How Americans Spend Their Time

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Time-use has already been the subject of numerous studies across multiple disciplines. However, most of this research has focused on a few broadly defined activities (e.g., work for pay, leisure or housework). In this study we take a holistic perspective, identifying a typology of “time-styles,” that defines the different ways people allocate the 24 hours they all have available in a day across multiple competing daily activities, taking into consideration the fact that we all have the same “budget” of 24 hours to spend every day, and that this allocation leads to highly sparse, truncated data.

[to cite]:


[url]:

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EXTENDED ABSTRACT

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Time is the ultimate constraint on human activity. In contrast to money, which can be traded among people and saved for the future, time can’t be stored, borrowed or lent. We are given 24 hours which must be spent each day, and how we distribute these 24 hours to our daily activities should tell something about how we live our lives. Having this purpose in mind, we propose a latent class model that addresses several methodological challenges in the study of how individuals allocate this valuable, perishable and limited resource in their daily lives, creating a typology of “time styles” that reflect the typical ways people spend a day.

In order to understand how individuals differ in their usage of time throughout the day, one must first acknowledge that we are quite diverse in our needs, leading to different time priorities. Any attempt to understand how we spend our days must account for this heterogeneity in “tastes” or life priorities. Life offers us many options and opportunities, and therefore we each engage in only a subset of the many possible daily activities, depending on our diverse needs. As a consequence, time-use reports are highly sparse, with a high percentage of zero-allocations to many of the available activities. Moreover, we all live on a fixed daily budget of 24 hours so that any time we devote to one activity reduces the time available for other activities and consequently, all activities compete against each other for our precious time. For this reason, we must take into account the trade-offs different individuals make to allocate their fixed time budget, which we accomplish with a constrained utility maximization model.

We assume that members of a latent class have an implicit random utility function for each life activity, and allocate time to these activities to maximize the total utility derived from them, subject to the constraint that the total allocated time must be exactly 1440 minutes (24 hours). This constrained optimization makes it possible to study time-use over the entire day, while accounting for the binding constraint on total time and allowing for zero allocations, thereby explaining why individuals choose not to engage in many activities, leading to the highly truncated data commonly observed in time diaries.

We apply our proposed model to data from the American Time Use Survey (ATUS) collected by the Bureau of Labor Statistics in 2006, identifying 11 segments of people with distinctive “time-styles,” but with some commonalities in time utilities. We find that, across all segments, marginal utilities decrease quite substantially after the first 30 minutes are spent on an activity. For example, the marginal utility for food and drink preparation and clean up drop to only 0.2% of the initial marginal utility after only 30 minutes, suggesting that anyone engaged in this activity is likely to spend a short time in it. This decay in marginal utility is less severe for activities such as Education (3.8%), Sleeping (2.6%), work and work-related activities (2.2%) suggesting that people engaged in this activities will spend more time in them.

As one would expect, personal care activities (sleeping, eating & drinking and other personal care) show the highest priorities across all segments. The same is true for leisure and entertainment, leading to high incidence rates for these activities across all classes. Two classes (A and B) also show high initial marginal utilities for work and work-related activities and work and education-related travel, while another (class C) shows relatively high initial marginal utilities for work and education-related travel and education.

They also represent the most sleep-deprived time-styles, as they spend 81 and 42 minutes less of sleep than average, respectively. Class C represents the time-style of students, as it spends 4 and half more hours of education than the average daily report. We also identify three other latent classes (D, E and F) reflecting the time-style of homemakers, with higher than average time spent on committed work (housework, food and drink preparation, childcare, shopping). Five other classes (G, H, I, J, and K) are more focused on personal care and free time as the other classes. Class G spends the most time in sports, exercise & recreation, and is among the highest on socializing and eating & drinking, reflecting an active leisure-oriented time-style. Classes H, J and K are quite peculiar, as they spend much more time sleeping (286 minutes more than average), on leisure and entertainment (391 minutes more than average) and personal care (478 minutes more than average), respectively.

Looking at the demographic profile and reporting day for the different “time-styles,” we find that classes A and B represent time-styles observed mostly on weekdays reported by subjects ages in their 20’s to 50’s, in upper income brackets who are active in the labor force. These first two time-styles clearly illustrate the “poverty of time” discussed in the literature with less time available for sleep and leisure, compared to other time-styles.

Time-style C also is reported mostly on weekdays, by single (79%) young (64% under age 30) subjects, which is consistent with the fact that this time-style shows the highest time spent in education. The remaining time-styles are reported mainly (but not exclusively) on weekends, which account for more than 62% of the cases in these classes. Time-styles D and F, which emphasize committed work, have higher representations of married females with at least one child under 12, as one would expect. Time-style E, which shows more than 6 hours of housework in a day, is comprised by older, childless, middle-income subjects. Time-style H, which shows almost 14 hours of sleep in a day and focuses its free time on socialization, has higher than average proportions of young, single, non-working, childless, non-white, lower-income and males. The most leisure and entertainment-oriented time-style (J), which spends over 10 hours in this particular activity, has a higher than average proportion of older, single, non-working, childless, low-income males.