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MRDRC WP 2024-487

UM23-19

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July 2024

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Acknowledgements

The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium through the University of Michigan Retirement and Disability Research Center Award RDR18000002-04 and the NIH U01 grant U01AG0772.80. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the federal government. Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States government or any agency thereof.

Job Demands, Time Use and Retirement: Results from a Pilot Survey

Abstract

This study explores the feasibility and validity of collecting ecological momentary assessment (EMA) data to characterize job demands and time use using data from a pilot survey administered through the Understanding America Study (UAS). We collected detailed real-time data on cognitive, physical, and social job demands alongside positive and negative affects at different times during the day, and over three days of the week, to capture differences in how people feel during work-related and nonwork-related activities. To examine the concurrent validity of our EMA measures, we combined this data with a standard time diary approach. Our analysis reveals that an EMA approach is highly feasible and valid, as demonstrated by high response rates to the survey and a high degree of consistency in the activities reported between our EMA and time diary surveys. We also find significant differences in demands and emotional affects between work-related and nonwork-related activities, with work-related activities generally perceived as more socially and cognitively (but not physically) demanding, as well as associated with higher levels of stress, frustration, and boredom, and lower levels of happiness. These differences are particularly more salient for respondents who are currently working.

Citation

Kapteyn, Arie, Italo Lopez Garcia, and Kathleen J. Mullen. 2024. “Job Demands, Time Use and Retirement: Results from a Pilot Survey.” Ann Arbor, MI. University of Michigan Retirement and Disability Research Center (MRDRC) Working Paper; MRDRC WP 2024-487. https://mrdrc.isr.umich.edu/publications/papers/pdf/wp487.pdf

Introduction

An increasing body of research examines the role of physical, mental and social job demands on retirement by regressing labor supply outcomes on job demands controlling for sociodemographic characteristics, but results are mixed and often contradictory (e.g., Aaron and Callan 2011; Angrisani et al. 2013; McFall et al. 2015; Angrisani et al. 2016; Lopez Garcia et al. 2022). One potential reason the current literature has not led to consistent findings is that it has overlooked how individuals choose to spend their time off the job, which is likely related to how they spend their time on the job and also can influence retirement decisions. For example, someone with a physically demanding job could compensate for the physical demands of his job by exercising less in his free time, thereby reducing the overall physical burden, which could lead to delayed retirement and understate the impact of physical demands on retirement timing. At the same time, if people who prefer physical activity tend to sort into physically demanding jobs, then they may be more likely to exercise in their free time as well, and regressing retirement on physical job demands alone will likely overstate the causal effect.

To be able to investigate these possible complementarities or trade-offs one needs detailed data on time use both on and off the job, along with measures of mental, physical and social demands. However, existing time use data sets, such as the American Time Use Survey (ATUS) and the Canadian General Social Survey (CGSS),

do not detail what types of activities occur during working time.[1,2] To fill this gap, we fielded a pilot study in the Understanding America Study (UAS), a nationally representative longitudinal study of Americans 18 and older who have agreed to participate in regular, online surveys. The pilot study combined a standard time diary approach (Gershuny et al. 2017) with real-time measures of mental, physical, and social demands from work and leisure activities using an "ecological momentary assessment" (EMA) approach, which has been shown to perform well in standard time-use settings (Stone and Shiffman 1994). In this paper, we report findings from the pilot study, which will guide future data collection enabling us to examine the relationship between job demands, leisure activities, and retirement.

Assessing the causal effect of job demands on the timing of retirement is important because changes in life expectancy in recent decades have increased the proportion of an individual's life spent in retirement, challenging the sustainability of Social Security programs (Gruber and Wise 2004). Delays in retirement could be encouraged by improving working conditions related to physical workload, job control,

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[1] An additional drawback to studying retirement using the ATUS or CGSS is that these are not panels but repeated cross-sections. This is not problematic as long as one could construct a synthetic panel based on occupational profiles. Unfortunately, the ATUS and CGSS do not record past occupation(s) for nonworkers, so it is impossible to construct occupational profiles to compare retired versus working individuals.

[2] Starting in 2001, in off-years a randomly selected subsample of approximately 5,000 Health and Retirement Study (HRS) respondents have been asked to participate in the Consumption and Activities Mail Survey (CAMS). Respondents are asked to estimate how much time (in hours) they spent in the last week performing 32 activities such as working for pay, reading books and newspapers, practicing sports or exercising, and visiting family and friends. As in the ATUS, time spent working does not include a breakdown of activities performed at work. Additionally, respondents are instructed to "double count" time spent doing multiple activities so total time allocation may exceed the number of hours available in a week.

and psychological job stress (Blekesaune and Solem 2005). More than half of American workers are exposed to physically demanding or even potentially dangerous working conditions (Maestas et al. 2017). Moreover, the importance of cognitive and social job demands for the explanation of labor supply outcomes has dramatically increased in recent decades (Deming and Kahn 2018). Finally, the recent expansion of telework during the COVID-19 pandemic and its effects on job demands further underscores the importance of understanding how job demands influence retirement.

Data and methods

We fielded the pilot study in the Understanding American Study (UAS), a nationally representative sample of Americans 18 and older who have agreed to participate in regular, online social science surveys. Participants who lack internet access or an internet-enabled device are provided with an internet subscription and tablet. All surveys are publicly available and can be linked to one another using an anonymous respondent ID variable. Building on results from a prior pilot study,[3] the pilot study combined the features of a standard time diary, covering three days (two weekdays and one weekend day) completed at the end of each day, with a series of randomly timed prompts over the same time period via the respondents' mobile devices. Questions elicited what respondents were doing, as well as what demands and affects

[3] UAS survey 472, fielded in August-September 2023, attempted to elicit work activities using the Day Reconstruction Method, in which respondents are asked to generate their own list of work activities (e.g., "check email," "meet with boss"). An analysis of the prior pilot found that many respondents listed only a few broad activities (including "work") with long durations (e.g., four to eight hours), making it unusable for our purposes.

they experienced, using a standard “ecological momentary assessment” (EMA) methodology (Stone and Shiffman 1994), described in more detail below. Respondents who consented to participate in the study agreed to install the Zemi app, developed by the UAS team, which provided the platform for the EMA surveys after receiving a (randomly timed) text message inviting respondents to open the Zemi app to complete a short survey. We randomized half of respondents to be given 30 minutes after each text prompt to complete the EMA survey, and the other half of respondents were given an hour after each prompt to complete the survey.

To determine participation in the study, we invited respondents to complete UAS survey 536, which invited UAS panel members “to take part in a new UAS research study that will help researchers understand how people in America balance job demands at work with activities performed during their leisure time, and how this influences their retirement choices and health.” We initially fielded the consent survey to a small sample of 32 respondents between November 4 and December 16, 2023, at which point we discovered a glitch in the Zemi app affecting respondents with Android devices. As a result, we decided to limit the study to respondents with Apple devices and resumed fielding the consent study to an additional 259 respondents between February 6 and March 7, 2024, for a total of 291 respondents completing the consent survey out of 332 invited (87.7% response rate). Of these, 176 respondents were eligible for the study (i.e., they had an Apple mobile device), and 151 respondents (85.8%) consented to participate in the study. The consent rate was similar for those randomized to a 30-minute window to complete each EMA survey (62/73, or 84.9%) and those randomized to a one-hour completion window (89/103, or 86.4%).

Consenting respondents agreed to receive four randomly timed prompts per day, between 8 a.m. and 9 p.m., throughout three randomly chosen days (two weekdays and one weekend day) within a seven-day period specified in advance by respondents. Each prompt invited respondents to complete a short, three-minute survey on the Zemi app. Additionally, at the end of each of the three days, respondents were invited to complete an online time diary survey the way they usually fill out UAS surveys (using their smartphone or a tablet/laptop/computer). Each time diary was expected to take 15 minutes. Respondents were compensated $2 each time they answered a three-minute EMA survey and $10 for answering the time diary survey. Hence, they could earn up to $18 per day or up to $54 for the week by participating in this study. After consenting to the study, respondents were sent a detailed user guide explaining how to install and log into the Zemi app and configure their phone to receive notifications. To spread the prompts throughout the day, we specified four nonoverlapping time intervals within which respondents would receive a single, randomly-timed prompt: 8 a.m. to 11 a.m., 11 a.m. to 2 p.m., 2 p.m. to 5 p.m., and 5 p.m. to 9 p.m. We further imposed a requirement that there be at least 75 minutes between prompts (i.e., if a respondents received a prompt at 10:59 a.m., they would receive the next prompt between 12:15 p.m. and 2 p.m.).

The EMA survey (completed up to four times a day, over the course of three days) asked respondents to report what they had been doing and how they were feeling over the last hour. Specifically, it asked respondents if “any of the activities” they were doing were work related (directly or indirectly), who they were with, where they were, as well as how mentally and physically demanding were the activities they were doing in

the last hour. Similarly, the prompts asked how stressed, happy, bored, frustrated, and tired they felt during that time period. Response options for the demand and affect questions were: Not at all, Slightly, Moderately, Very, Extremely. Of the 151 respondents who consented to participate in the study, 127 (84%) answered at least one prompt, 106 (70%) answered at least eight prompts, and 51 (33.8%) answered all 12 prompts.

Complementing the EMA data, on each of the three days during which respondents received prompts, we fielded an end-of-day (EOD) survey. On the first day, respondents were asked whether they are currently working for pay and, if so, how often they perform mentally demanding activities ("for example, analyzing information, learning new material, or solving complex problems"), how often they perform physically demanding activities ("for example, those that require strength or physical effort"), and how often they interact with other people while working (including on the phone, in person, and online) ("Never" to "Almost always or always"). On the first day respondents were also asked how stressful they find their current job and how satisfied they are in their current job ("Not at all" to "Extremely"). Finally, the Day 1 EOD survey including questions about their subjective probability of working after age 65 (or age 75 for older respondents) or their subjective probability of returning to work sometime in the future if they were not currently working. On all three days, respondents were asked to report all activities performed over a 24-hour period, divided in 15-minute time slots and starting at 4 a.m., and to specify the start and end times for each activity (one or more 15-minute slots). Respondents selected activities from a drop-down list of activities drawn

from existing categorizations in the Canadian General Social Survey.[4] Of the 151 respondents consenting to participate in the study, 140 (93.3%) completed the EOD survey on Day 1, 138 (92%) completed the EOD survey on Day 2, and 127 (84.7%) completed the EOD survey on Day 3.

Results

Response rates to EMA prompts

Table 1 shows the distribution of the number of prompts responded to by participants who consented to participate in the EMA survey. Though we see that a significant number of respondents (N=24; 15.9%) did not complete any survey, the vast majority of respondents (N=100; 66.2%) completed at least 9 out of the 12 prompts received across the three survey days, and 78.1% of respondents completed at least 5 prompts. Looking at the distribution of prompts by survey days, we see that responses were not highly concentrated on a given day. For example, among participants who responded to five to eight prompts, 12 (60%) did so across two days, and eight (40%) did so across three days.

[4] Activities included: personal care, unpaid household work, leisure, socializing, shopping/personal services, care to household children and adults, working, and commuting to work. Except for working and commuting, each activity included a second dropdown menu of subactivities (e.g., sleeping, grooming, etc. under personal care activities).

Table 1: Distribution of prompts responded by participant

N of Prompts Responded	Freq.	Percent	Cum.
0	24	15.9	15.9
2	2	1.3	17.2
3	3	2.0	19.2
4	2	1.3	20.5
5	2	1.3	21.9
6	5	3.3	25.2
7	7	4.6	29.8
8	6	4.0	33.8
9	6	4.0	37.8
10	16	10.6	48.3
11	27	17.9	66.2
12	51	33.8	100.0
N of survey participants	151		

From Table 1, we can also deduce that our 151 survey participants responded to a total of 1,281 prompts. Table 2 shows the distribution of prompts responded to by the day of the week and whether the day was a business day or not. Since our EMA surveys were collected on one weekend day and two weekdays, it is not surprising that 836 (65.3%) surveys were collected on a business day, and 445 (34.7%) on a nonbusiness day. Fifteen surveys collected on a weekday were from a nonbusiness day as it coincided with the Thanksgiving holiday. Importantly, we also observe a similar distribution of prompts collected on business days across different days of the week.

Table 2: Distribution of prompts responded by day of the week

Day of the Week	Business day?		Total
	No	Yes	
Sunday	248	0	248
Monday	0	168	168
Tuesday	0	167	167
Wednesday	0	186	186
Thursday	12	171	183
Friday	3	144	147
Saturday	182	0	182
N of Prompts	445	836	1,281
	34.7%	65.3%	100.0%

Despite a large proportion of prompts occurring on business days, Table 3 shows that in less than half of these cases, individuals reported to be actually working during the hour before receiving the prompt. Specifically, individuals reported working as their main activity in 384 instances (30%). The vast majority of these instances (353 out of 384; 91.9%) occurred on business days. On nonbusiness days, 93% of the surveys indicated that the activity performed during the last hour was not work-related, which is consistent with some respondents dedicating at least some hours during the weekend to work.

Table 3: Response rates by work activity and day type

Business Day?	Activities were work related?		
	No	**Yes**	**Total**
No	414	31	445
	93.0%	7.0%	100.0%
Yes	483	353	836
	57.8%	42.2%	100.0%
Total	897	384	1,281
	70.0%	30.0%	100.0%

Table 4 shows the average proportion of prompts responded to by survey participants overall and by two key dimensions of heterogeneity: Whether the individual is still in the labor force or not, and whether they were (randomly) given 30 minutes or one hour to respond to the prompt. The overall fraction of answered prompts was 0.71 (SD = 0.36). Participants who were still working (currently working, temporarily laid off, or unemployed) had a higher response rate (Mean = 0.75, SD = 0.37) compared to those who were not working (retired or disabled) (Mean = 0.69, SD = 0.37), although the difference of 0.06 (SE = 0.04) is not statistically significant. For the subsample of individuals who were given a 30-minute time window to respond, the overall response rate was 0.66 (SD = 0.36), with working participants responding at a rate of 0.64 (SD = 0.39) and nonworking participants at a rate of 0.67 (SD = 0.37), resulting in a small, not statistically significant difference of -0.03 (SE = 0.06). For the subsample given a one-hour time window to respond, the overall response rate was 0.74 (SD = 0.36), with working participants responding significantly more frequently (Mean = 0.83, SD = 0.33) than nonworking participants (Mean = 0.71, SD = 0.38), showing a difference of 0.12 (SE = 0.05). Finally, individuals given one hour to respond to the prompts were 8%

more likely to complete the EMA surveys than those given 30 minutes to respond, with the bulk of that difference arising from working individuals.

Table 4: Prompts responded by work status and time given to answer

		By Work Status		
	Overall	**Working**	**Not Working**	**Difference**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SE)**
% of Answered prompts	0.71 (0.36)	0.75 (0.37)	0.69 (0.37)	0.06 (0.04)
By Prompt Randomizer				
30 minutes	0.66 (0.36)	0.64 (0.39)	0.67 (0.37)	-0.03 (0.06)
1 hour	0.74 (0.36)	0.83 (0.33)	0.71 (0.38)	0.12 (0.05)

Finally, we are interested in understanding how individual characteristics influence the likelihood of responding to EMA prompts. Table 5 presents the results of OLS and Poisson regressions analyzing the number of prompts answered by survey participants based on their individual characteristics. Both types of regressions yield consistent results: While age, gender, race, marital status, and labor force status do not significantly predict responses to EMA prompts, higher levels of education are strongly associated with increased compliance. For instance, having a bachelor's degree is associated with an increase of 4.0 additional prompts answered, and having a master's degree is associated with an increase of 4.6 additional prompts, relative to having a high school degree or less. These differences are statistically significant at the 5% level. Additionally, being self-employed is associated with an increase in the number of

prompts answered compared to being employed in either the government or the private sector, but this result is not robust to the regression specification. In sum, although we lack specific information about participants' occupations, we hypothesize that job flexibility and autonomy are important predictors of compliance with EMA surveys, as individuals with lower educational levels often have less flexible and autonomous jobs.

Table 5: Prompts responded by individual characteristics

Dep Var: Number of Answered Prompts	(1) OLS	(2) Poisson
Age	0.00676	0.000939
	(0.0300)	(0.00247)
Gender	-0.733	-0.0834
	(0.769)	(0.0627)
White	0.224	0.0261
	(0.946)	(0.0770)
Married	-0.143	-0.0152
	(0.780)	(0.0624)
Disabled	-0.954	-0.142
	(2.032)	(0.181)
Retied	0.368	0.0275
	(1.415)	(0.113)
Education (Ref: Highschool)		
Some college	1.161	0.169
	(1.208)	(0.108)
Bachelor's	3.199***	0.407***
	(1.202)	(0.106)
Master's/PhD	3.695***	0.460***
	(1.387)	(0.119)
Employment (Ref: Employed)		
Not Working	0.624	0.0779
	(1.113)	(0.0899)
Self Employed	2.188	0.240**
	(1.400)	(0.105)
Constant	7.842**	2.019***
	(3.499)	(0.306)
Observations	151	151
R-squared	0.149	

Standard errors in parentheses

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

Examining time delays to responses to prompts

Time delays in responses to prompts raise important concerns about the quality of EMA surveys. Longer delays can increase recall bias regarding how respondents were feeling and what they were doing during the hour before receiving the prompt. Thus, there is a tradeoff if giving individuals more time to respond to EMA prompts results in higher compliance but also higher delays in responding. Our findings support this: Individuals given a 30-minute time window to answer prompts took an average of 5.2 minutes to respond, while those given a one-hour time window took an average of 8.4 minutes. These average times mask important distributional details. Figure 1 plots the cumulative density function of the response time delay for each given time window, adjusted for the final compliance rate — 66% for the 30-minute condition and 74% for the one-hour condition. The noticeable kinks in the distributions at the 15-minute mark for the 30-minute condition, and at the 30-minute mark for the one-hour condition, correspond to reminders sent to respondents at these times. Overall, approximately 16% of respondents in the one-hour condition took more than 15 minutes to respond. In contrast, only 8% of respondents in the 30-minute condition took more than 15 minutes to respond. Figure 2 depicts average time delays by educational level. Interestingly, time delays increase with higher educational levels in both the 30-minute and one-hour conditions. While this result may seem counterintuitive given the positive correlation between education and response rates, it suggests that individuals with less flexible jobs either respond as soon as possible if they can, or not at all if too much time has passed since receiving the prompt. But this results certainly merit further investigation.

Figure 1: Cumulative density function (CDF) of time delays by time given to answer prompts

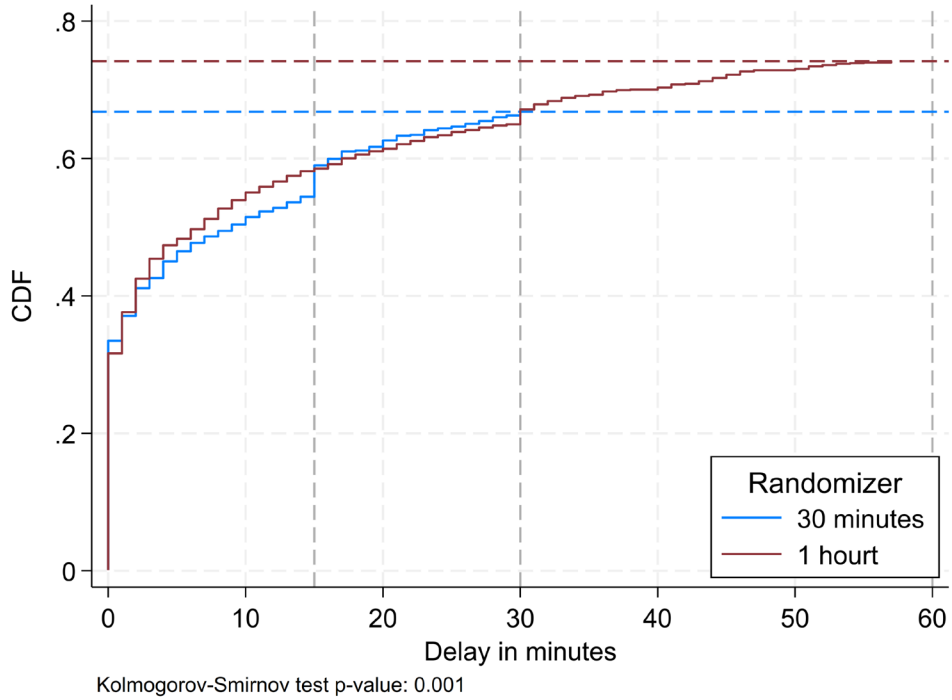
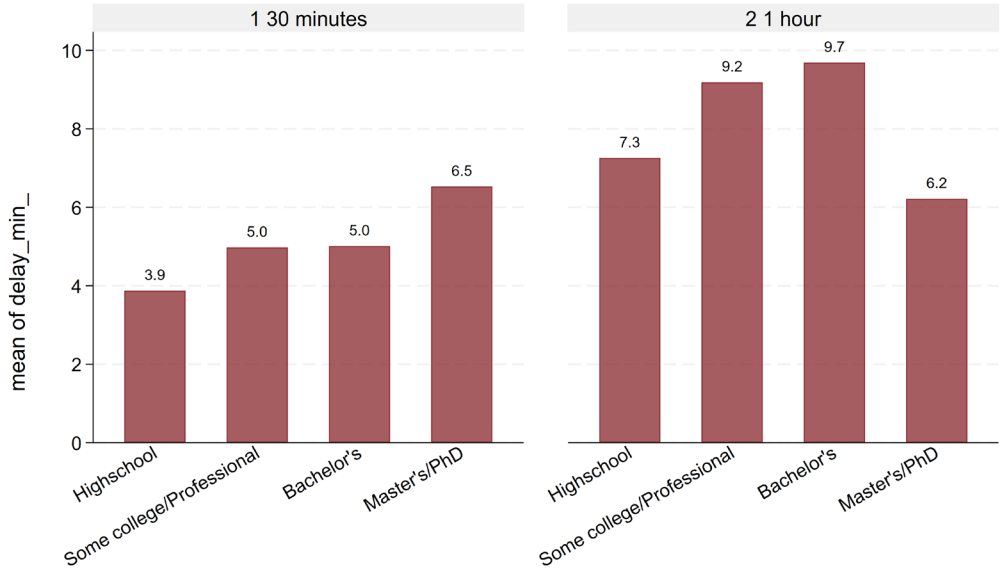


Figure 2: CDF of time delays to answer prompts adjusted by participation rate



Concurrent validity between EMA and EOD surveys

An important validity check for our EMA data is to examine the consistency between the times individuals reported performing any work activity in the hour before receiving a prompt and the working times reported in their time diaries (EOD surveys) using a day reconstruction method. To our knowledge, no previous study has performed such a comparison. Specifically, focusing on the 384 prompts where respondents reported performing any work activity in the previous hour (Table 3), Table 6 shows the proportion of prompts with overlapping times between the last hour before receiving the prompt and a working activity reported in the time diary. We report overall results, by the time window given to respond to prompts, and by survey day.

The results are quite encouraging: Overall, we find a high degree of overlap (Mean=0.84, SD=0.28 between the working periods reported in the EMA survey and the reported activities in the EOD survey. The overlap is slightly higher under the one-hour condition (Mean=0.86, SD=0.26) compared to the 30-minute condition (Mean=0.80, SD=0.32, but the difference is not statistically significant. We also observe an increase in concurrent validity between these two surveys across the three survey days, which potentially reflects a learning effect among survey participants. Additionally, we performed the reverse exercise and found that 85% of the prompts answered during working hours based on the EOD survey corresponded to work activities reported in the EMA survey.

Table 6: Consistency of work activity reports in EMA and EOD surveys

	Overall Mean (SD)	By Time Window 30 Minutes Mean (SD)	1 hour Mean (SD)	Difference Mean (SE)
% of Confirmed prompts	0.84	0.80	0.86	0.05
	(0.28)	(0.32)	(0.26)	(0.06)
By day				
Day 1	0.83	0.75	0.87	0.12
	(0.38)	(0.45)	(0.34)	(0.14)
Day 2	0.86	0.85	0.88	0.03
	(0.35)	(0.38)	(0.34)	(0.12)
Day 3	0.88	0.85	0.89	0.05
	(0.34)	(0.38)	(0.32)	(0.12)

Table 7 further explores the consistency between EMA and EOD reports concerning work activities by showing the overlapping rates when an EMA prompt is considered confirmed only if there is at least a 15-minute or a 30-minute overlap with the time diary. As expected, these restrictions decrease the overlap rate, but the concurrent validity of work activities between the EMA and EOD surveys remains quite high. The overlapping rates range from 0.73 to 0.79 for at least a 15-minute overlap, and from 0.69 to 0.78 for at least a 30-minute overlap.

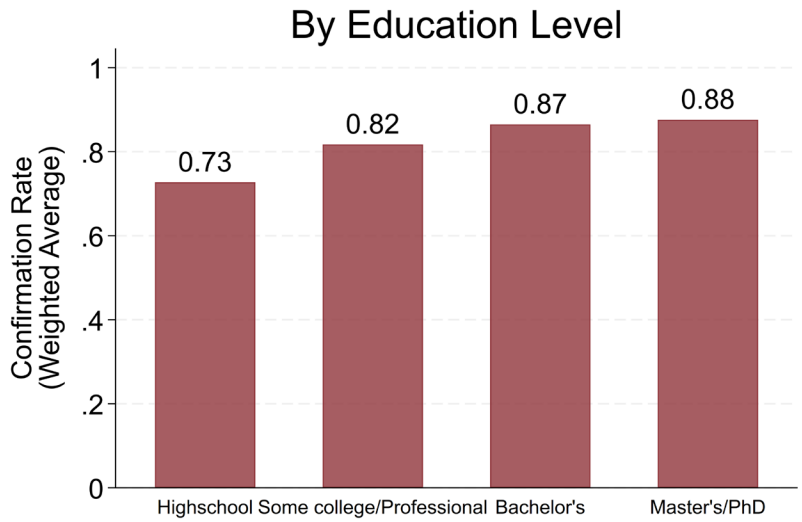
Table 7: Robustness check of overlapping work activity reports in EMA and EOD surveys

% of Confirmed Working prompts	Overall Mean (SD)	By Randomizer 30 Minutes Mean (SD)	1 hour Mean (SD)	Difference Mean (SE)
Any overlap	0.84	0.80	0.86	0.05
	(0.28)	(0.32)	(0.26)	(0.06)
15 minutes overlap	0.77	0.73	0.79	0.06
	(0.28)	(0.32)	(0.26)	(0.06)
30 minutes overlap	0.74	0.69	0.78	0.09
	(0.29)	(0.32)	(0.26)	(0.06)

Finally, based on having any overlap, we find that the consistency of EMA and EOD reports of work activities tends to increase with the level of education. We did not

find economically or statistically significant differences by gender.

Figure 3: Consistency of work activity reports by educational level



Average job demands and affects

Finally, after concluding our quality checks, Tables 8 and 9 report the average job demands and affects at the individual level, as reported by EMA survey respondents. These averages are based on ratings from 1 to 5, where 1 is “Not at all” and 5 is “Extremely.” We present results along two dimensions: whether the activities were work-related or not and whether the respondent is working/in the labor force or not working/not in the labor force. In terms of sample size, a total of 88 respondents reported demands and affects for work-related activities. Of those, 12 were formally retired/disabled (not working) but reported to perform some work activities, and 76 were active workers (working). A total of 125 respondents, 43 not working and 82 working, reported demands and affects for nonwork-related activities.

Table 8 provides a clear picture of job demands. For individuals not working, social demands were slightly higher for work-related activities (Mean = 1.05) compared

to nonwork-related activities (Mean = 0.74), with a marginally significant difference (p = 0.073). For working individuals, social demands were significantly higher for work-related activities (Mean = 1.42) compared to nonwork-related activities (Mean = 0.79), with a highly significant difference (p = 0.000). Physically, work-related activities were more demanding for nonworking individuals (Mean = 1.93) compared to nonwork-related activities (Mean = 1.47), though not statistically significant (p = 0.106). For working individuals, there was no significant difference in physical demands between work-related (Mean = 1.46) and nonwork-related activities (Mean = 1.50). Cognitively, work-related activities were significantly more demanding for both nonworking (Mean = 2.11) and working individuals (Mean = 2.66), than for nonwork-related activities (Means of 1.42 and 1.39, respectively), with statistically significant differences at the 1% level (p = 0.007 and p = 0.000, respectively).

These results indicate that, overall, work-related activities are perceived as more socially and cognitively demanding compared to nonwork-related activities, especially among individuals who are currently working. Perhaps surprisingly, we do not find substantial differences in the perceived physical job demands between work-related and nonwork-related activities.

Table 8: Average job demands reported in EMA survey

Job Demands	Work-related		Nonwork-related		Dif.	SE	p-value of diff
	N	Mean	N	Mean			
Social (N of people)							
Not working	12	1.05	43	0.74	0.31	0.16	0.073
Working	76	1.42	82	0.79	0.63	0.08	0.000
Physically Demanding							
Not working	12	1.93	43	1.47	0.46	0.26	0.106
Working	76	1.46	82	1.50	-0.04	0.09	0.649
Cognitively Demanding							
Not working	12	2.11	43	1.42	0.69	0.21	0.007
Working	76	2.66	82	1.39	1.27	0.11	0.000

Table 9 explores the average affects reported by EMA survey respondents. Stress-wise, work-related activities were reported as more stressful for both nonworking (Mean = 1.84) and working individuals (Mean = 1.81) compared to nonwork-related activities (Means of 1.29 and 1.34, respectively), with statistically significant differences at the 1% level ($p = 0.005$ and $p = 0.000$, respectively). In terms of happiness, there is no significant difference between work-related (Mean = 3.30) and nonwork-related activities (Mean = 3.31). However, for working individuals, happiness is significantly lower during work-related activities (Mean = 2.82) compared to nonwork-related activities (Mean = 3.28), with a difference that is statistically significant at the 1% level. ($p = 0.000$). Regarding boredom, nonworking individuals show a slight, nonsignificant increase in boredom for work-related activities (Mean = 1.33) compared to nonwork-related activities (Mean = 1.14). However, working individuals report significantly higher boredom during work-related activities (Mean = 1.47) compared to nonwork-related activities (Mean = 1.26), with a statistically significant difference at the 1% level ($p =$

0.006). In terms of frustration, nonworking individuals report higher frustration for work-related activities (Mean = 1.63) compared to nonwork-related activities (Mean = 1.18), although the difference is not statistically significant (p = 0.120). Working individuals, however, experience significantly more frustration during work-related activities (Mean = 1.71) compared to nonwork-related activities (Mean = 1.26), with a statistically significant difference at the 1% level (p = 0.000). Finally, regarding tiredness, nonworking individuals feel slightly less tired during work-related activities (Mean = 1.90) compared to nonwork-related activities (Mean = 2.14), with a nonsignificant difference (p = 0.408). For working individuals, there is no significant difference in tiredness between work-related (Mean = 1.92) and nonwork-related activities (Mean = 1.89).

Overall, these results suggest that work-related activities are associated with lower levels of happiness and higher levels of boredom and frustration, particularly among working individuals, while the differences in tiredness are minimal and not statistically significant.

Table 9: Average affects reported in EMA survey

Affects	Work-related		Nonwork-related		Dif.	SE	p-value of diff
	N	Mean	N	Mean			
Stressed							
Not working	12	1.84	43	1.29	0.54	0.15	0.005
Working	76	1.81	82	1.34	0.47	0.08	0.000
Happy							
Not working	12	3.30	43	3.31	-0.01	0.14	0.946
Working	76	2.82	82	3.28	-0.46	0.11	0.000
Bored							
Not working	12	1.33	43	1.14	0.20	0.13	0.168
Working	76	1.47	82	1.26	0.21	0.07	0.006
Frustrated							
Not working	12	1.63	43	1.18	0.46	0.27	0.120
Working	76	1.71	82	1.26	0.44	0.10	0.000
Tired							
Not working	12	1.90	43	2.14	-0.24	0.28	0.408
Working	76	1.92	82	1.89	0.03	0.07	0.667

Conclusions

Our pilot study offers valuable insights into the complexities of cognitive, physical, and social demands and affects during working and nonworking times, and their potential impact on retirement decisions. The results highlight significant variations in job demands and emotional affects between work-related and nonwork-related activities. Notably, work-related activities are generally perceived as more socially and cognitively demanding, particularly among individuals who are currently working. This increased demand correlates with higher levels of stress, frustration, and boredom, and lower levels of happiness.

Furthermore, our study underscores important tradeoffs in how much time individuals are given to respond to EMA prompts. On one hand, giving respondents

more time to find a quiet place to respond to a survey prompt increases response rates, which are lower for less educated individuals. On the other hand, more time leads to longer delays in responding to the survey, which can introduce recall bias and affect data quality. Our findings also demonstrate high concurrent validity between EMA and time diary surveys, reinforcing the reliability of using these methods in time use research.

Overall, our research aims to contribute to a deeper understanding of how job demands and leisure activities interact and influence retirement timing and well-being. Our next step is to collect an improved version of this survey in a larger pilot involving a sample of 1,000 adults in the UAS. This will allow us to continue refining our EMA methodology and start testing how the interplay between demands and affects experienced during working and nonworking times can help explain labor supply decisions later in life, ultimately informing policies aimed at improving work conditions and retirement outcomes.

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