

**Are We Having More Fun Yet?
Categorizing and Evaluating Changes in Time Allocation**

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Abstract

This paper provides two new methods and data for tracking and evaluating changes in time allocation. The first method uses cluster analysis to assign activities to categories based on six dimensions of participants' reported affective experiences (feeling interested, stressed, happy, tired, sad, pain) during those activities. The second method uses the U-index, a measure of the percentage of time in which the strongest emotion is a negative one. The U-index was computed for 72 harmonized activities in 2006 and assigned to historical time-use data from 1965 to 2005. The main substantive findings are that there has been a decrease in the share of time devoted to "mundane chores", such as ironing, and an increase in time spent on "affectively neutral downtime" activities, such as watching television. Men have reduced their time in work-related activities while women have increased theirs. On net, there have *not* been major shifts in time allocation toward more or less unpleasant activities over the last 40 years for men and women as a whole, although for men there has been a gradual downward trend in the proportion of time spent in unpleasant activities.

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Are people spending their time in more or less enjoyable ways today than they were in earlier generations? The answer to this question is central for understanding economic and social progress yet has been elusive and controversial.

From 1965-66 to 2005, for example, working-age American women increased the amount of time spent working for pay, watching television, and caring for adults while they reduced the amount of time spent cooking, cleaning, entertaining friends and reading books. Do these shifts imply that women are better off or worse off?

Becker (1965) and Gronau (1977) provide the modern economic framework for modeling time allocation among market work, home production and leisure. Ramey and Francis (2006) and Aguiar and Hurst (2007) provide thorough attempts to apportion historical time-use data into these categories. These studies are controversial and reach conflicting conclusions, however, in part because external judgments were used to classify activities into home production, leisure and market work.¹ Should gardening, for example, be classified as leisure or home production for the average person? Another problem is that it is unclear how to tradeoff shifts in time allocation across categories, or within them, when it comes to evaluating individuals' welfare. Not all leisure activities are equally enjoyable, nor all home production tasks equally taxing.

This paper provides two alternatives to the traditional work, home production, and leisure breakdown for evaluating welfare changes associated with trends in time allocation. The first method assigns activities to categories based on six dimensions of participants' reported affective experiences (feeling interested, stressed, happy, sad, pain

¹ To their credit, the papers are transparent about their classification decisions and often examine the robustness of their conclusions to alternative decisions. Sociologists (e.g., Michelson, 2005), have used a broader set of categories, distinguishing among paid work, household work, child care, active leisure and passive leisure. These classifications, which may capture affective experience better than home production, work and leisure, also require external judgments.

and tired) during various activities. The second approach makes use of the U-index, a measure of the percentage of time spent in an unpleasant state, where an unpleasant state is defined as an episode in which the strongest emotion is a negative one. The U-index is computed for each of 72 harmonized activities in 2006 and assigned to historical time-use data from 1965 to 2005 to summarize trends in time allocation. Both analyses make extensive use of the Princeton Affect and Time Survey (PATS), a national survey of time use and affective experience. The PATS, like other diary-based measures, probably yields a more accurate measure of affective experience than domain-specific enjoyment questions (Kahneman and Krueger, 2006, Robinson and Godbey, 1997 and Gershuny and Halpin, 1996).

The methods presented here have three principal advantages over the previous categorization of time used by economists and sociologists. First, the categories are based on subjects' reported experiences, not external researchers' judgments. Second, different types of leisure and home production activities are assigned to distinct categories if they are associated with different feelings and therefore represent distinct experiences. Third, the classification scheme is based on multiple aspects of affective experience, not a unidimensional measure of enjoyment, as in Juster's (1985) landmark study.

The main substantive findings are that there has been a decrease in the share of time devoted to "mundane chores", such as ironing, and an increase in time spent on "neutral downtime" activities, such as watching television. On net, however, there have *not* been major shifts in time allocation toward more or less unpleasant activities over the last 40 years for men and women as a whole. For men, there has been a gradual

downward trend in the proportion of time spent in unpleasant activities as measured by the U-index; for women there is no detectable trend in the U-index despite significant changes in underlying time allocation.

The next section describes the PATS data in more detail. Section II describes and implements a method for classifying activities into six distinct categories, and Section III uses these categories to summarize trends in time allocation since the mid 1960s. Section IV describes and implements the U-index method, and Section V discusses extensions and limitations of the analysis.

I. Princeton Affect and Time Survey

The Princeton Affect and Time Survey (PATS) is a new source of data on time use and affective experience. The survey was designed by the author and administered by the Gallup Organization in a random digit dial telephone survey of U.S. residents from May to August of 2006. PATS is patterned on the Bureau of Labor Statistics' American Time Use Survey (ATUS) and the Day Reconstruction Method.²

The survey worked as follows. Respondents were first asked to describe each episode (defined as an interval of time in which the respondent was engaged in a specified activity; the average respondent reported 17.8 episodes) of the preceding day, as in the ATUS. Information about the activity individuals engaged in was collected for each episode. After the entire day was described in this manner, three episodes were randomly selected in proportion to duration and without replacement. For these episodes, respondents were asked the extent to which they experienced six different feelings (pain,

² See Kahneman, et al. (2004) for a discussion and evaluation of the Day Reconstruction Method. The PATS questionnaire and related documentation are available at www.krueger.princeton.edu.

happy, tired, stressed, sad, and interested) during each episode on a scale from 0 to 6, where they were instructed that a 0 meant they did not experience the feeling at all at the time and a 6 meant the feeling was very strong. Specifically, respondents were asked to report their feelings during a randomly selected 15-minute interval of the sampled episodes. The order in which the feelings were presented was randomly assigned across respondents from six different permutations.

Weights were developed by Gallup to make the sample representative of the general population in terms of geographic region, gender, age and race. The weights were based on counts from the Current Population Survey (CPS). The weighted allocation of time across activities closely matched that in the ATUS data for the corresponding months of 2004 and 2005 ($r=0.99$), which suggests that the weighted sample is representative of the population, at least in terms of time use.

Interviews were conducted in English and Spanish. A total of 3,982 people completed the survey, for a response rate of 37 percent. Sixty-one percent of the unweighted respondents were women, a majority were white (88 percent), 90 percent had a high school education or higher, and 40 percent had household income less than \$40,000 per year. The average age was 51.4 years. Re-weighting the sample to represent the population resulted in some significant distributional changes. Most notably, compared with the unweighted sample, the weighted sample had fewer women (53 percent), higher income (36 percent below \$40,000), and a lower average age (45.2 years).

The affect data collected in the PATS are similar to the idea of “process benefits” referred to by Dow and Juster (1985). Individuals receive a certain flow utility, or flow

of emotional experience, while they are engaged in various activities. Some activities, such as work or setting the table, are ordinarily undertaken for the payoff received during other episodes, rather than their immediate emotional experience. Nonetheless, the emotional experience during these activities is relevant to individuals' subjective well-being, and the spillover benefits from these activities are, in principle, registered during other episodes in the survey (e.g., during meal time). The description that emerges from the episodic affect data is unaffected by the fact that the full benefit (or cost) of some activities may be delayed as long as a representative sample of time is surveyed. It goes without saying that the affect data cannot be used to make causal statements about how individuals should optimally allocate their time without knowing how time spent during particular episodes affects well-being at other times, or why people choose to engage in certain activities.³ One would need experimental manipulation of time use to draw causal inferences about how changes in activities or the environment would influence affective experience over a longer period. Still, tracking time use in affectively similar categories provides a rich description of how society's subjective well-being evolves over time, just as the National Income accounts provide a useful description of the evolution of society's income over time.

II. Clustering Activities

The weighted-average ratings of pain, happy, tired, stressed, sad, and interested that were reported during the various activities were used to assign activities to

³ An analogy to the national income accounts is instructive. One could observe that doctors are paid more than the average worker and that their pay contributes significantly to national income, but one cannot draw a causal inference that national income will be higher if more people became doctors without knowing the cost of doctors' education and the alternative incomes that those who become doctors would have earned. This inconvenience does not diminish the utility of tracking national income.

categories. These emotions were chosen, in part, to represent points along the Russell (1980) circumplex. Specifically, K-means cluster analysis was used to identify six groups of activities associated with similar emotional experiences. Cluster analysis is a family of techniques for assigning observations to groups (clusters) in a way that minimizes the discrepancies within groups and maximizes discrepancies between groups. The algorithm for the Stata cluster procedure used here minimizes the sum of squared Euclidean distances of the emotions associated with the activities from their cluster means.

Activities are the unit of observation for the cluster analysis. Activities in the PATS were originally coded with the same scheme and algorithm that the Census Bureau uses for ATUS. Because a goal here is to make historical comparisons, however, we converted the ATUS activity codes to 72 harmonized codes used in the American Heritage Time Use Studies (AHTUS).⁴

Two additional features of the analysis are worth noting. First, the activities were weighted by their relative frequencies.⁵ Thus, the resulting clusters can be thought of as minimizing the weighted sum of within-group variances. Second, because cluster analysis is an iterative procedure that can be sensitive to the starting point, we executed the cluster command 35 times using random starting points and selected the estimates with the highest Calinski and Harabasz pseudo-F statistic, defined as:

$$F = \frac{\text{trace}(B)/(g - 1)}{\text{trace}(W)/(n - g)}$$

⁴ The concordance was from the Center for Time Use Research (www.timeuse.org/athus/documentation). The concordance contains 92 activities, 14 of which could not be coded in the ATUS. We combined child care regardless of the child's age. We omitted sleeping and napping and a small number of infrequent activities that were not covered by PATS.

⁵ Because Stata does not have a weight option with cluster, we created a new data set in which each activity could be represented multiple times, in proportion to its relative frequency.

where B is the between-cluster sum of squares and cross-products matrix, W is the within-cluster sum of squares and cross-products matrix, g is the number of groups and n is the sample size.

Table 1 reports the optimal cluster assignments for the most frequent activities and the average ratings for each of the six emotions. In addition, the table reports “net affect,” which is the average of the positive emotion (happy) less the negative ones (sad, pain, stressed).⁶ Many of the cluster assignments make intuitive sense. Paid work performed at home and away from home, for example, are both in cluster 6, as is helping someone with homework. Home production activities, including cleaning and putting away dishes, are mostly assigned together in cluster 5. There are some unexpected results, however. For example, time on a second job is classified in cluster 2 while other paid work is in cluster 6.

Table 2 reports the mean of the emotions and net affect for each cluster of activities. The lowest rated cluster in terms of net affect is cluster 1, which includes receiving medical care, purchasing medical services, seeking government services and doing homework. Cluster 2 involves tasks like writing and using a computer. The most enjoyable and interesting activities are in cluster 3, including religious activities, exercise, attending parties, listening to music, playing with children and recreation. Cluster 4 is a mixture of activities, such as watching television, relaxing, cooking and gardening, that are close to average in terms of affect ratings. Cluster 5, which includes domestic activities such as doing laundry, ironing, caring for adults, and cleaning, is slightly above cluster 6 (work) in terms of net affect but well below it in terms of interest.

⁶ Net affect is a controversial measure because it treats the positive and negative emotions equally and in an additive fashion. It is also unclear how to integrate some features of experience, such as interest and tiredness, into net affect.

If we were to use value laden terms to describe the clusters, we could think of cluster 1 as unpleasant personal maintenance, cluster 2 as moderately enjoyable tasks, cluster 3 as engaging leisure and spiritual activities, cluster 4 as neutral downtime and cooking, cluster 5 as mundane chores, and cluster 6 as work-like activities.

One caveat to bear in mind is that average affect ratings are conditional on engaging in the activity for a given length of time. People probably sort into the activities that they engage in based, in part, on how much utility they derive from them. It is reassuring to note, however, that if person fixed effects are removed, the correlation (weighted by frequency) between net affect across activities in the unadjusted and within-person data is 0.92. (The unweighted correlation is 0.72.) Moreover, if the cluster analysis is redone using residuals of the six emotions after removing person effects, 83 percent of activities (weighted by frequency) remain in the same cluster as in the original assignment that did not remove person effects.

III. Historical Data on Time Use

To make comparisons over time, we used data from a project originally of the Yale University Program on Non-Market Accounts, known as the American Heritage Time Use Studies (AHTUS). The AHTUS consists of five time-use surveys conducted from 1965-66 through 2003. The disparate activity codes were harmonized to a common set of 72 main activities (plus missing/unclassified). In addition, we merged the harmonized activity codes to the 2005 ATUS and include it as well. The underlying sources of the harmonized data are:

- 1965-1966: Original source is Multinational Comparative Time-Budget Research Project conducted by the University of Michigan's Survey Research Center. N=1,968.
- 1975-1976: Original source is American's Use of Time: Time Use in Economic and Social Accounts, conducted by the University of Michigan's Survey Research Center. N=5,869.
- 1985: Original source is American's Use of Time, conducted by the University of Michigan's Survey Research Center. N=2,308.
- 1992-1994: Original source is National Human Activity Pattern Survey, conducted by the University of Maryland's Survey Research Center. N=5,964.
- 2003: Original source is ATUS, conducted by Census Bureau for Bureau of Labor Statistics. N=15,999.
- 2005: Original source is ATUS, conducted by Census Bureau for Bureau of Labor Statistics. N=10,112.

Sample weights were used for all estimates. Because we lack affect ratings during sleep, we focus on the waking day.⁷ One issue that we can only partially address is that the data sets use different methods and sampling frames. For example, the 1965-66 survey sampled people from households in which someone was employed in a nonagricultural industry, and only covered certain months of the year.⁸ The samples were restricted to those from age 19 to 64 to have a consistent age range. The average age was fairly similar in the data sets, ranging from 38.4 in 1985 to 40.6 in 2003.

Appendix Tables A1 and A2 present the average proportion women's and men's awake time spent in the harmonized activities, respectively. A motivation of the cluster analysis was to classify these activities into affectively similar categories so that changes in time use could be tracked in a more manageable set of categories.

⁷ Sleep rose from 7.95 hours in 1965-66 to 8.5 hours in 2005, or by 2.3 percentage points on a 24 hour day.

⁸ Aguiar and Hurst use the same underlying data, so differences in data sets are unlikely to account for any differences.

Specifically, for each person we first computed the average percent of the awake day spent in each of the six clusters described above. We next averaged over every individual in the sample.⁹ Table 3a summarizes the results for men and women combined. The picture that emerges is one of stability for clusters 1 (unpleasant personal maintenance), 2 (moderately enjoyable tasks) and 6 (work-like activities). Time spent on cluster 4 (neutral downtime) is up while cluster 3 (engaging leisure) and cluster 5 (mundane chores) are down. Overall, these figures suggest that affectively neutral downtime activities like watching television have gained at the expense of mundane chores and engaging leisure activities over the last 40 years.

Tables 3b and 3c report separate results for men and women, respectively. For men, the share of the day devoted to cluster 6 (work-like activities) has declined by 6 percentage points since 1965-66, while the share devoted to cluster 4 (neutral downtime) has increased by 8.5 points. Women, not surprisingly, have increased time in cluster 6 activities by 5 percentage points because of higher labor force participation, while time spent on mundane chores fell even more, by almost 7 points. The amount of time women spend in cluster 3 (engaging leisure) fell by roughly the same amount (3 points) as their time devoted to cluster 4 (neutral downtime) increased. These shifts, on balance, do not suggest significant improvements in affective experience for women over this entire 40 year time span.

⁹ Because a small number of activities (accounting for less than 3 percent of awake time each year) were not assigned to clusters in the PATS, they are omitted here. The percentages were renormalized to sum to 100 percent accordingly.

IV. Activity-based U-Index

In addition to classifying time into categories, it is useful to summarize time allocation in a single welfare measure. Here we use the U-index, a misery index of sorts that measures the percent of moments spent in an unpleasant state. An unpleasant state is defined as one where a negative emotion (e.g., sad, stress, or pain) strictly dominates the positive emotions (happy in this case). A desirable feature of the U-index is that it is ordinal at the level of an individual's feelings (see Kahneman and Krueger, 2006).

We first computed the U-index for each harmonized activity using the 2006 PATS data for a pooled sample of men and women. For example, the U-index during paid work was 27%, during exercise was 8%, and during television viewing was 18%. We next computed the weighted average U-index where the weights were the percent of awake time the average person spent in each activity. Formally, the weighted average U-index, denoted \bar{U}_t , each year is:

$$\bar{U}_t = \sum_i w_i (\sum_j p_{ijt} U_j) / \sum_i w_i ,$$

where w_i is the sample weight for individual i , p_{ijt} is the proportion of time individual i spent in activity j in year t , and U_j is the U-index for activity j from the PATS.

Panel A of Table 4 reports the results. The activity-based U-Index shows very little trend over the last 40 years for men and women combined or for women as a group. For men, however, there has been a shift away from activities associated with unpleasant feelings. To put the estimates in context, note that the difference between the activity-based U-index on weekends and weekdays is about 3 percentage points. (With episode-level data, the weekend-weekday difference is about twice as large.) Thus, the one point

drop in the U-index from 1965-66 to 2005 is about one third of the difference in unpleasant feelings associated with activities during the week and those on the weekend.

Although the U-index is highly correlated across activities for men and women, there are some notable differences in a small number of activities. Women, for example, find supervising/helping with homework and voluntary acts less unpleasant than do men. Panel B of Table 4 combines gender-specific U-indexes for each activity with gender-specific time allocations. The results are generally consistent with those in Panel A, though they are noisier. The gender-specific weighted U-index displays no trend for women and has trended downward for men over the last 40 years.

Table 5 presents regressions to control for possible changes in the age and education composition of the samples, as well as the survey day and month. The unit of observation for the regressions is an individual. The dependent variable is the duration-weighted U-index for each person's activities on the survey day, or $\sum_j p_{ijt} U_j$ where U_j is the U-index for activity j for men and women combined. The regression-adjusted estimates reveal a similar pattern: very little shift toward or away from unpleasant activities, on net, for women, but about a one percentage point shift away from activities associated with unpleasant feelings for men since the mid 1960s.

V. Conclusion

This paper provides two new methods for classifying activities and evaluating trends in time use. The results indicate that, for the population as a whole, changes in time allocation over the past 40 years have *not* led to a decrease in the amount of time people spend in activities associated with unpleasant feelings. For men, however, there

has been a gradual shift away from activities that are associated with unpleasant feelings, primarily because of a downward trend in paid work and an upward trend in more “affectively neutral downtime” activities, such as “relaxing/doing nothing” and watching television. For women, a decrease in household chores has been accompanied by an increase in market work and in time spent in neutral downtime activities.

Time spent in the most enjoyable and engaging forms of leisure activities has decreased for both men and women since the mid 1960s. This conclusion is at odds with Aguiar and Hurst (2007; p. 999), who write, “we have documented that the amount of leisure enjoyed by the average American has increased substantially over the last 40 years.” The difference stems from the fact that activities were assigned to groups according to people’s own reports of their affective experiences in the present paper.¹⁰ The affect data suggest that people find television more pleasant than work and home chores but less pleasant than socializing with friends and other activities that are classified in the most enjoyable cluster.

Understanding why time spent watching television has increased so much in the last 40 years, and what this shift implies for well-being, would seem to be a priority for future research. Three possible hypotheses, with varying implications, come to mind. One is that watching television has become more attractive, as a result of more variety in programming, better television sets, and greater flexibility because of Tivo and video technology. The second is that many people feel too tired to engage in non-work activities that are associated with more positive affective experiences, such as socializing or entertaining, perhaps because of increased work effort by women. Thirdly, some

¹⁰ The trends in the underlying activities are quite similar in Aguiar and Hurst and the present paper, despite the fact that Aguiar and Hurst did not have access to the harmonized activity codes when they undertook their study. The robustness of the underlying trends is encouraging.

people may be seduced by the ease of watching television to suboptimally allocate their free time. The resolution of these hypotheses is left for future work.

Several other extensions of the analysis are possible. First, the social context of episodes could be taken into account in defining and classifying activities. If one commutes to work alone or in a carpool, for example, the experience is likely to be different. Second, the range of emotional experiences associated with activities can be extended beyond the six emotions considered here. Third, secondary activities could be taken into account as well as the main activity. Fourth, paid work could be subdivided into different activities depending on the nature of the job or occupation. Fifth, one could experiment with assigning activities to more or fewer than six categories. The similarity of results based on the U-index, which is a continuous measure, suggests that the main results are not sensitive to the number of categories.

Three limitations of the present paper are also worth noting. First, the nature of activities could have changed substantially over time. Although this limitation applies to all studies of trends in time use at the activity level, it is particularly apparent here. For example, the experience of using a computer or watching television is undoubtedly quite different today than it was in 1965. Second, different people have different emotional responses to the same activities, and the mix of responses could be changing over time. Third, it is unclear how time spent sleeping should be factored into the U-index. If data were available to compute the U-index at the episode level for representative samples over time, the first two limitations could potentially be overcome.

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Table 1. Clusters assigned based on six emotions, 2006 PATS

Activity	Cluster	Net Affect	Happy	Tired	Stress	Sad	Interested	Pain	No. of Episodes
personal medical care	1	0.21	2.34	3.69	2.21	1.06	2.70	3.10	24
financial/government services	1	0.32	2.87	3.19	3.40	1.86	3.34	1.92	20
homework	1	0.80	2.71	3.08	3.32	0.94	3.08	1.47	43
purchase medical services	1	2.08	3.67	2.77	2.51	0.74	4.08	1.63	80
writing by hand	2	2.79	3.46	1.97	0.96	0.52	3.69	0.53	34
purchase routine goods	2	3.08	4.03	2.29	1.46	0.52	3.96	0.88	218
other child care	2	3.08	3.93	2.43	1.32	0.48	3.79	0.73	30
use computer	2	3.24	3.99	2.17	1.16	0.55	4.52	0.55	240
second job, other paid work	2	3.40	4.39	2.49	1.42	0.66	4.48	0.90	67
other meals & snacks	2	3.61	4.47	2.42	1.15	0.58	3.91	0.83	971
walking	2	3.95	4.66	1.56	0.64	0.27	4.21	1.22	56
general voluntary acts	3	3.36	4.22	2.41	1.40	0.61	4.86	0.57	53
conversation, phone, texting	3	3.42	4.55	2.44	1.50	0.93	4.61	0.98	377
read books	3	3.49	4.36	2.35	0.94	0.83	4.81	0.87	474
receive or visit friends	3	3.79	4.71	2.71	1.25	0.59	4.77	0.90	187
read to/with, talk with children	3	3.92	4.73	2.61	1.45	0.39	4.72	0.58	35
travel related to consumption	3	4.04	5.02	2.87	1.86	0.51	4.23	0.55	18
other in-home social, games	3	4.08	4.77	2.23	1.04	0.25	4.92	0.78	121
pet care, walk dogs	3	4.14	4.91	2.89	1.06	0.49	4.51	0.75	104
worship and religious acts	3	4.24	4.97	1.70	0.90	0.66	5.09	0.61	151
sports & exercise	3	4.26	5.09	2.87	0.89	0.25	4.97	1.34	208
café, bar	3	4.39	5.00	2.24	0.88	0.29	4.59	0.66	255
general out-of-home leisure	3	4.39	4.91	1.91	0.46	0.38	4.49	0.69	29
purchase personal services	3	4.43	5.06	2.08	0.69	0.16	4.33	1.05	22
parties or receptions	3	4.72	5.24	2.04	0.88	0.29	5.00	0.38	90
hunting, fishing, boating, hiking	3	4.73	5.32	1.91	0.74	0.36	5.26	0.68	30
attend sporting event	3	4.74	5.24	1.73	0.78	0.04	4.97	0.69	21
play with children	3	4.81	5.41	2.49	0.74	0.21	4.69	0.86	40
listen to music (cd etc.)	3	4.81	5.33	1.56	0.38	0.35	5.06	0.84	22
watch television, video	4	2.94	3.91	2.94	1.17	0.82	3.97	0.94	1946
food preparation, cooking	4	3.14	4.25	2.65	1.63	0.60	3.91	1.11	452
relax, think, do nothing	4	3.25	4.40	2.77	1.31	0.80	3.96	1.34	313
gardening	4	3.34	4.26	2.79	0.92	0.43	3.88	1.41	306
set table, wash/put away dishes	5	2.28	3.32	2.81	1.45	0.68	2.76	0.93	145
laundry, ironing, clothing repair	5	2.46	3.33	2.28	1.11	0.61	2.73	0.94	187
adult care	5	2.56	3.90	2.56	1.72	1.19	3.82	1.10	87
Cleaning	5	2.63	3.72	2.85	1.61	0.62	3.54	1.05	327
other domestic work	5	2.63	3.76	2.59	1.85	0.66	3.87	0.90	368
travel related to leisure/other	5	3.00	4.02	2.73	1.66	0.57	3.43	0.79	1120
wash, dress, personal care	5	3.11	4.31	3.16	1.78	0.77	3.39	1.02	140
home repairs, maintain vehicle	6	2.22	3.50	2.76	1.97	0.85	3.95	1.03	89
paid work at home	6	2.35	3.47	2.66	2.01	0.63	4.00	0.71	207
regular schooling, education	6	2.42	3.77	3.73	2.69	0.89	4.01	0.48	70
main paid work (not at home)	6	2.55	3.83	2.72	2.44	0.69	3.98	0.71	1425
general care of older children	6	3.55	4.54	3.41	1.98	0.45	4.36	0.54	235

Table 2. Average of emotions by cluster

Cluster	Happy	Tired	Stressed	Sad	Interested	Pain	Net Affect
1	3.09	2.97	2.92	1.18	3.57	1.80	1.12
2	4.29	2.31	1.18	0.55	4.06	0.78	3.45
3	4.79	2.37	1.05	0.56	4.79	0.84	3.97
4	4.05	2.87	1.23	0.76	3.95	1.06	3.04
5	3.86	2.72	1.64	0.63	3.44	0.89	2.80
6	3.88	2.83	2.35	0.69	4.04	0.69	2.63

Note: averages are weighted by episode frequency and sample weights. All emotions are reported on a 0 to 6 scale. Based on July 5, 2007 cluster6_freqwgt_ctus_best.log

Table 3. Average percent of day by cluster, 1965-66 to 2005**Panel A: All**

Cluster	1965-66	1974-75	1985	1992-94	2003	2005
1	4.2%	3.6%	3.9%	5.8%	4.4%	3.8%
2	10.7%	12.1%	11.8%	9.5%	11.1%	11.5%
3	19.8%	19.6%	19.0%	16.5%	18.3%	17.1%
4	16.3%	20.3%	20.1%	21.2%	20.6%	22.3%
5	17.6%	15.2%	16.3%	14.6%	14.0%	14.1%
6	31.4%	29.2%	28.9%	32.4%	31.6%	31.2%

Panel B: Men

Cluster	1965-66	1974-75	1985	1992-94	2003	2005
1	4.5%	4.0%	4.2%	5.0%	3.9%	3.6%
2	10.7%	11.5%	11.2%	9.4%	10.8%	11.1%
3	18.2%	17.5%	17.8%	15.5%	17.4%	16.1%
4	14.5%	17.3%	18.8%	20.7%	20.9%	23.0%
5	9.7%	10.2%	12.6%	11.4%	10.4%	10.2%
6	42.4%	39.5%	35.4%	38.0%	36.5%	36.0%

Panel C: Women

Cluster	1965-66	1974-75	1985	1992-94	2003	2005
1	4.0%	3.2%	3.6%	6.5%	4.9%	3.9%
2	10.7%	12.5%	12.3%	9.6%	11.3%	11.9%
3	21.2%	21.5%	20.2%	17.3%	19.2%	18.1%
4	17.9%	23.0%	21.3%	21.6%	20.2%	21.7%
5	24.7%	19.6%	19.6%	17.2%	17.5%	17.9%
6	21.5%	20.1%	23.0%	27.8%	26.9%	26.5%

Table 4. U-Index based on time in various activities each year

A. U-Index from Men and Women Combined

	1965-66	1975-76	1985	1992-94	2003	2005
All	20.1%	19.5%	19.5%	20.0%	19.3%	19.6%
Men	20.9	20.4	20.1	20.2	19.6	19.9
Women	19.4	18.7	19.0	19.8	19.2	19.4

B. Gender-Specific U-Indexes and Time Allocation

	1965-66	1975-76	1985	1992-94	2003	2005
Men	20.2	20.1	19.2	18.8	18.7	19.0
Women	20.8	19.4	20.0	21.0	20.1	20.4

Note: A small number of missing and unclassified activities were assigned the mean U-index each year.

Table 5. Regression Models for Activity-based U-Index
Dependent variable is the duration-weighted average U-index

	All		Men		Women	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Intercept	20.905	0.224	21.108	0.356	19.862	0.279
Year=1975-76	-0.518	0.074	-0.338	0.118	-0.689	0.094
Year=1985	-0.544	0.070	-0.731	0.111	-0.363	0.088
Year=1992-94	-0.031	0.071	-0.677	0.113	0.551	0.089
Year=2003	-0.682	0.070	-1.255	0.110	-0.130	0.090
Year=2005	-0.409	0.070	-0.950	0.109	0.110	0.089
Tuesday	-0.137	0.071	-0.122	0.113	-0.149	0.090
Wednesday	0.007	0.071	0.035	0.113	-0.023	0.090
Thursday	-0.194	0.071	-0.049	0.112	-0.325	0.090
Friday	-0.513	0.071	-0.553	0.112	-0.474	0.090
Saturday	-2.231	0.071	-2.599	0.113	-1.893	0.090
Sunday	-3.018	0.072	-3.431	0.113	-2.645	0.090
February	0.022	0.089	-0.128	0.140	0.158	0.113
March	0.203	0.092	-0.072	0.146	0.451	0.115
April	0.056	0.095	-0.179	0.149	0.243	0.121
May	-0.118	0.093	-0.272	0.146	0.004	0.117
June	-0.146	0.089	-0.302	0.142	-0.018	0.112
July	-0.406	0.111	-0.351	0.177	-0.470	0.139
August	-0.405	0.107	-0.473	0.171	-0.363	0.134
September	-0.018	0.096	-0.221	0.152	0.177	0.121
October	0.088	0.095	0.028	0.150	0.109	0.120
November	0.142	0.087	-0.031	0.140	0.313	0.109
December	0.102	0.089	0.082	0.140	0.092	0.113
Age	0.036	0.011	0.054	0.017	0.018	0.013
Age-Squared	-0.001	0.000	-0.001	0.000	0.000	0.000
Female	-0.921	0.038	---	---	---	---
< HS	-0.048	0.059	-0.025	0.093	-0.113	0.074
Some College	0.438	0.052	0.511	0.084	0.329	0.066
College	0.152	0.056	0.103	0.087	0.142	0.072
> College	0.009	0.075	-0.006	0.112	-0.054	0.099
R-Square	0.104		0.115		0.084	
Sample Size	40,388		17,921		22,467	

Notes: Regressions are estimated by weighted least squares. Person weights have been normalized to sum to one in each sample. Weighted mean (and standard deviation) of the dependent variable is 19.7% (4.0) for all, 20.1% (4.3) for men and 19.3% (3.8) for women. All explanatory variables are dummy variables except age and age-squared. Base year is 1965-66.

Appendix Table A1. Percentage of women's days spent in each activity, 1965-66 to 2005

	Main Activity	1965-66	1975-76	1985	1992-94	2003	2005
1	general or other personal care	1.52%	0.20%	0.79%	0.32%	0.25%	0.09%
2	wash, dress, personal care	5.80%	4.90%	6.67%	5.84%	5.22%	4.96%
3	personal medical care	0.06%	0.11%	0.04%	0.06%	0.44%	0.64%
4	meals at work	0.74%	0.69%	0.72%	0.00%	0.05%	0.03%
5	other meals & snacks	7.09%	7.83%	7.32%	6.88%	5.27%	5.51%
6	main paid work (not at home)	14.32%	14.07%	15.83%	21.10%	19.51%	19.13%
7	paid work at home	0.62%	0.56%	1.36%	0.81%	1.36%	1.28%
8	second job, other paid work	0.14%	0.17%	0.26%	0.01%	0.64%	0.62%
9	work breaks	0.51%	0.34%	0.18%	0.06%	0.02%	0.02%
10	other time at workplace	0.23%	0.19%	0.16%	0.00%	0.00%	0.00%
11	time looking for work	0.00%	0.08%	0.08%	0.06%	0.18%	0.14%
12	regular schooling, education	0.19%	0.30%	0.33%	1.01%	0.61%	0.43%
13	homework	0.30%	0.42%	0.48%	0.77%	0.79%	0.70%
14	short course or training	0.21%	0.20%	0.28%	0.04%	0.06%	0.21%
15	other education or training	0.72%	0.03%	0.16%	0.09%	0.02%	0.02%
16	food preparation, cooking	7.46%	7.08%	5.77%	4.09%	3.74%	3.77%
17	set table, wash/put away dishes	3.71%	2.26%	1.87%	0.68%	1.23%	1.22%
18	cleaning	5.94%	5.76%	4.52%	4.79%	3.97%	4.58%
19	laundry, ironing, clothing repair	4.43%	2.45%	1.99%	1.58%	2.21%	2.37%
20	home repairs, maintain vehicle	0.30%	0.60%	0.40%	0.39%	0.32%	0.28%
21	other domestic work	1.58%	0.59%	1.49%	1.40%	1.26%	1.24%
22	purchase routine goods	1.90%	2.94%	3.10%	0.93%	3.35%	3.31%
23	purchase consumer durables	0.14%	0.12%	0.08%	2.60%	0.01%	0.02%
24	purchase personal services	0.27%	0.26%	0.16%	0.18%	0.26%	0.19%
25	purchase medical services	0.13%	0.25%	0.30%	0.37%	0.43%	0.33%
26	purchase repair, laundry services	0.33%	0.16%	0.10%	0.09%	0.12%	0.11%
27	financial/government services	0.06%	0.14%	0.20%	0.12%	0.09%	0.10%
28	purchase other services	1.52%	0.10%	0.19%	0.10%	0.06%	0.06%
29	general care of older children	3.47%	2.36%	2.23%	1.44%	2.60%	2.37%
30	medical care of children	0.09%	0.12%	0.07%	0.02%	0.16%	0.17%
31	play with children	0.32%	0.30%	0.41%	0.33%	0.87%	0.81%
32	supervise/help with homework	0.25%	0.13%	0.16%	0.18%	0.52%	0.45%
33	read to/with, talk with children	0.24%	0.36%	0.18%	0.06%	0.38%	0.43%
34	other child care	0.30%	0.57%	0.23%	0.43%	0.54%	0.53%
35	adult care	0.67%	1.10%	0.51%	0.51%	1.65%	1.35%
36	general voluntary acts	0.45%	0.29%	0.43%	0.05%	0.91%	0.78%
37	political and civic activity	0.09%	0.04%	0.01%	0.00%	0.02%	0.00%
38	worship and religious acts	0.95%	1.09%	0.84%	1.02%	0.98%	0.89%
39	general out-of-home leisure	0.16%	0.18%	0.16%	0.00%	0.19%	0.21%
40	attend sporting event	0.11%	0.26%	0.28%	0.31%	0.22%	0.16%
41	theater, concert, opera	0.02%	0.09%	0.06%	0.14%	0.11%	0.08%
42	museums, exhibitions	0.01%	0.04%	0.01%	0.06%	0.06%	0.05%
43	café, bar	0.11%	0.27%	0.49%	0.30%	1.63%	1.44%
44	parties or receptions	1.54%	0.55%	0.55%	0.69%	0.68%	0.61%
45	sports & exercise	0.34%	0.60%	0.98%	1.50%	0.90%	0.84%

46	walking	0.10%	0.13%	0.25%	0.00%	0.31%	0.26%
47	cycling	0.00%	0.03%	0.02%	0.00%	0.03%	0.02%
48	physical activity/sports with child	0.05%	0.13%	0.15%	0.10%	0.02%	0.04%
49	hunting, fishing, boating, hiking	0.08%	0.21%	0.25%	0.00%	0.08%	0.10%
50	gardening	0.27%	0.55%	0.36%	0.26%	0.82%	0.80%
51	pet care, walk dogs	0.13%	0.37%	0.57%	0.44%	0.60%	0.65%
52	receive or visit friends	4.97%	4.78%	2.94%	4.01%	4.62%	1.81%
53	other in-home social, games	0.46%	0.69%	0.71%	0.56%	0.58%	0.80%
54	artistic activity	0.07%	0.15%	0.11%	0.09%	0.02%	0.02%
55	crafts	1.24%	1.44%	0.76%	0.55%	0.11%	0.17%
56	hobbies	0.04%	0.04%	0.02%	0.03%	0.02%	0.03%
57	relax, think, do nothing	0.59%	1.16%	0.74%	1.81%	1.77%	1.69%
58	read books	3.02%	2.97%	2.68%	2.44%	1.96%	2.15%
59	listen to music (cd, etc.)	0.08%	0.20%	0.08%	0.04%	0.10%	0.07%
60	listen to radio	0.28%	0.19%	0.23%	0.11%	0.07%	0.11%
61	watch television, video	8.47%	12.74%	13.02%	14.87%	13.60%	14.68%
62	writing by hand	0.74%	0.23%	0.39%	0.72%	0.19%	0.15%
63	conversation, phone, texting	1.60%	2.20%	3.37%	1.42%	0.92%	3.45%
64	use computer	0.00%	0.00%	0.08%	0.26%	0.89%	1.00%
65	imputed travel	0.00%	0.05%	0.00%	0.00%	0.33%	0.03%
66	travel related to personal care	0.71%	0.96%	0.86%	1.76%	1.56%	0.97%
67	travel related to work	1.35%	1.37%	1.97%	2.26%	1.68%	1.66%
68	travel related to education	0.11%	0.13%	0.22%	0.23%	0.13%	0.11%
69	travel related to consumption	2.13%	2.06%	2.33%	2.22%	2.50%	1.26%
70	travel related to child care	0.55%	0.53%	0.53%	0.36%	0.77%	0.72%
71	travel related to volunteering/worship	0.39%	0.91%	0.67%	0.37%	0.27%	0.26%
72	travel related to leisure	1.89%	1.87%	2.04%	2.00%	1.71%	1.56%
73	missing/unclassified	1.34%	2.79%	2.18%	1.66%	0.47%	2.92%

Appendix Table A2. Percentage of men's days spent in each activity, 1965-66 to 2005

	Main Activity	1965-66	1975-76	1985	1992-94	2003	2005
1	general or other personal care	0.93%	0.19%	0.74%	0.34%	0.25%	0.17%
2	wash, dress, personal care	4.60%	4.04%	4.93%	4.10%	3.67%	3.51%
3	personal medical care	0.06%	0.04%	0.02%	0.04%	0.31%	0.60%
4	meals at work	1.55%	1.18%	0.90%	0.00%	0.05%	0.06%
5	other meals & snacks	7.49%	8.42%	7.63%	7.13%	5.55%	5.93%
6	main paid work (not at home)	34.98%	30.28%	25.57%	29.27%	28.44%	27.41%
7	paid work at home	0.97%	1.76%	2.62%	1.23%	1.54%	1.89%
8	second job, other paid work	0.96%	0.71%	0.54%	0.06%	1.00%	0.96%
9	work breaks	1.16%	0.60%	0.27%	0.08%	0.03%	0.03%
10	other time at workplace	0.68%	0.40%	0.35%	0.00%	0.00%	0.00%
11	time looking for work	0.00%	0.16%	0.12%	0.10%	0.30%	0.15%
12	regular schooling, education	0.32%	0.67%	0.64%	1.23%	0.64%	0.50%
13	homework	0.73%	0.76%	0.93%	0.93%	0.68%	0.90%
14	short course or training	0.26%	0.25%	0.20%	0.03%	0.03%	0.09%
15	other education or training	0.29%	0.09%	0.12%	0.07%	0.04%	0.00%
16	food preparation, cooking	0.84%	1.03%	1.44%	1.52%	1.42%	1.42%
17	set table, wash/put away dishes	0.35%	0.22%	0.38%	0.14%	0.33%	0.30%
18	cleaning	0.94%	1.79%	2.13%	2.54%	1.88%	1.89%
19	laundry, ironing, clothing repair	0.11%	0.10%	0.26%	0.30%	0.42%	0.45%
20	home repairs, maintain vehicle	0.99%	1.75%	1.80%	1.64%	1.49%	1.47%
21	other domestic work	0.79%	0.72%	1.35%	1.13%	0.88%	0.84%
22	purchase routine goods	1.05%	1.31%	1.69%	0.44%	2.17%	1.95%
23	purchase consumer durables	0.18%	0.15%	0.10%	1.24%	0.03%	0.01%
24	purchase personal services	0.09%	0.05%	0.06%	0.04%	0.06%	0.06%
25	purchase medical services	0.17%	0.14%	0.19%	0.21%	0.24%	0.28%
26	purchase repair, laundry services	0.25%	0.13%	0.15%	0.18%	0.13%	0.11%
27	financial/government services	0.04%	0.13%	0.16%	0.10%	0.08%	0.07%
28	purchase other services	1.02%	0.11%	0.23%	0.10%	0.05%	0.04%
29	general care of older children	0.40%	0.48%	0.38%	0.25%	0.83%	0.84%
30	medical care of children	0.00%	0.02%	0.01%	0.00%	0.05%	0.01%
31	play with children	0.46%	0.17%	0.23%	0.20%	0.60%	0.54%
32	supervise/help with homework	0.08%	0.05%	0.04%	0.05%	0.23%	0.17%
33	read to/with, talk with children	0.06%	0.11%	0.08%	0.07%	0.12%	0.12%
34	other child care	0.11%	0.13%	0.06%	0.15%	0.25%	0.25%
35	adult care	0.47%	0.91%	0.54%	0.40%	1.22%	1.13%
36	general voluntary acts	0.21%	0.24%	0.26%	0.10%	0.72%	0.67%
37	political and civic activity	0.10%	0.02%	0.00%	0.03%	0.00%	0.05%
38	worship and religious acts	0.59%	0.76%	0.54%	0.65%	0.74%	0.57%
39	general out-of-home leisure	0.03%	0.08%	0.19%	0.00%	0.22%	0.17%
40	attend sporting event	0.14%	0.30%	0.28%	0.40%	0.26%	0.29%
41	theater, concert, opera	0.05%	0.08%	0.09%	0.06%	0.09%	0.16%
42	museums, exhibitions	0.02%	0.05%	0.03%	0.03%	0.06%	0.01%
43	café, bar	0.66%	0.48%	0.83%	0.78%	1.67%	1.65%
44	parties or receptions	1.40%	0.59%	0.61%	0.61%	0.62%	0.52%
45	sports & exercise	0.72%	1.24%	1.75%	2.21%	1.39%	1.36%

46	walking	0.16%	0.19%	0.26%	0.00%	0.23%	0.22%
47	cycling	0.00%	0.03%	0.03%	0.00%	0.05%	0.07%
48	physical activity/sports with child	0.04%	0.07%	0.10%	0.04%	0.04%	0.07%
49	hunting, fishing, boating, hiking	0.52%	0.63%	0.99%	0.00%	0.53%	0.50%
50	gardening	0.16%	0.38%	0.61%	0.33%	1.39%	1.64%
51	pet care, walk dogs	0.06%	0.34%	0.52%	0.40%	0.45%	0.47%
52	Receive or visit friends	3.29%	3.36%	2.50%	3.60%	3.86%	1.63%
53	other in-home social, games	0.54%	0.52%	0.51%	0.51%	1.00%	1.06%
54	Artistic activity	0.11%	0.05%	0.09%	0.03%	0.02%	0.00%
55	Crafts	0.01%	0.22%	0.03%	0.04%	0.18%	0.13%
56	hobbies	0.28%	0.32%	0.30%	0.04%	0.04%	0.06%
57	relax, think, do nothing	0.31%	1.21%	0.77%	1.74%	1.75%	1.93%
58	read books	3.46%	2.61%	2.42%	2.44%	1.55%	1.44%
59	listen to music (cd, etc.)	0.10%	0.42%	0.13%	0.08%	0.26%	0.32%
60	listen to radio	0.44%	0.28%	0.33%	0.24%	0.12%	0.13%
61	watch television, video	11.21%	12.77%	14.55%	16.41%	16.08%	17.25%
62	writing by hand	0.27%	0.12%	0.23%	0.60%	0.12%	0.11%
63	conversation, phone, texting	0.99%	1.53%	2.05%	0.73%	0.44%	2.69%
64	use computer	0.00%	0.00%	0.17%	0.58%	1.24%	1.25%
65	imputed travel	0.00%	0.04%	0.01%	0.00%	0.24%	0.03%
66	travel related to care	0.97%	1.48%	1.08%	1.83%	1.66%	1.09%
67	travel related to work	3.68%	3.19%	3.45%	3.35%	2.86%	2.69%
68	travel related to education	0.19%	0.27%	0.17%	0.22%	0.15%	0.09%
69	travel related to consumption	1.63%	1.41%	1.86%	1.59%	2.12%	0.95%
70	travel related to child care	0.28%	0.21%	0.23%	0.11%	0.32%	0.26%
71	travel related to volunteering/worship	0.37%	0.81%	0.62%	0.35%	0.24%	0.18%
72	travel related to other purposes	2.06%	1.97%	2.58%	2.35%	1.79%	1.71%
73	missing/unclassified	1.60%	2.67%	2.00%	2.23%	0.47%	2.47%