-based conflict is a motivating factor behind recent pushes to prevent work from crowding out non-work activities, including establishing boundaries around specific non-work time periods that can be allocated to non-work activities (c.f., Perlow, 2012). Perlow notes that people given such blocks of non-work time are eager to devote them to family and recreation, and it is likely that some of the time is devoted to sleep as well.

Empirical research provides more systematic support for the resource drain view of time-based conflict, with time spent working competing with time spent with family and time spent sleeping (Basner, Fomberstein, Razavi, Banks, William, Rosa, & Dinges, 2007; Ilies et al., 2007; Moreno-Jimenez, Mayo, Sanz-Vergel, Geurts, Rodriquez-Munoz, & Garrosa, 2009; Rothbard & Edwards, 2003). For example, Ilies et al. (2007) found that day-to-day workloads subsequently influenced the extent to which employees engaged in various activities with their spouses in the evenings. Likewise, a two-week diary study by Barnes and colleagues (2012) found that time spent working influenced subsequent time spent with family as well as subsequent time spent sleeping, but that time spent sleeping or with family was not significantly related to subsequent time spent working. In other words, it appears that time spent working has a larger influence on non-work activities than these activities have on the subsequent day's time spent working. Similarly, Rothbard and Edwards (2003) found that work time had a relatively strong influence on family time, but that family time had a marginally significant effect on work time, which was only half as strong as the effect of work on family.

This suggests that by influencing the amount of time an employee works on a given day, business cycles will also influence non-work activities such as time spent with family, time spent sleeping, and time spent recreating. As noted above, when business cycles are in recessionary phases, employees will spend less time working. As a result, they will have more time available for alternative activities. Moreover, previous research suggests that people will spend this extra time with family, sleeping, and recreating (Aguiar & Hurst, 2007; Aguiar, Hurst, & Karabarbounis, 2013; Barnes et al., 2012). Therefore, we contend that non-work activities will be entrained to business cycles as well, with time spent working serving as the causal mechanism. Accordingly, Hypotheses 2-4 describe our expectation that macroeconomic business cycles will influence the amount of time individual employees spend with family, sleeping, and recreating.

Hypothesis 2: Macroeconomic business cycles influence the amount of time employed individuals spend on family-related activities, such that employees will spend more time on family-related activities in recessionary economies than in strong economies.

Hypothesis 3: Macroeconomic business cycles influence the amount of time employed individuals spend sleeping, such that employees will spend more time sleeping in recessionary economies than in strong economies.

Hypothesis 4: Macroeconomic business cycles influence the amount of time employed individuals spend recreating, such that employees will spend more time recreating in recessionary economies than in strong economies.

Besides highlighting that business cycles influence the amount of time that employees spend on non-work activities, as discussed above, the resource drain model of time-based work-

family conflict (Edwards & Rothbard, 2000) also suggests that the specific amount of time that employees spend on these non-work activities depends on the amount of time they spend working. Thus, time spent working serves as the underlying explanatory mechanism of the effects of macroeconomic business cycles on time spent on family activities, sleeping, and recreating. Accordingly, Hypothesis 5 indicates that time spent working will mediate each of these relationships.

Hypothesis 5: Time spent working mediates the influence of macroeconomic business cycles on a) time spent on family-related activities, b) time spent sleeping, and c) time spent recreating.

METHOD

Data

Our data are drawn from the American Time Use Survey (ATUS), an ongoing survey sponsored by the U.S. Bureau of Labor Statistics (BLS), and supplemented with data on unemployment rates also obtained from the BLS. The ATUS sample is a stratified random sample, covering all civilian, non-institutionalized residents living in the U.S. and who are at least 15 years of age. The ATUS interview is conducted by telephone with a single person randomly selected from each household.

The main goal of ATUS is to measure how people divide their time among various life activities, such as paid work, child and adult care, volunteering, socializing, sleeping, etc. (Bureau of Labor Statistics, 2011). In order to do so, ATUS participants are asked to provide an account of how they spent their time in different activities the previous day in the form of a diary report. The diary day starts at 4 a.m. the day before the interview and goes through 4 a.m. the day of the interview, thus providing a 24-hour report for each participant. For each activity that

participants report, ATUS collects the start and stop times for that activity as well as where (e.g., at home or at work) and with whom (e.g., with a coworker or with a family member) the activity occurred. In addition, demographic information, such as gender, age, marital status, number of children in the household, educational attainment, occupation, income, etc., is also available for each respondent. Of note, ATUS respondents are interviewed only one time (i.e., only cross-sectional data and not repeated measures data are available for each respondent).

Sample

A typical monthly ATUS sample includes around 2,194 households, which results in an annual sample of approximately 26,328 households. Each monthly sample is randomly split into four sub-samples, one for each week of the month, and each of the resulting four weekly sub-samples is evenly divided between weekdays and weekend days. As a result, 50% of ATUS respondents provide information about activities performed during the weekend.

Based on the nuances of the ATUS data structure and the objectives of our study, we adopted a number of sample selection criteria. First, because we investigate how business cycles affect workers' allocation of time among work and non-work activities, we decided to use all ATUS data collected between 2003 and 2010. This period is particularly interesting because it spans from the end of the early 2000s recession to the end of the "Great Recession" of 2007-2009. Second, to ensure that our analysis includes only working individuals, we restricted the sample to respondents who reported being employed. Finally, in order to capture typical work activities and avoid the dominance of weekend activities, we further restricted the sample to respondents whose diary day fell on a weekday (that was not a holiday).

The resulting *annual* samples ranged in size from 3,869 employed individuals in 2007 to 6,480 employed individuals in 2003, generating an overall sample of 34,653 individuals for the

entire 2003-2010 period. The mean age of respondents for the entire sample is 40.51 years (*SD* = 13.96), and approximately 47% of them are female. Table 1 provides additional descriptive statistics about the sample. To ensure that the results are representative of the target population of interest, all estimations include sampling weights that were specifically created by the BLS to account for characteristics of the sampling and data collection.

Measures

Unemployment rate. The most highly publicized and widely used indicator of the state of the economy is the unemployment rate (Bureau of Labor Statistics, 2006). Indeed, the vast majority of the empirical studies that we reviewed for this paper relied on the unemployment rate to measure the effects of business cycles. In accordance, we used the BLS unemployment rate estimates, which are the official source of unemployment data in the U.S. Given that employees are embedded within a specific region (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001) and also exposed to different economic conditions over time, we focused on the monthly unemployment rates that are reported for each state. In so doing, we are able to better capture the geographical and temporal factors that are relevant in varying economic conditions. Over the study period, the unemployment rates ranged from 1.8% in Hawaii in December 2006 to 14.8% in Michigan in July 2009. As a point of reference, the average unemployment rate across all states and months included in our study was 5.9%.

Time spent working. ATUS respondents reported the amount of time spent on several work activities, such as working at the primary job, working at any secondary job, and going through security procedures associated with work. We aggregated all these activities to create a composite variable that captures the amount of time spent working. Note that time spent working

includes time spent both at the workplace and outside the workplace (e.g., at home) to perform work activities. Respondents reported working an average of 6.54 hours a day.

Time spent sleeping. ATUS respondents also reported the amount of time spent sleeping. Notably, this measure excludes the amount of time a respondent might have spent lying in bed awake or tossing and turning, which are separate ATUS activities, and is thus a relatively uncontaminated assessment of the amount of time spent sleeping. Respondents reported sleeping an average of 7.90 hours each day.

Time spent on family-related activities. To obtain a measure of time spent on family-related activities, we adopted the method used by Barnes et al. (2012) and aggregated the amount of time that ATUS respondents reported having spent caring for and helping household members (e.g., caring for and helping household children, performing activities related to household children's education, caring for and helping household adults, etc.) and performing household activities (e.g., housework, food preparation and cleanup, household management, etc.). Respondents reported spending 1.69 hours each day, on average, on family-related activities.

Time spent on recreation activities. To measure time spent on recreation activities, we used the amount of time that ATUS respondents reported having spent on relaxation and leisure activities such as watching television, playing games, arts and crafts, hobbies, and reading for personal interest. Respondents reported recreating for 2.59 hours each day, on average.

***Control variables*.** For an employed individual, family demands may be dynamic across the lifespan and may also depend on gender and family composition (Basner et al., 2007; Damato & Burant, 2008; Plessow, Keisel, Petzold, & Kirschbaum, 2011). Together, these factors may influence the time spent on different work and non-work activities. For this reason, we included age, gender, marital status, presence of children, number of children, and age of

youngest child as control variables. Moreover, to ensure that our estimates do not capture spurious relationships related to a number of other demographic and employment factors, we also included control variables for race, educational attainment, occupation, industry, hourly pay status, self-employment, and government employment.

RESULTS

To test Hypotheses 1 to 4, we estimated multilevel models using the statistical software Mplus 6.0 (Muthén & Muthén, 2010). The use of multilevel modeling was necessary to account for the non-independent nature of the observations in our sample. Because our observations were nested both within states and within time periods, we created a grouping variable specifying all possible combinations of states, months, and years. The initial number of groups was 4,896 (50 states plus District of Columbia, times 12 months, times 8 years), but only 4,483 of them had valid observations and could be used in the empirical analyses. Therefore, each of the resulting 4,483 groups identified observations residing in the same state and interviewed during the same month of a given year. The average number of observations per group is 7.73. Another important aspect of our study is the fact that the dependent variables of time spent working, sleeping, recreating, and on family-related activities are interrelated. To account for these interdependencies, we estimated our multilevel models simultaneously by allowing the error terms to be correlated across equations.

Table 1 reports the means, standard deviations, and zero-order correlations between the main variables used in the study. Table 2 shows the results from the joint estimation of the multilevel models associated with our first four hypotheses. We first looked at the effects of the control variables and then we examined the additional effect of the unemployment rate. The vast majority of our control variables are statistically significant in all models, and many of their

effects are interesting in their own right. For example, female workers are found to spend less time working and recreating (b = -52.35, $p < 0.01$, and -26.41, $p < 0.01$, respectively; Table 2, Models 1a and 4a) and more time on family-related activities and sleeping (b = 56.87, $p < 0.01$, and 6.39, $p < 0.01$, respectively; Table 2, Models 3a and 2a) than their male counterparts. What is particularly intriguing about these results is the fact that the time taken away from work and recreation is not entirely devoted to family and sleep, which seems to suggest that the additional non-work demands faced by employed women go beyond the typically assumed family-related activities (perhaps to include volunteer activities, education and training, or personal care activities). Another interesting finding is that self-employed workers spend less time working (b = -59.50, $p < 0.01$; Table 2, Model 1a) and more time on family-related activities, sleeping, and recreating (b = 24.31, $p < 0.01$, 16.27, $p < 0.01$, and 8.74, $p < 0.01$, respectively; Table 2, Models 3a, 2a, and 4a) than otherwise similar workers. Note that these effects are all conditional on the other control variables included in the models.

Hypothesis 1 predicted that business cycles, operationalized as unemployment rates, would influence the amount of time employees spend working. The results indicate that the unemployment rate has a negative effect on the amount of time spent working (b = -2.80, $p < 0.01$; Table 2, Model 1b), providing support for Hypothesis 1. Hypothesis 2 predicted that business cycles would influence the amount of time employees spend with family. The results show no statistically significant relationship between the unemployment rate and the amount of time spent on family demands (b = 0.25, *n.s.*; Table 2, Model 3b), failing to provide support for Hypothesis 2. Hypotheses 3 and 4 predicted that business cycles would influence the amount of time employees spend sleeping and recreating. Results indicate that the unemployment rate has a statistically significant positive effect on both the amount of time spent sleeping and the amount

of time spent recreating ($b = 0.97$, $p < 0.01$, and 1.24, $p < 0.01$, respectively; Table 2, Models 2b and 4b), providing support for Hypothesis 3 and Hypothesis 4. In conclusion, we found support for three of our four main-effect hypotheses.

Insert Tables 1 and 2 about here

Hypothesis 5 predicted that the amount of time spent working would mediate the relationship between the unemployment rate and the amount of time spent on family activities, sleeping, and recreating. To test this hypothesis we used the general multilevel SEM framework proposed by Preacher, Zyphur, and Zhang (2010) to investigate mediation effects in multilevel data. This approach is particularly useful when dealing with two-level research designs in which the independent variable (e.g., unemployment rate) is measured at level 2, and the mediator and the dependent variable at level 1, as is the case in our study. In such situations, usually referred to as 2-1-1 designs (Krull & MacKinnon, 2001), traditional multilevel modeling approaches do not provide an unbiased estimate of the effect of the mediator on the dependent variable because they fail to recognize the fact that this effect has both a within-cluster component and a between-cluster component (Preacher et al., 2010). This is particularly important in 2-1-1 designs where the effect of the independent variable only occurs at the between-cluster level, and therefore only the between-cluster component of the effect of the mediator on the dependent variable should be considered when estimating indirect effects (Preacher et al., 2010). The method proposed by Preacher et al. (2010) addresses this problem within a multilevel SEM framework, and allows us to obtain unbiased estimates of the indirect effects of macroeconomic business cycles on employed individuals' non-work activities. Consistent with our tests for the main-effect

hypotheses, to account for the interdependencies between the dependent variables, we estimated our three multilevel mediation models simultaneously by allowing the error terms associated with time spent sleeping, time spent on family activities, and time spent recreating to be correlated with one another. The results of these analyses are shown in Figure 1 and Table 3.

Insert Table 3 and Figure 1 about here

Our results provide strong empirical support for Hypothesis 5. After accounting for the effect of time spent working, the effect of the unemployment rate on time spent sleeping and time spent recreating becomes statistically insignificant (b = 0.57 and 0.50, respectively, *n.s.*; Table 3, Models 1 and 3), and, as expected, the effect of time spent working on time spent sleeping and time spent recreating proves negative and statistically significant (b = -0.14 and -0.27, respectively, $p < 0.01$; Table 3, Models 1 and 3). Moreover, the effect of the unemployment rate on time spent on family activities remains statistically insignificant (b = -0.31, *n.s.*; Table 3, Model 2), and, again as expected, the effect of time spent working on time spent on family activities proves negative and statistically significant (b = -0.20, $p < 0.01$; Table 3, Model 2). Following the procedures outlined by Preacher et al. (2010), the resulting indirect effects are clarified in Table 4. As Figure 1 shows, the effect of the unemployment rate on the amount of time spent working is negative and statistically significant (a = -2.78, $p < 0.01$). This suggests that the indirect effect of the unemployment rate that operates through the effect of time spent working is positive and statistically significant for all three outcomes of interest (ab = 0.38, $p <$ 0.01 for time spent sleeping, 0.75, $p < 0.01$ for time spent recreating, and 0.56, $p < 0.01$ for time

spent on family activities). Taken together, these results offer strong empirical evidence in favor of a mediation process, thus providing support for Hypothesis 5.

Insert Table 4 about here

Supplemental Analyses

To assess the robustness of our results we performed a series of supplemental analyses. These analyses examined whether our findings were sensitive to different family income levels, the inclusion of weekend days and holidays in the sample, the use of alternative proxies for the business cycle (i.e., the labor force participation rate and the GDP growth rate), and the inclusion of month as an additional control variable. Across these different model specifications, the main pattern of results remained very similar, thus confirming the robustness of our findings. As an additional sensitivity check, we also estimated our models using an aggregate version of our data obtained by averaging the individual responses within each of the 4,483 state-period clusters. As expected, the aggregate data results proved very similar to the individual data results.

DISCUSSION

Aristotle is credited with saying that "the end of labor is to gain leisure." Neoclassical economics bolsters this view by considering that there is a fundamental conflict between work and leisure (or non-work activities); "with a fixed number of hours in a day, the more you work the less time you have for leisure activities" (Budd, 2011; p. 78). Our research suggests that these individual time allocation choices are also influenced by macroeconomic factors: during periods of high unemployment, *employed* individuals spent less time working and more time in non-work activities, particularly, sleep, recreation, and family activities. Furthermore, time spent

working mediated the relationship between the unemployment rate and time spent on non-work activities.

The magnitude of the effects that we observe can be understood in the context of business cycles, which have expansionary and recessionary phases of economic growth that cause fluctuations in the unemployment rate. How is a particular unemployment rate categorized as "good" or "bad"? Economists prefer to use the term "natural rate" of unemployment, but disagree on what this rate should be (Ehrenberg & Smith, 2003). However, the United States Full Employment and Balanced Growth Act of 1978 provides an indicator to guide policy makers; although not enforceable, according to this Act, the federal government is 'required' to aim toward an overall unemployment rate of 4% (Ehrenberg & Smith, 2003). To interpret effect sizes, we use this 4% unemployment rate as a benchmark and compare it to the highest annual national unemployment rate observed in our survey period, which was 9.6%. This 5.6% rise in the unemployment rate represents an increase from the natural level to the recessionary level. Because our survey data cover all weekdays, we can multiply our daily effects by 5 to obtain non-weekend weekly effects (i.e., weekly effects that do not account for time spent working during weekend days).

Our findings indicate that when the unemployment rate increases by 1%, employed individuals work 2.78 minutes less per day, on average. This implies a weekly effect of 13.90 minutes for each percent increase in the unemployment rate, and therefore an overall average weekly effect of 77.84 minutes for a 5.6% increase in the unemployment rate. Put simply, when there is a change in the unemployment rate from the natural level to the recessionary level, employed individuals spend 77.84 minutes less time working each week. These results suggest very clearly that during recessionary phases, organizations decrease their demand for labor by

reducing the work hours of their employees or, in other words, by making adjustments on the intensive margin (Ohanian & Raffo, 2012; Varian, 2010). In turn, this adjustment has consequences for how employees manage the rest of their life. Specifically, our results indicate that when the unemployment rate changes from the natural level to a recessionary level, the indirect effect that operates through time spent working is, on average, 10.64 minutes per week for time spent sleeping, 21.00 minutes per week for time spent recreating, and 15.68 minutes per week for time spent on family activities. The decrease in time spent working and the resulting increases in time spent on non-work activities can be explained by entrainment processes associated with the unemployment rate (see Ancona & Chong, 1996). Functioning as an external pacer, the unemployment rate influences the work and non-work cycles, with time spent working serving as an underlying linking mechanism between the unemployment rate and non-work activities.

In considering these effects, it is important to note that even small amounts of time in these categories can be important. Barnes (2012) discusses how even small amounts of lost sleep can matter. Indeed, research indicates that even a 6 minute nap can produce a noticeable improvement in declarative memory performance (Lahl, Wispel, Willigens, & Pietrowsky, 2008). Similarly, 15 minutes of quality time with a family member may be a meaningful experience that adds quality of life to all family members involved, and spending even small amounts of time recreating can provide some restoration.

In addition to the powerful effects of even small amounts of time, it is worth noting that the effects reported in our analyses represent the average time gains allocated to non-work domains during recessionary periods, yet actual realization of this time gain could come in the form of discrete experiences that occur over larger blocks of time. For instance, the 15.68

minutes per week of additional family time might actually come in the form of approximately two additional days off of work per year, allowing an employee to enjoy an extended weekend vacation with his or her family; likewise, the average 21 minutes of recreation time per week could translate into an additional soccer game or tennis match each month for the employee. Conversely, the increase in work time and loss of non-work time during expansionary phases could be evident in an employee spending an "all-nighter" at work a few times a quarter, which can affect sleep on that night as well as mood, health, and performance on subsequent days.

Overall, employees allocate approximately 61% of the time that they save from working less to sleep, recreation, and family activities. These gains in non-work time are the unexpected benefits of bad economic conditions. The remaining 39% of the gains are allocated to other non-work activities such as volunteering, education and training, government services and civic obligations, personal care (such as grooming and health-related self care), eating and drinking, shopping, etc. Because these activities make up a significant portion of a person's non-work domain, they offer an interesting avenue for future research. As already mentioned above, the average individual in our sample spends about 6.54 hours a day working, 7.90 hours a day sleeping, 2.59 hours a day recreating, and 1.69 hours a day taking care of family-related activities, which leaves him or her about 5.28 hours a day for additional non-work activities. Put differently, the non-work activities that we investigated in our study represent approximately 70% of the average worker's non-work time. Looking at the non-sleep non-work domain alone, which gets about 9.56 hours per day, the activities explored in our study only capture 45% of the average worker's time. It is therefore important for future research to consider other interesting time-based tradeoffs in people's lives. Our focus in this study was on non-work activities that

have already been noted or recognized in the work-life literature and have been suggested to promote individual well-being.

Despite the lack of support for Hypothesis 2, our overall results are consistent with our theoretical framework and empirical findings in the economics literature (e.g., Aguiar et al., 2013), and clearly indicate that business cycles affect the amount of time employees spend on family-related activities. This is because we observe a mediation process whereby business cycles have an indirect effect on time spent on family activities through time spent working. In other words, we found an indirect relationship between business cycles and time spent on family activities without observing a direct association between them. Although decades ago such a finding may have appeared contradictory, recent developments in mediation analysis have illustrated how such effects are reasonable and widely evident (Hayes, 2009, 2013; Mathieu & Taylor, 2006). The total effect of business cycles on time spent on family activities, which we tested in Hypothesis 2, is the sum of the direct effect and all possible indirect effects of business cycles on time spent on family activities. When developing our theoretical framework, we only considered the indirect effect that operates through time spent working and assumed that the total effect would be dominated by it. Our findings of an insignificant total effect and a significant indirect effect indicate that there are other channels through which business cycles can affect time spent on family activities and that at least some of these channels oppose the observed indirect effect. Future studies could further develop the literature by exploring these alternative paths.

The effect sizes that we identify are aggregate estimates over the timeframe of our study, and across a wide range of employees and employers. Such aggregate estimates are useful to illustrate the impact of business cycles on time allocation. Understandably, these estimates may

differ at particular timeframes and for particular organizations. This is because the magnitude of these effects depends not only on the strength of the macroeconomic shocks, but also on the ability of organizations to optimally adjust their workforces. For instance, it is possible that some employers might lay off too many workers during a recession, thus being forced, at least in the short run, to ask some of their remaining employees (who will have less bargaining power in recessionary labor markets) to work more hours than before. The magnitude of the effects may be weaker in such organizations. Conversely, some employers might have policies in place that prevent them from engaging in layoffs except as a last resort, thus being forced to reduce the hours of work of their employees beyond the level observed in otherwise similar organizations. The magnitude of the effects may be weaker or stronger in such organizations, yet these specific instances nonetheless illustrate the strength of the entrainment effect that economic business cycles have on the time that employees spend working.

Similarly, these effects could be stronger or weaker across different individuals, as they have the potential to make different time allocation choices in the face of changing work contexts. Some may view sleep as the least important, and during economic booms allocate extra work time away from sleep while keeping time spent with family and time spent recreating constant. Others may prioritize sleep above recreation activities. Another way to examine such a topic would be to examine individual differences in the degree to which employees view time spent in a given category as discretionary. There may be non-work based constructs that could play an important moderating role, such as marital satisfaction or spousal activities (cf., Fuchs & Jacobsen, 1991). Individuals may also differ in how they respond to changes in the economy. For example, it may be that for highly skilled employees, those seeking to contain their work hours

to a certain level may use their increased bargaining power during economic booms to actually cut their work hours.

Organizations experiencing fluctuating demands throughout economic cycles may also treat different employees differently based on certain employee characteristics. Exempt and non-exempt employees may experience different magnitudes in the degree of change in their work hours. People at different levels of the organization may be asked to cut or increase their hours by different amounts; perhaps managers higher up in the hierarchy have more stable work hours. Of course, there may be other relevant characteristics that could moderate these effects as well.

In building our hypotheses, we relied on entrainment theory to explain the link between macroeconomic business cycles and time spent working, and thus assumed that employees have no control over changes in their work hours during periods of economic boom and bust. Although entrainment theory is helpful in establishing the expected sign of the effect of business cycles on time spent working, other theoretical explanations are nevertheless possible. For example, the economic theory of intertemporal labor supply (Cahuc & Zylberberg, 2004) could also be used to predict changes in work hours over the business cycle. According to this theory, which relies on the mechanism of intertemporal substitution, the optimal behavior of workers when confronted with temporary changes in their wages is to adjust their hours of work (Cahuc & Zylberberg, 2004, p. 23). Because real wages tend to be procyclical (Elsby, Shin, & Solon, in press), the implication is that workers would choose to work fewer hours during periods of economic decline (when real wages go down), and more hours during periods of economic growth (when real wages go up). Therefore, the economic theory of intertemporal labor supply reinforces the predictions of entrainment theory under the assumption that workers have full control over changes in their work hours.

Our results also offer useful implications for organizations and managers. For instance, one positive aspect of the finding that employees spend less time working and more time sleeping and recreating during recessionary phases is that these time gains from less work may enable them to replenish their resources (Beal, Weiss, Barros, & MacDermid, 2005). This represents an opportunity for organizations to offer work-life programs that enable employees to more fully utilize time gains to spur recovery. Of course, cost considerations are central for organizations in developing and offering such programs, yet reports suggest that a large majority of organizations (81%) retained their work-life programs during recessionary times, and 13% of employers even increased such programs during recessionary times (Galinsky & Bond, 2009). At first glance, increases to work-life programs during recessions are paradoxical. Taken in the context of our results, however, they suggest two clear benefits. First, as noted, such programs will help employees derive greater benefits in terms of resource recovery and replenishment—critical in difficult economic circumstances—because of less time being spent at work and more time being available for recovery activities (see also Fuchs & Jacobsen, 1991). Second, adoption of such programs may enable organizations to retain talented employees to enhance the organization's competitiveness in difficult times, and it may also signal that the organization is an "employer of choice" (see Kossek, Lewis, & Hammer, 2010). Furthermore, during recessionary economies, some employees may be particularly sensitive to any reductions in work hours, which may spur their intentions to quit the organization (see Shoss & Probst, 2011 for a review). Moreover, recessionary economies may also heighten perceptions of job insecurity, which have been associated with negative psychological and physical well-being outcomes (Shoss & Probst, 2011; Sverke, Hellgeren, & Näswall, 2002). In adopting work-life programs, organizations may assuage such employee concerns, and also attain overall cost-savings due to

lower voluntary employee turnover and greater organizational citizenship behaviors (Kossek, et al., 2009).

Conversely, during expansionary phases of the economy, recovery opportunities may be more limited because of greater time spent working, which may result in resource depletion. Here, too, work-life programs may be beneficial interventions that could aid in managing workloads, navigate diffuse work-non-work boundaries and counter employee perceptions that they face a "time famine", to mitigate resource depletion and stimulate resource replenishment (Kossek, et al., 2009; Matos & Galinsky, 2011). More specifically, drawing upon the findings of this study, and those of Sweet and colleagues (Sweet, Besen, Pitt-Catsouphes, & McNamara, 2014), organizations could adopt "a strategic model for advancing flexible work options, one that is sensitive not only to the presence of internal resources, but also to broader economic conditions" (p. 900).

The findings of our study offer valuable insight into the processes that drive some of the previously observed unexpected benefits of recessions. For example, recent research from a variety of countries indicates that physical health improves and mortality decreases when the economy weakens (for a review of this literature, see Ruhm, 2012). One reason commonly cited for this phenomenon is related to changes in behaviors and lifestyles. Our study confirms that during times of economic downturn, employed individuals spend more time in activities that tend to promote individual well-being, and thus can be regarded as a first step towards establishing a causal link between business cycles and health. It would be interesting for future research to further investigate this link by testing the entire model in a single study.

Future research should consider the possibility of dynamically regulating vacation time to match business cycles. When economies are booming and work hours increase—leaving little

time for family or recreation—it may make sense to increase employee well-being by increasing vacation time. This intuition also underlies programs such as work-sharing (Fuchs & Jacobsen, 1991), and could be considered at the organizational level or at the national level. Beyond this, we hope that future research will consider other policy interventions, given that we have established a clear link between business cycles and individual behavior relevant to work-family conflict.

Limitations and Directions for Future Research

Below, we identify the limitations of our study and note that these limitations provide the impetus for future research. Even though we use a large dataset spanning several years' time, one limitation is that our research design is based on repeated cross-sections of different nationally representative samples of individuals. The disadvantage of a repeated cross-sectional design is that it does not allow us to examine within-person changes across time, which can reveal employees' variability in time allocation across business cycles. Investigating such within-person variability in time allocation represents an opportunity for future research to better understand the dynamics of business cycles and their impact on work-life issues.

A related limitation is that the mediator (time spent working) was measured at the same time as the dependent variables (time spent on family activities, time spent sleeping, and time spent recreating) raising concerns of reverse causality. However, our focal antecedent is the unemployment rate, which is not self-reported, and exists independent of the time that employees spend working or in non-work activities. From a theoretical standpoint, changes in the unemployment rate directly impact individuals' employment in organizations rather than their life at home. That is, the unemployment rate (which temporally precedes time allocation across activities) will first directly influence the time employees spend at work, and only subsequently

their non-work activities. Thus, although we cannot firmly establish causality, the theory and research design permits us to claim temporal precedence, which is a key ingredient for identifying causality (Cook & Campbell, 1979).

Another potential limitation of our study is that although the ATUS time categories are extensive, there may still be activities that are not included in our measures. It may be that some of the activities categorized by participants as recreational are actually work-related. For example, a professor may read a book for pleasure that is also related to work. As a result of this limitation, our data likely yield a conservative test of our hypotheses. We recommend that future research utilize a variety of measures of these activities such that the literature as a whole is not dependent upon one particular approach and its limitations.

In this study we intentionally focused on employed individuals' time allocation under varying economic conditions. A related and important line of inquiry will focus on those individuals who have lost jobs during recessions. Understanding their time allocation between non-work activities and job search activities would shed greater light on the job search process and the family experiences of unemployed individuals (c.f., Wanberg, Glomb, Song, & Sorenson, 2005). We also recognize that our data are from the U.S., and our interpretations are bound by the prevailing economic and legal environment. In other national contexts where there are different labor regulations, particularly regarding work hours, organizations may have less flexibility in making adjustments on the intensive margin, which may result in different effects. Examining whether there are similar hidden benefits of bad economic conditions across countries with varying national norms and legislation on work hours is a related opportunity for future research.

In this study, we primarily considered the quantity of time spent in each activity. Another avenue for future research would be to examine the quality of time spent in each of the non-work categories because it may provide additional insight on employees' subjective well-being. For instance, it is possible that the intensity of work might increase during recessionary economies and lead to higher employee fatigue (Green, 2004), thus becoming an alternate contributory factor toward more time spent in sleep. Therefore, it will be useful to disentangle the effects associated with the quality and quantity of time spent in each activity. It may be that the quality and quantity of time spent have independent main effects on other outcomes. Alternatively, it may be that quantity and quality interact, such that high quality can offset low quantity.

We hope that future research will examine policies that organizations can enact to help employees maximize the usage of their non-work time on recovery activities. Adding mindfulness interventions to organizational wellness programs may be a good step in this direction. Mindfulness is especially helpful for getting employees focused on the moment, rather than ruminating about the past or worrying about the future (Brown & Ryan, 2003). We suspect that focusing on the present will increase the value of time spent with family and time spent on recreational activities (cf., Glomb, Duffy, Bono, & Yang, 2011). This may help employees who gain time in those categories to use it in a manner that benefits their well-being. We also hope that future research will examine individual differences and preferences that may moderate the effects we examine in this paper. Work centrality entails the degree to which work is not only a central part of an employee's identity, but also a top priority in his or her life (Paullay, Alliger, & Stone-Romero, 1994). Future studies may find that employees high in work centrality take actions at work to resist the decline in work hours that they would otherwise experience when an economy contracts, whereas other employees are more willing to take the extra time to devote to

family, recreation, and sleep. Along similar lines, employees' preferences for work hours and schedule flexibility may play a relevant role (Golden, 2009), and could potentially magnify the effects we observe.

In conclusion, our multilevel model of business cycles and work-life conflict extends the work-life literature, specifically the resource-drain model of time-based conflict. By drawing from entrainment theory and utilizing a macro-level of analysis, we highlight the multilevel nature of the time allocation process that occurs at the individual level. By adding a new level of analysis to the work-life conflict literature, it is our hope that future research will continue crossing the micro-macro divide to gain a richer view of employee life in work and non-work domains.

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Table 1: Means, Standard Deviations, and Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	40.51	13.96													
2. Female	.47	.50	.01												
3. White, Non-Hispanic	.71	.45	.12**	.00											
4. Married	.62	.48	.31**	-.06**	.11**										
5. Children	.45	.50	-.28**	.01	-.11**	.19**									
6. Number of Children	.84	1.14	-.25**	-.01**	-.13**	.18**	----								
7. Paid by the Hour	.53	.50	-.20**	.08**	-.12**	-.17**	.04**	.03**							
8. Self-Employed	.11	.32	.16**	-.08**	.08**	.08**	-.02**	-.01	----						
9. Government Job	.15	.36	.09**	.09**	.01	.03**	-.03**	-.03**	-.05**	----					
10. Unemployment Rate	6.25	2.23	.02**	.00	-.03**	-.01	-.01	-.00	-.00	.01	-.01				
11. Work Time	392.19	234.67	.09**	-.15**	.01	.10**	-.05**	-.05**	-.13**	-.02**	-.02**	-.02**			
12. Sleep Time	473.95	118.47	-.10**	.04**	-.06**	-.09**	.00	-.01	.07**	.01*	-.03**	.02**	-.37**		
13. Family Time	101.39	128.72	.07**	.21**	.04**	.18**	.22**	.22**	-.00	.05**	.03**	.01	-.39**	-.03**	
14. Recreation Time	155.15	136.48	.07**	-.08**	-.02**	-.08**	-.12**	-.11**	.10**	.00	-.01	.01**	-.36**	.03**	-.07**

Notes: N = 34,653.

Female, white, non-Hispanic, married, children, paid by the hour, self-employed, and government job are all dummy variables coded as follows: 1 = yes, 0 = no. All time variables are in minutes.

Hourly pay status is not available for self-employed individuals. Self-employment and government employment are mutually exclusive.

All estimations include sampling weights. *$p < .05$, **$p < .01$ (two-tailed).

Table 2: Effects of Unemployment Rate on Time Spent Working, Sleeping, on Family Activities, and on Recreation Activities

	Time Spent Working		Time Spent Sleeping		Time Spent on Family Activities		Time Spent on Recreation Activities	
Predictors	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Age	0.34**	0.32**	-0.64**	-0.64**	1.08**	1.11**	0.89**	0.89**
Female	-52.35**	-52.56**	6.39**	6.42**	56.87**	56.97**	-26.41**	-26.42**
White, Non-Hispanic	-20.81**	-20.84**	-7.01**	-6.94**	15.77**	15.94**	-4.03*	-3.98
Married	20.52**	20.02**	-6.06**	-5.97**	20.89**	21.01**	-13.15**	-12.98**
Children	1.94	1.80	0.22	0.12	103.59**	104.15**	-22.63**	-22.70**
Number of Children	-7.53**	-7.67**	-4.11**	-4.08**	5.49**	5.45**	-5.30**	-5.26**
Age of Youngest Child	-0.77*	-0.76*	-0.13	-0.13	-5.99**	-6.00**	0.71**	0.71**
Paid by the Hour	-47.06**	-47.34**	7.48**	7.41**	8.08**	8.31**	20.19**	20.16**
Self-Employed	-59.50**	-59.77**	16.27**	16.17**	24.31**	24.30**	8.74**	8.67**
Government Job	-27.56**	-27.95**	-0.50	-0.43	1.32	1.43	7.62**	7.57*
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unemployment Rate		-2.80**		0.97**		0.25		1.24**

Notes: N = 34,653. Number of state-period clusters = 4,483. Average cluster size = 7.73.

Female, white, non-Hispanic, married, children, paid by the hour, self-employed, and government job are all dummy variables coded as follows: 1 = yes, 0 = no. The industry controls are 12 dummy variables for the following industries: agriculture, forestry, fishing, and hunting; mining; construction; wholesale and retail trade; transportation and utilities; information; financial activities; professional and business services; educational and health services; leisure and hospitality; other services; public administration (the omitted category is manufacturing). The occupation controls are 9 dummy variables for the following occupations: management, business, and financial occupations; service occupations; sales and related occupations; office and administrative support occupations; farming, fishing, and forestry occupations; construction and extraction occupations; installation, maintenance, and repair occupations; production occupations; transportation and material moving occupations (the omitted category is professional and related occupations). The education controls are 5 dummy variables for the following educational attainment levels: less than high school degree; some college, but no degree; associate degree; bachelor's degree; graduate degree (the omitted category is high school degree).

All time variables are in minutes.

Models 1a, 2a, 3a, and 4a estimated simultaneously. Models 1b, 2b, 3b, and 4b estimated simultaneously. All estimations include sampling weights. *$p < .05$, **$p < .01$ (two-tailed).

Table 3: Effects of Time Spent Working on Time Spent Sleeping, on Family Activities, and on Recreation Activities

Predictors	Time Spent Sleeping 1	Time Spent on Family Activities 2	Time Spent on Recreation Activities 3
Age	-0.58**	1.18**	0.97**
Female	-3.00	45.54**	-37.93**
White, Non-Hispanic	-10.70**	11.42**	-8.52**
Married	-2.39	25.37**	-8.59**
Children	0.40	104.57**	-22.26**
Number of Children	-5.45**	3.78**	-6.94**
Age of Youngest Child	-0.26	-6.17**	0.54*
Paid by the Hour	-1.09	-1.98	9.81**
Self-Employed	5.47*	11.29**	-4.44
Government Job	-5.44*	-4.65*	1.45
Industry Controls	Yes	Yes	Yes
Occupation Controls	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes
Unemployment Rate	0.57	-0.31	0.50
Time Spent Working	-0.14**	-0.20**	-0.27**

Notes: N = 34,653. Number of state-period clusters = 4,483. Average cluster size = 7.73.

Female, white, non-Hispanic, married, children, paid by the hour, self-employed, and government job are all dummy variables coded as follows: 1 = yes, 0 = no. The industry controls are 12 dummy variables for the following industries: agriculture, forestry, fishing, and hunting; mining; construction; wholesale and retail trade; transportation and utilities; information; financial activities; professional and business services; educational and health services; leisure and hospitality; other services; public administration (the omitted category is manufacturing). The occupation controls are 9 dummy variables for the following occupations: management, business, and financial occupations; service occupations; sales and related occupations; office and administrative support occupations; farming, fishing, and forestry occupations; construction and extraction occupations; installation, maintenance, and repair occupations; production occupations; transportation and material moving occupations (the omitted category is professional and related occupations). The education controls are 5 dummy variables for the following educational attainment levels: less than high school degree; some college, but no degree; associate degree; bachelor's degree; graduate degree (the omitted category is high school degree).

All time variables are in minutes.

All models estimated simultaneously. All estimations include sampling weights. *$p < .05$, **$p < .01$ (two-tailed).

Table 4: Indirect Effects of Unemployment Rate on Time Spent Sleeping, on Family Activities, and on Recreation Activities via Time Spent Working

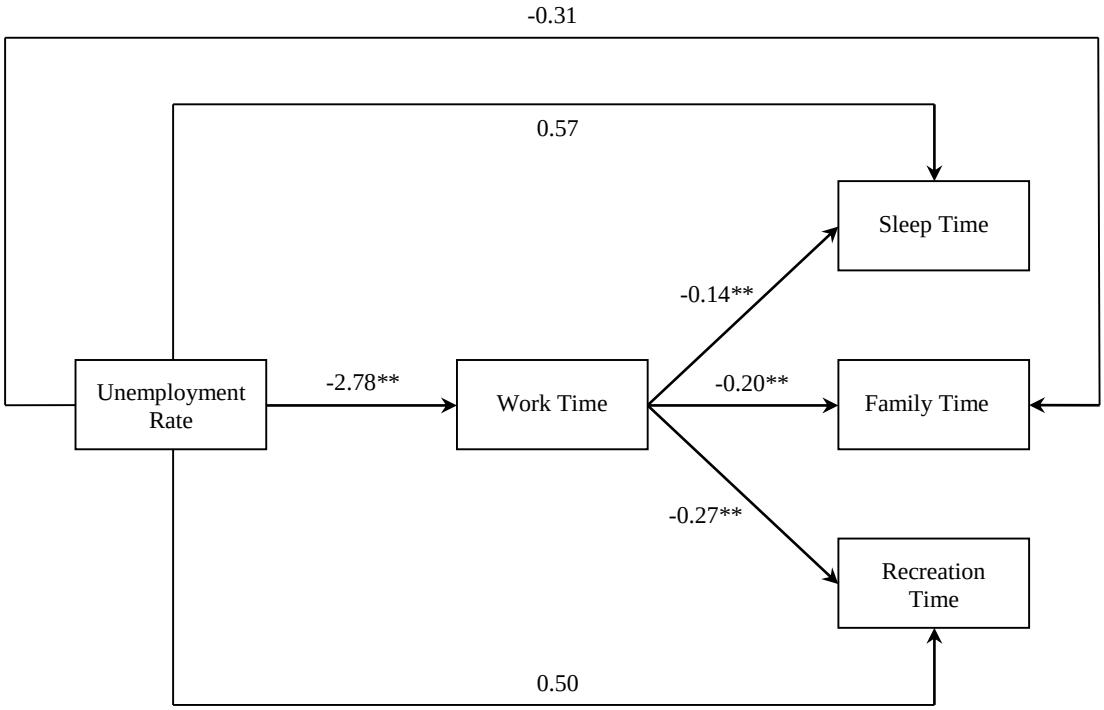
	Time Spent Sleeping	Time Spent on Family Activities	Time Spent on Recreation Activities
Indirect Effect of Unemployment Rate via Time Spent Working	0.38**	0.56**	0.75**

Notes: N = 34,653. Number of state-period clusters = 4,483. Average cluster size = 7.73.

All models include controls for age, gender, race, marital status, presence of children, number of children, age of youngest child, hourly pay status, self-employment, government employment, industry, occupation, and education. All time variables are in minutes.

All models estimated simultaneously. All estimations include sampling weights. *$p < .05$, **$p < .01$ (two-tailed).

Figure 1: Effects of Unemployment Rate on Time Spent Working, Sleeping, on Family Activities, and on Recreation Activities



Notes: N = 34,653. Number of state-period clusters = 4,483. Average cluster size = 7.73.

All models include controls for age, gender, race, marital status, presence of children, number of children, age of youngest child, hourly pay status, self-employment, government employment, industry, occupation, and education. All time variables are in minutes.

All models estimated simultaneously. All estimations include sampling weights. *$p < .05$, **$p < .01$ (two-tailed).

Editor Comments:

The reviews of your paper, The Benefits of Bad Economies: Business Cycles and Time-Based Work-Life Conflict (2014-1234-R), have been returned to my office, and I am pleased to inform you that it has been judged suitable for publication in the Journal of Occupational Health Psychology, provided some changes are made.

We are excited to have reached this stage. This has been a great review process.

The kinds of revisions requested are clearly set out in the reviewers' comments. Although all three reviewers are positive about your manuscript and its potential, Reviewer 1 was less sanguine. I am swayed by the Reviewer's comments and requests, particularly since they are reinforced by Reviewer #3.

I ask that you thoroughly address each of the points raised and emphasize that acceptance of your revision is conditional upon a satisfactory response to the reviewers' comments. When the necessary changes have been made, please send the electronic version of the revised manuscript to our editorial office along with a letter describing the revisions you have made. In order to facilitate locating your changes in the revised text, please indicate them in the text by using a red font. I will review the paper and inform you promptly of a decision.*

As you recommend, we address each of the reviewers' comments below. We note that we kept the dialogue structure initiated by Reviewer 1. For each comment, Reviewer 1 begins by quoting his/her original comment from the first submission, and then considers how our response addressed that comment. For some of these comments (Comments #2, #4), he/she ends up noting that he/she is satisfied with our response. In others (Comment #1, #3, #5, and #6), he/she asks for further clarification.

Reviewer #1 Comments:

Discussion of Previous report and author(s) response(s)

1. .... What purpose does entertainment theory have within the paper? Normally, I would expect theory to inform either the paper's testing structure or drive the null hypothesis. I cannot find this within the paper. The basic static labor supply model can generate the premise that the labor versus leisure decision is affected by the state of the macro economy. ....

This is definitely an issue of language. Your response helped me understand the bridging purpose of entertainment theory in work-life conflict literature, but it would be helpful to make clear how the testing model is informed by the theory, i.e. does the theory simply inform the expected sign in the testing or is there is a more complex or subtle purpose.

We are glad that we were able to clarify the purpose of entrainment theory in this manuscript. On page 28, we now explicitly note that this theory informs the expected signs in the relationships depicted in our model, and following Reviewer 3's suggestion, we also discuss the theory of intertemporal labor supply as a possible (economics) alternative explanation for the decline in work hours in a downturn.

2. … Furthermore, I believe that employing a labor supply model would generate additional testable hypotheses. For example, the Slutsky equation demonstrates that a rise in wages does not always produce an increase in the labor supply as leisure is sold and consequently the income and substitution affects work against one another. This indicates that a rise in wages may not induce greater work hours as a rational individual chooses more leisure (sleeping, family, or recreation) because fewer hours at a higher wage makes this possible. This suggests that the wage rate is not a simple control variable but rather a first order consideration. More simply, I would suggest that it might be fruitful to consider whether sub-sample analysis stratified by wage level might demonstrate different sensitivities. …

… I also have an issue with the decision to remove weekend survey data. The decision to remove weekend days could affect the empirical analysis. Is it possible that weekend days serve as a reservoir for the allocation of time during the weekdays? For example, an employed individual might shorten their time spent in sleep on Thursday or Friday if the sleep could be recovered on the weekend. More simply, it seems that the weekday allocations might be a function of weekend days and a failure to capture weekend results removes a potential explanatory source. …

I am satisfied that the authors consideration of the moderating affects of family income and weekend effects.

Thank you for your guidance on this issue. We agree that these moderation analyses added value to our manuscript.

3. … The choice of state level unemployment rate as a proxy for the business cycle should also be discussed. The unemployment date during the "Great Recession" failed to fully capture the recession labor effect as it ignores those who are underemployed and also those who have left the labor force. The authors might consider the labor participation rate among others as a robustness check. …

While I am satisfied with the new robustness checks contained with the paper I do have a question. Why is the unemployment rate a better measure of labor market health than the labor force participation rate? On might argue that during the "great recession" of 2008 the labor force participation rate was a better measure of the labor market difficulties as it captures those would be in the job market if said market was stronger.

We agree that both the unemployment rate and the labor force participation rate are measures of labor market health – however, because they focus on different things, they capture *different* aspects of labor market health. Generally speaking, the unemployment rate reflects the fraction of people *in the labor force* who do not have jobs *but are looking for work*, and so most of the variation in the unemployment rate is driven by macroeconomic business cycles. In contrast, the labor force participation rate reflects the fraction of people in the working-age population who are part of the labor force (i.e., are either employed or unemployed), and so the variation in the labor force participation rate is driven not only by macroeconomic business cycles, but also by demographic changes (e.g., the ageing of the U.S. population). As a matter of fact, a recent research report published by the Federal Reserve Bank of Philadelphia (Fujita, 2014) shows that roughly 65% of the decline is the labor force participation between 2000 and 2013 is accounted for by retirement and disability (both of which are related to demographic changes). The report also reveals that for the period 2007-2011, the group of *discouraged workers* (i.e., those who dropped out of the labor force because they couldn't find work) only explains about 30% of the total decline in the labor force participation for that period. Finally, the report indicates that the overall labor force participation has been more or less steadily declining since around 2000 (see Figure 1, which also shows the fluctuations in the unemployment rate over the same period). These findings suggest that the labor force participation rate did not very closely (or at least not as closely as the unemployment rate) track the movements in the business cycles between 2000 and 2013. As a final note, because the labor force participation rate captures movements in and out of the labor force – and not in and out of employment –, it only focuses on the subgroup of unemployed workers who become discouraged and drop out of the labor force.

Fujita, S. (2014). On the Causes of Declines in the Labor Force Participation Rate. *Federal Reserve Bank of Philadelphia Research Rap (Special Report)*. Retrieved from https://www.phil.frb.org/-/media/research-and-data/publications/research-rap/2014/on-the-causes-of-declines-in-the-labor-force-participation-rate.pdf

4. … The structure of the simultaneous equations models is confusing. Typically, simultaneous equation models are estimated by two stage least squares and the inclusion and exclusion of independent variables are discussed at length to determine whether the system is just identified or over identified. A more careful discussion of this feature of the system is necessary, as the reader at this point cannot determine the structure of the equations. ….

The change in the text is clarifying.

Thanks again for your prompts to clarify this issue.

5. … The authors note that multiple observations of the family units through time would be useful and I believe that this is roughly possible. If the selection of the survey units is random then it is possible to conduct two levels of panel analysis. First, one would aggregate at the state-monthly level. This would remove the need to perform a multi-level analysis. The variables would then be cross-sectional monthly averages and a panel model analysis could be performed (I am not sure this is appropriate for survey data and the authors would lose significant

variation but it might clarify the unit level affect of the unemployment rate). Second, why not aggregate up to a national monthly level and perform a straight time series analysis. This would allow for additional measures of unemployment (i.e. National Bureau of Research recession determination) and further isolate the business cycle affect. …

In their response the authors posit that the aggregation could create issues? I would find it helpful to understand these aggregation issues. Second, how does the theory support the need for individual analysis or put another what is gain when the unit of observation is a cross-section of individuals as opposed to a "representative" individual. I do agree that any aggregation would assume minimal cohort affects.

There are no issues *per se* with aggregating the data and estimating macro-level models. Actually, the results should be very similar to those from micro-level models (Angrist & Pischke, 2009). We have followed your advice and aggregated the data at the state-period level (using the sampling weights when computing the group averages), and then re-estimated our models using the resulting sample of 4,483 observations (corresponding to the 4,483 state-period clusters). The results are presented in the table below. We have also estimated the aggregated models using the cluster size as weights – this approach should produce results that are closer to the micro-level results (Angrist & Pischke, 2009). In both cases, the results are very similar to those from the micro-level models, and for the estimation weighted by cluster size, they are almost the same. Finally, to address the problem of serial correlation in the resulting panel of states, we have followed the recommendation of Bertrand, Duflo, and Mullainathan (2004) and bootstrapped the standard errors using block bootstrap (i.e., instead of simple random resampling, we resampled entire blocks of data belonging to the same state). Although the bootstrapped standard errors (based on 10,000 replications) were different from the original ones, all the p-values associated with the estimates of interest remained lower than .01 (and so the results presented in the table below were not affected).

The main reason why we chose the micro-level models is that the individual level of analysis is consistent with other work in this domain, such as Barnes et al. (2012). Moreover, the work/life conflict literature more broadly speaking focuses on the individual level of analysis. In short, that literature depicts time allocation to work and family as a choice made by individual employees (although those choices may be influenced by work demands and the demands of family members). In our process of bridging across macro and micro views of work/life conflict, we believe that it is best to keep the individual level of analysis for the outcome variables (consistent with the work/life conflict literature that we seek to contribute to), but consider macro-level factors that are historically ignored by this literature. If we were to aggregate individual responses, we would lose the focus on choices made by individuals.

Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How Much Should We Trust Differences-in-Differences Estimates? *The Quarterly Journal of Economics*, 119, 249-275.

Results from Table 3 and Figure 1 in the paper (*n* = 34,653)

Effect of unemployment rate on time spent working: -2.78**
Effect of time spent working on time spent sleeping: -0.14**
Effect of time spent working on time spent on family activities: -0.20**
Effect of time spent working on time spent on recreation activities: -0.27**
*p < .05, **p < .01 (two-tailed)
Results for aggregate data (n = 4,483)
Effect of unemployment rate on time spent working: -3.49**
Effect of time spent working on time spent sleeping: -0.17**
Effect of time spent working on time spent on family activities: -0.23**
Effect of time spent working on time spent on recreation activities: -0.22**
*p < .05, **p < .01 (two-tailed)
Note: Results are based on models that include the same controls as in Table 3 and Figure 1 in the paper.
Results for aggregate data using the cluster size as weights (n = 4,483)
Effect of unemployment rate on time spent working: -2.85**
Effect of time spent working on time spent sleeping: -0.17**
Effect of time spent working on time spent on family activities: -0.22**
Effect of time spent working on time spent on recreation activities: -0.23**
*p < .05, **p < .01 (two-tailed)
Note: Results are based on models that include the same controls as in Table 3 and Figure 1 in the paper.

6. … There is an econometric issue with the dependent variables. The time variables are clearly bounded from below. It seems that the bounded nature of the variables would affect the error distribution. This is not a TOBIT issue (negative values non-observation) but rather one of construction. I would suggest that the authors might want to consider whether a transformation of the time variables could produce an unbounded dependent variable. Alternatively, if the aggregation test suggested above is appropriate, the authors could conduct the analysis in changes. …

A larger sample does not address the non-spherical errors generated by the malformed dependent variable and I agree that a transformation would make interpretation more difficult. I am convinced, however, that at a minimum a robustness check is needed as the reader cannot have a great deal of faith in the standard errors of the SUR given the current formulation.

We agree that a robustness check is needed, so we used the following approaches. First, we dropped all respondents who had values of zeros on *any* of the four time variables used in the analyses (i.e., time spent working, time spent sleeping, time spent on family activities, and time spent recreating), and re-estimated our models using the reduced sample. As mentioned in our previous response, the reduced sample was almost 40% smaller than the full sample (the number of observations dropped from 34,653 to 20,853), and obviously not representative of the target population. However, we used it only as a robustness check because it had the advantage that the time variables were not malformed anymore. The results are presented in the table below. Interestingly enough, although the point estimates are somewhat different, the main pattern of results is the same, thus confirming the robustness of our initial findings. As an additional

robustness check, we re-estimated the models using the reduced sample, but this time also after taking the natural log of all time variables. Again, the main pattern of results remained unchanged; however, because the time variables are in logs now, the results are not directly comparable with the previous ones, and the effects have a "percentage change" interpretation. Last but not least, the previous results based on aggregate data represent another type of robustness check because the time variables are not malformed anymore after aggregation. Also, because in that case the sample remains representative of the target population, we believe that the aggregate data results offer the best check for the robustness of our findings (and so we are very grateful for your suggestion to perform the check with aggregate data). We have now included a note on page 22 discussing the results of the aggregate data analysis.

Results from Table 3 and Figure 1 in the paper (*n* = 34,653)

Effect of unemployment rate on time spent working: -2.78**

Effect of time spent working on time spent sleeping: -0.14**

Effect of time spent working on time spent on family activities: -0.20**

Effect of time spent working on time spent on recreation activities: -0.27**

*$p < .05$, **$p < .01$ (two-tailed)

Results for sample with no zeros on time variables (*n* = 20,853)

Effect of unemployment rate on time spent working: -1.73**

Effect of time spent working on time spent sleeping: -0.24**

Effect of time spent working on time spent on family activities: -0.16**

Effect of time spent working on time spent on recreation activities: -0.20**

*$p < .05$, **$p < .01$ (two-tailed)

Note: Results are based on models that include the same controls as in Table 3 and Figure 1 in the paper.

Results for sample with no zeros on time variables and with time variables in logs (*n* = 20,853)

Effect of unemployment rate on ln(time spent working): -0.01**

Effect of ln(time spent working) on ln(time spent sleeping): -0.11**

Effect of ln(time spent working) on ln(time spent on family activities): -0.30*

Effect of ln(time spent working) on ln(time spent on recreation activities): -0.23*

*$p < .05$, **$p < .01$ (two-tailed)

Note: Results are based on models that include the same controls as in Table 3 and Figure 1 in the paper.

Reviewer #2 Comments:

I appreciate the work that the authors put in to address my comments. I believe that they have sufficiently addressed these concerns.

We appreciate the guidance you have provided in this review process.

I have two small additional comments:

(1) I'd recommend double checking the calculations in the discussion section (pg. 23). Your findings indicate that when the unemployment rate increases by 1%, employed individuals work 2.78 minutes less per day, on average. However, the coefficient in the table reads -2.80.

Thank you very much for bringing up this issue. The calculations are correct, but we have two point estimates for the effect of the unemployment rate on time spent working. The first (-2.80) corresponds to Hypothesis 1 and is discussed on page 19 (and shown in Table 2, Model 1b). The second (-2.78) corresponds to Hypothesis 5 and is discussed on page 21 (and shown in Figure 1). The calculations in the discussion section on page 23 are based on the second point estimate. Please note that the results in Figure 1 come from the exact same estimation as the results in Table 3. We didn't include the coefficients for the mediator equation in Table 3 because they were almost identical to those shown in Table 2, Model 1b (any differences were at the second decimal place, as was the case of the coefficient for the unemployment rate).

(2) Pg 21 "allowing the error terms to be correlated across equations." Can you please clarify which error terms were correlated (especially for the mediational analyses - Table 3)?

Thank you very much for pointing out this lack of clarity in the manuscript. We have now changed the text on page 21 from "*allowing the error terms to be correlated across equations*" to "*allowing the error terms associated with time spent sleeping, time spent on family activities, and time spent recreating to be correlated with one another*". We hope that the description of our mediation analyses is clearer as a result of this change.

Reviewer #3 Comments:

The authors have incorporated all 12 of my suggestions, adequately to thoroughly.

We are grateful for your suggestions, all of which added great value to our manuscript.

The only minor comment remaining to address is to make sure to juxtapose the entrainment theory framewok with an "inter-temporal labor supply" model, as a possible (economics) alternative explanation for the decline in work hours in a downturn (even though the latter may be less adequate here, given the authors use of direct observations on non-work time uses, not to mention its dismissable presumption that reduced hours are a voluntary worker choice, a pure "substitution effect.")

Following your suggestion, on page 28, we now discuss the theory of intertemporal labor supply as a possible (economics) alternative explanation for the decline in work hours in a downturn.