

Developing the American Time Use Survey activity classification system

Classifying what Americans do during the day and how much time they spend doing those activities is an arduous task that calls for addressing numerous coding issues, but the data provide a broad source of information for various researchers

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The American Time Use Survey (ATUS) was officially added to the Federal Government's list of statistical surveys when it received approval and funding in December 2000. The roots of the survey had taken hold nearly 10 years earlier when a Congressional bill, the "Unremunerated Work Act of 1991," prompted the Bureau of Labor Statistics to investigate ways of measuring unpaid work.¹ This examination evolved into an interest in measuring time allocation of individuals, which is generally the starting point for estimating the value of nonmarket production.

Thus, in 1998, a BLS working group was formed and tasked with examining the feasibility of collecting time-use data and then developing a detailed plan for doing so. By December 2000, significant progress had been made toward laying the groundwork for the survey, which was scheduled to be launched in January 2003. One of the most important undertakings in this process was the design of an activity classification scheme, or coding lexicon, for categorizing the activities that survey respondents report during the time-diary portion of the interview.

This article briefly discusses the processes that created both an ATUS activity coding lexicon and activity coding operations procedures. It also briefly describes the evolution of the major activity categories in the coding lexicon. Finally, it discusses how activities in the coding lexicon were combined so that BLS could produce analytically meaningful tables for publication.

Development of the coding lexicon

Background and research. Initial work on developing the ATUS coding lexicon was facilitated by a rich source of existing information on time-use classification schemes. At least 11 countries had completed one or more national time-use surveys before ATUS was funded, and the Institute of Social Research at the University of Michigan and the Survey Research Center at the University of Maryland had, between them, fielded four time-use surveys in the United States. Most of these earlier time-use classifications used a conceptual framework developed by Alexander Szalai for the Multinational Time Use project nearly 40 years ago.² Szalai recognized the need to standardize the classification of activities in a way that would allow time-use staff to code daily activities reported in respondents' everyday language in a meaningful way, and allow data users to analyze time-use information in systematic ways. His first classification scheme consisted of 96 activity codes that fell into 10 major categories of time use, and took into account the importance of social interaction (who was with the respondent during the activity) and location (where the activity took place) in describing and categorizing daily activities.

Dagfinn Aas built on Szalai's work by identifying four broad classifications, or typologies, of time into which time-use activity categories may be divided: 1) necessary time, 2) contracted time, 3) committed time, and 4) free time.³

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International comparability among time-use surveys usually is not possible at a detailed activity level because countries tend to adapt time-use classification schemes that reflect their own cultures and economies. However, broad comparisons are achievable for even differing classification systems when activities and categories are fit into Aas' four typologies.⁴

Three sometimes competing concerns—international comparability, analytical relevance, and coder usability— Influenced the approach taken to create the ATUS lexicon. The ATUS coding team sought to build a system that would balance the desire for international comparability with the need for data that would be analytically meaningful to users in the United States. But the lexicon's usability (how understandable the activity categories are to the staff who assigns activity codes) was a primary concern as well; when activities cannot be coded accurately or consistently, the end result is poor data. After studying existing time-use classification systems used throughout the world—in particular, the coding schemes of Australia, New Zealand, Eurostat, Canada, and the University of Maryland's scheme used in surveys about the United States—the team decided to model the ATUS lexicon most closely after Australia's 1997 system. Its appeal, compared with other time-use survey classifications systems, lay in its high level of detail and the specific categories that appeared to describe well the types of activities done by persons in the United States. The greater level of detail did not prevent analysts from collapsing activities into the four-fold typologies of time for broad comparisons of other time-use surveys. Like most other countries' time-use surveys, the first ATUS classification system was designed using a three-tiered hierarchical structure, classifying reported activities into major categories, with two additional levels of detail in each category.

In conjunction with researching and developing a first draft of the coding lexicon, the ATUS team researched coding operations issues that would have to be addressed prior to production. These issues included: 1) how the activity data should be coded—“on the fly” by interviewers as they talked to respondents, after the interview by coding specialists, or some other way, 2) the kind of coding instrument (software application) that should be used, 3) what information, besides the activity verbatim, should be available to those coding the data, and 4) the best way to maintain quality control and ensure accurate and consistent coding.

Again, the ATUS team started by examining coding operations used by other time-use survey administrators, and eventually leaned most heavily toward those used by the Australian Bureau of Statistics (ABS), but with modifications toward creating a system specific to ATUS needs. Two of the most important operational decisions made were to: 1) have interviewers also code activities (though not their own interviews with respondents), and 2) implement a coding

verification strategy to ensure quality control. Additionally, BLS decided to use Blaise software⁵ to build a coding application. Each of these decisions yielded positive results—most obviously during the dress rehearsal and pre-fielding, adding significant value to coding operations well into the second year of full production.⁶

Implementation, testing, and revisions. Although the decision was made early in the lexicon development process to use the Australian time-use activity classification scheme as a model for the ATUS, the classification system that was actually in place for coding ATUS data in January 2003 was substantially different from the Australian system.

First, BLS staff and reviewers of the initial ATUS lexicon concluded that adopting the four-fold typology as a central guideline for coding might prove problematic because of the number of exceptions to the rules governing how activities were to be classified within the typology. Instead, the classification system would be organized based on a widening sphere of social involvement as the underlying structure, beginning with activities done primarily by and for oneself, followed by activities done by and for one's household, and then followed by community activities. It was theorized that losing the typology as a coding guideline would not mean losing the ability to produce data comparable to other time-use surveys, as the ATUS coded data could be recoded into each typology of time either by BLS during postprocessing or by users of the data. For example, one could assume that all educational activities are contracted time and all shopping activities are committed time.

And second, in another departure from the first draft “Australian model” lexicon, the final production lexicon contains significantly expanded categories at all levels to enable more detailed time-use analyses, thus enhancing the analytical flexibility for users. The final ATUS lexicon contains 17 major categories (compared with 9 in the Australian system), 105 second-tier categories, and 438 third-tier categories. The coding team left room for up to 99 subcategories under each third tier. This break with the two-digit, nine subcategory convention used in other time-use systems occurred as the ATUS staff reasoned that a much larger sample size (up to 24,000 interviews per year) than any other time-use survey to date could support more detailed analyses, especially after pooling multiple years' data.

Arriving at the final production lexicon took approximately 2 years. Over the course of this program development period, numerous revisions to the lexicon were implemented as a result of a series of coding tests, a dress rehearsal, and pre-fielding of the survey before data collection officially began in January 2003. Coding tests were used to evaluate the intuitive appeal of the lexicon's organizational structure, to assess coding speed and accuracy, to identify ambiguous or

uncodable activities, and to test the usability of a prototype of the coding instrument. The first three tests were conducted at the Census Bureau's telephone center in Jeffersonville, Indiana, using Census Bureau staff, experienced in coding data from other surveys. The fourth test took place at Westat, a research corporation with facilities in Rockville, MD, which also used coders with experience on other surveys. The testing process was similar for each test: BLS staff discussed the purpose of the American Time Use Survey, introduced test participants to the lexicon, conducted coding training, and provided a set of coding rules to use during testing. Debriefings with test participants were held after each test, and further revisions were made to the lexicon based on their feedback and the measures of coding accuracy. Also, coding rules were added and more fully developed to address difficult-to-code activities. Then, the next test was conducted using the revised lexicon and coding rules, and so on.

Coding issues and resolutions

Numerous coding issues emerged during the testing period, dress rehearsal, and pre-fielding; the most difficult challenges were how to code work, childcare, adult care, and travel. Other significant issues emerged around coding consumer goods and services purchases, media use, and volunteer activities. The BLS coding team gave a great deal of attention to the best way to handle these issues, implementing a combination of lexicon revisions and coding rules, and also developing additional probes and summary questions to be asked during and after the diary portion of the interview to elicit information about the respondent's activity or travel purpose. A summary of these special challenges and the implemented solutions are described in more detail in the following sections.

Work. Collecting and coding accurate measures of total time spent working was a BLS priority. Across occupations, work tasks are so varied that a coding system to handle them all would be prohibitively difficult to develop. Also, for most people, time spent working consists of numerous tasks, many of which are repetitive (such as "ringing up a customer's purchase"). Finally, a primary purpose of time-use surveys is to focus on examining how respondents balance work and other activities with family and leisure time, not specific occupational tasks. For these reasons, the ATUS team decided that "unpacking" the work day (collecting a detailed account of the respondent's activities) would unduly lengthen the interview, as well as create unnecessary coding difficulties. Early testing made clear, however, that although most work activities were clearly reported as such, the collected information did not always accurately capture work activities. Activities done outside the usual work environment or by self-employed persons or telecommuters were particularly

difficult to code. Consider a time diary with the following activities:

9:00 a.m.	"I sorted laundry and started washing a load."
9:10 a.m.	"I composed and sent an e-mail to a coworker."
9:25 a.m.	"I put the clothes in the dryer."
9:29 a.m.	"I was working on the computer."

Without additional information, these activities might be coded as doing laundry, sending e-mail, doing laundry, and computer use when, in fact, the respondent was doing work tasks at home in between household tasks. To address this issue, the ATUS questionnaire designers developed questions to be asked of all employed persons to identify work activities not clearly identified in the diary. Responses to these questions eliminated the guesswork about coding work activities.⁷

The ATUS team also revised the working and work-related activities category to include select activities (eating and drinking, socializing, and playing sports) that respondents often identified as being done as part of their job. These activities were added at the second-tier level, thus allowing data users the flexibility to classify such activities as either the activity itself or as work-related.

Childcare. The BLS coding team conceptually defined primary childcare as any activity done with a child that is interactive in nature—such as reading, playing, and talking—and correctly coding such activities posed few difficulties. However, other activities were considered primary childcare as well, but were not limited to this restrictive definition requiring interaction with a child. For example, an activity could be coded as childcare if a child was not present but the activity (such as "talking to my child's teacher") was clearly done in the child's interest or on the child's behalf. Further complicating coding were activities where a respondent reported doing something with a child, such as watching a movie; although not interactive, the presence of a child during the activity prompted coders to classify such an activity as childcare. These types of exceptions or ambiguities had to be addressed explicitly in a revised concept and related coding rules. Without such, coders would have trouble discerning that if a respondent reported "watching television" with a child in the room or "watching television with my child," the correct activity code would be the one associated with watching television under socializing, relaxing, and leisure. But, if the respondent reported "playing Monopoly with my child," the correct activity code would be "playing with children," under childcare.

The ATUS coding team devised an approach to help coders deal with the difficulties coding childcare and helping activities—an approach that combined classroom training, written conceptual definitions, and lists of examples of

activities that showed how and why a particular code should be assigned. The box (below) illustrates the types of examples used in the coding rules manual. These examples make it clear to coders that neither the presence of a child during an activity nor a child’s participation in the respondent’s activity is sufficient alone to code an activity as childcare. Rather, the guiding rule is that when the respondent is directly watching or interacting with a child only or accompanying a child to an activity that has no clear purpose without the child’s involvement, the activity should be coded as childcare. Also, coders were instructed to classify as childcare any activity during which the respondent reported doing something related to a child’s health care or educational needs, even if the child was not present during the activity, such as “attending a parent-teacher conference.”

Caring for and helping adults. Beginning with the first coding tests, coders found that distinguishing household activities from helping activities was difficult. The first-tier household activities category included doing laundry, paperwork, pet care, and organizational tasks for the household. Categories also existed for helping adults who live in the household and those who do not live in the household. An activity such as packing a suitcase or feeding a pet for another adult arguably could be coded as either a household activity or a helping activity.

The coding team developed guidelines, rules, and rationales similar to those in the box below to ensure consistent coding of activities done to help adults who live in the household. Coders were instructed to classify an activity under “helping household adults” only when an activity was done to benefit another household adult personally. So, the statement taken verbatim, “I helped my wife cook dinner,” would be coded as a household activity (meal preparation) because cooking a meal benefits the entire household, whereas the statement taken verbatim, “I filled out my husband’s application form,” would be coded as a helping activity.

Applying these same guidelines when respondents reported helping *nonhousehold* adults was not feasible, however, as “feeding my neighbor’s cat” does not logically fit as an activity done for the respondent’s household. In such cases, all reports of helping an adult who does not live in the respondent’s household were to be coded under the helping category in early versions of the lexicons. However, two coding activities—helping adults who do not live in the household and organizing and planning for these “nonhousehold adults”—were vague to coders. The BLS coding team sought a way to code activities done to “help” other adults while preserving the information about the actual helping activity. To accomplish this, the team significantly revised the second-tier lexicon category, helping nonhousehold adults, under caring for and helping nonhousehold members. This category was expanded to include eight categories that mirrored household activity categories. For example, the household section included “animal and pet care” and the new helping section included “animal and pet care assistance.” This change meant that coders, when faced with a report such as “feeding my neighbor’s cat,” would need not struggle with deciding whether to classify the activity as a household activity or a helping activity, but rather would assign a code that clearly identified the activity as both a helping one and a household one under helping nonhousehold adults/animal and pet care assistance. The additional advantage to this restructuring was that data users who did their own tabulations would be able to choose to classify such activities as either household or helping (or both), depending on their research needs.

Volunteering. Distinguishing volunteering activities from household or helping activities for nonhousehold members was problematic. Without clear rules, “reading to a blind neighbor” might reasonably be coded as helping a nonhousehold member, volunteering, or even socializing. “Feeding the neighbor’s cat” might correctly be coded either as helping a nonhousehold member or as volunteering.

Examples of how to code childcare versus other activities		
Reported activity	Correct lexicon category	Rationale
“Watching cartoons with my child”	Relaxing/watching television	Not an interactive activity
“Shopping for school clothes with daughter”	Shopping	Respondent’s primary activity is shopping
“Playing Monopoly with my wife and son”	Relaxing/playing games	Interactive activity with child and adult; presence of adult trumps presence of child
Talking to my neighbor and her children	Socializing and communicating	Interactive activity with children and adult; presence of adult trumps presence of children
Playing Monopoly with my kids	Childcare	Interactive activity, child only
Attending my child’s school PTA meeting	Childcare	Without the child, the respondent would not be attending the function

During the development of the coding lexicon, BLS took several steps to define a “volunteering” concept and to ensure that the information collected on volunteering was consistent with that concept. The first step was to draw a clear line (in terms of the coding lexicon) between formal helping (volunteering) and informal helping (caring for and helping nonhousehold members) by separating these into two major categories. Next, to establish a standard definition or, at least, some distinguishing characteristics of volunteer activities, BLS contracted with the National Opinion Research Center (NORC) to provide a literature review on volunteering. BLS also drew on the definition of volunteering that was used in a special supplement to the Current Population Survey that collected information on volunteering activities. The final ATUS conceptual definition describes volunteering as an activity that one did for or through an organization, of one’s own free will, and for no pay, except perhaps expenses. A question was added to the survey that asked respondents to identify which activities in their diary day were volunteering according to these criteria.

Travel. Travel activities were the most challenging ones for coders to assign accurately. A general rule for coding travel in both time-use and travel surveys is to code trips according to the traveler’s motivation or major purpose for each travel episode. For example, the verbatim “I drove my child to church” might reasonably be coded as travel related to religious activities by one coder and as travel related to childcare by another. Without clear-cut rules, assigning codes to travel episodes would be left up to each coder’s interpretation of verbatim reports, because respondents are not asked to specify their travel purpose.⁸ Initially, the main ATUS travel coding rule stipulated that travel episodes be coded to the travel *destination*, such as a school or store, the rationale being that destination implied purpose. However, the first draft coding lexicon associated travel with *activities* (for example, travel related to religious activities), not destinations or locations, so this rule could not be implemented successfully. To address this issue, the BLS coding team revamped the rules, instructing coders to associate the travel episode with the respondent’s next *activity* at the travel destination. To illustrate, if “I drove my child to church” was followed by “I dropped my child off,” then the travel episode would be coded as travel related to childcare. By contrast, if the next activity was “I attended worship service,” then the travel episode would be coded as travel related to religious activities. Rules were also revised to clarify how to code waiting while traveling, multi-leg trips, and trips with several intervening activities and destinations.

Despite these rule changes, travel activities were more complicated to code than any other category in subsequent

coding tests. As a result, “fixing” the travel coding rules and improving training became a top priority for the BLS coding team.

The greatest challenges centered around two related issues: how to determine the purpose of the travel episode and how to code waiting activities during or after travel episodes. Determining the purpose of a travel episode involved looking ahead to the activity reported at the travel destination. Following this travel rule worked relatively well when coding a single-destination trip, but became increasingly complex when multiple stops were involved, some of which may only have been incidental to the primary purpose of the travel. To collect travel data that most closely reflected true travel purpose, the BLS coding team originally directed coders to code travel to a destination’s activity during multiple-destination trips *only if the duration of the intervening destination’s activity was 10 minutes or longer*. Thus, if someone drove 30 minutes to work, but stopped for 5 minutes along the way to purchase a cup of coffee, all the travel was to be coded as travel related to work. However, if the coffee purchase took 10 minutes, the first leg of the trip was to be coded as travel related to consumer purchases and the second leg would be coded as travel related to work. Following this “10-minute” travel rule proved confusing and difficult to implement on many occasions and accuracy rates remained low despite substantial training efforts. Ultimately, the BLS requirement to apply the 10-minute travel rule when dealing with multi-stop trips was dropped. Instead, a rule was developed to code travel according to the purpose of each leg of a multi-stop trip, no matter the length of the stops at each destination.

Coding travel accurately was further complicated when the respondent reported waiting while traveling.⁹ The difficulties can be demonstrated using a hypothetical example of a time-use diary:

Travel leg 1:	Driving to the train station (20 minutes)
Activity:	Waiting for the train (15 minutes)
Travel leg 2:	Taking the train to the city (30 minutes)
Activity:	Waiting for a table (15 minutes)
Activity:	Eating at a restaurant (2 hours)

In this example, travel leg 1 would be coded as traveling related to waiting associated with traveling related to eating and drinking, whereas travel leg 2 would be coded as traveling related to waiting associated with eating and drinking. Because of these challenges, the confusing “waiting” categories were stripped from the travel categories, and coders were instructed to fold any waiting time while traveling directly into associated travel episodes.

The decision to code multiple-destination travel according to the purpose of the activity at the next destination, regardless of the length of time of the stop, means that travel

legs are often not actually coded to “main” purpose of the trip. Therefore, travel time related to certain activities may be under- or overreported when part of a multiple-destination trip. Analysts using travel data from the ATUS will probably want to examine the activity codes in detail and modify them according to their research interests. For example, those interested in measuring commuting time may want to make assumptions about trip purpose when the final destination is the workplace, but an intervening stop for another purpose took less than 10 minutes.

Purchasing consumer goods and services. A common category in time-use survey coding systems is purchasing goods and services. The ATUS lexicon originally adopted this phrasing, which is meaningful to economists, as it included time spent in all purchasing activities, but it was not intuitive to coders. Coder feedback and the results of coding accuracy evaluation from the earliest coding tests immediately pointed to problems with understanding the original purchasing goods and services category. In particular, the coders did not relate medical, legal, or childcare services to the goods and services category, and did not know where to look when coding an activity such as “having a doctor’s appointment.” To facilitate coding, the BLS coding team decided to break the goods and services category into several categories. One category would cover purchases of consumer goods, and several others would cover purchases of various services: professional services (including financial, legal, and medical); household maintenance services; and government services. However, in published tables these categories would be recombined into one category covering all goods and services.

Media use. In several other time-use surveys, activities such as reading books, magazines, and newspapers; watching television; listening to the radio; playing records, CDs, or tapes; reading mail and writing letters; and using the telephone, are classified under a mass media category. But determining where to classify and how to code types of media use—including using a computer or the Internet—in the ATUS proved challenging. Tests showed that the distinctions between some of the major activity categories were blurry, and activities could reasonably be coded under more than one category, depending on one’s interpretation of the category definitions. For example, classifying “reading the newspaper” under socializing and relaxing seemed to coders as logical as classifying it under media use, where other time-use surveys included it. To ensure accuracy at the first tier, the BLS coding team decided to drop the “media use” language, which was sometimes confusing for coders, and to include watching television, listening to the radio, reading for personal interest, and computer and Internet use for personal interest as subcategories under the overarching

category called *socializing, relaxing, and leisure*. However, reading e-mail and writing e-mail were grouped in the major category *household activities*, where handling regular mail is classified.

Other categories. Although the previously mentioned categories provided the most significant challenges, many other activities were important to clarify for coders as well. “Purchasing movie tickets” might be considered as making a consumer purchase or attending a movie. “Talking with a professor” might be coded as socializing and communicating or attending class. These and many more similarly ambiguous activities required BLS to make decisions about how conceptual definitions for each activity category should be refined and operationalized through coding rules. It was clear that any conceptual definitions and rules created for coding purposes might be at odds with the needs of individual data users because, ultimately, how an activity should be classified depends on the question being answered by analysts of time-use data. The need to build a coding lexicon that would allow consistent coding without losing analytical relevance and flexibility continued to be a challenge right up to the start of the survey.

Full production coding operations

Full production of the ATUS began in January 2003, with a 17-tier coding lexicon, desk aids, and an extensive coding rules manual. Although experienced in collecting data for other BLS surveys, Census Bureau employees at the Jeffersonville Telephone Center in Indiana faced new challenges in conducting and coding ATUS interviews. Collecting time-use data requires the use of *conversational interviewing*. That is, in addition to asking a series of structured, scripted questions to update household roster and employment status information, interviewers must guide respondents through their report about the prior day using active listening techniques and selective probing to keep respondents on task, filter out irrelevant information, and ensure adequate detail in order to code responses. ATUS also diverges from Census Bureau convention by requiring interviewers to code interview responses (although not from the interviews that they conducted) into activity categories—a job normally assigned to coding specialists.

The ATUS coding team conducted debriefings of Census Bureau interviewers after the dress rehearsal and pre-fielding periods ended, and has continued to do so periodically since the survey entered full production. Over time, interviewers have become increasingly comfortable with conversational interviewing. More importantly, interviewers’ reactions to their new dual job role as interviewers/coders have been consistently positive. When coding time diaries, interviewers

become more aware of the difficulty of classifying activities and the consequences of improperly or vaguely recorded activities. Because of this perspective gained from coding, interviewers have become much more skilled at collecting and recording codable time diary information.

Even the most carefully collected and recorded time diaries contain activities that are difficult to code. To achieve coding accuracy and consistency, the ATUS team focuses heavily on training and qualifying individuals before they are allowed to code real cases, and verifies all assigned codes in every case. This process is similar to the one implemented for the Australian time-use survey. After a coder completes a case, a second coder (the verifier) re-codes the same case without seeing the original codes. If both coder and verifier assign the same activity codes, the case is closed. If there is disagreement on any code, the case goes to an adjudicator who is an experienced supervisor or coach. The adjudicator assigns a correct code to the disputed activities, and then closes the case. The adjudicator also assigns an error to the coder or verifier (or both) who assigned the incorrect activity code. Information on errors is fed back to coders in the form of an error report and discussions with adjudicators as to why an activity code was reassigned. Thanks in part to this verification system, coding error rates dropped from 14.3 percent during the dress rehearsal in April 2002 to 5.5 percent in January 2004, 1 year into full production.

The experiences from testing the coding process and conducting a dress rehearsal demonstrated that without substantial training, practice, a comprehensive set of coding rules, and a verification process, many reported activities are open to a wide range of interpretation. Training and practice are essential to first-time interviewers/coders, as they convey interviewing and probing techniques, explain the coding lexicon and rules for coding, and allow ample opportunity for questions and answers.

Using the Blaise-designed computer coding application also contributes to accurate and consistent coding. Completed cases are loaded into the ATUS coding application, which has multiple windows so coders can simultaneously view the activity being coded, the coding categories, and the respondent's entire time diary. In the time diary window, the following information is included for each activity: start time, duration, who was in the room with or accompanied the respondent, location, and whether or not the respondent identified the activity as done as part of one's job, as another income-generating activity, or as volunteering for an organization. Using tabs at the top of the window, the coder can access additional information on the respondent's occupation and industry, the ages and relationships of household members, and any notes about the case that the interviewer added for assistance with coding. The coding software includes a search feature that helps coders find the

correct code for ambiguous activities and increases coding speed. Verification and adjudication systems are also built into the system.

Since full production began, debriefings and the coding verification and adjudication systems have brought to light coding issues that required some changes to the coding lexicon and coding rules. These changes were implemented in January 2004, are few and relatively minor, and will have little or no impact on the continuity of the data between 2003 and 2004. Lexicon changes—mostly in the form of adding examples—largely help to disambiguate activity categories and provide a better understanding for the staff doing the coding.

Unlike other survey classification systems—such as those relating to occupations or industries, which require periodic revisions to reflect changes in business practices or a restructuring of the economy—the time-use activity categories at the first-tier level in the coding lexicon are not likely to change significantly. Although relative time spent in various activity categories may grow or decline as a result of cultural, workplace, or technological changes, the major activity categories themselves will probably remain the same. After carefully reviewing and analyzing the first few years' time-use estimates, second- and third-tier activity categories may be expanded to enable the collection of greater detail for activities that account for a lot of time, or collapsed to combine activities that show up infrequently. For example, if analyses show that computer use for personal interest accounts for a disproportionate amount of time spent in leisure activities, this category could be broken into two third-tier categories: non-Internet computer use for personal interest and Internet use for personal interest to obtain measures of both “off-line” and “on-line” computer use.

Structure of the classification system

As mentioned earlier, the ATUS coding lexicon uses a hierarchical structure, classifying reported activities into major categories, with two additional levels of detail in each category. ATUS, however, has a much larger number of first-tier (major) categories than other time-use surveys: 17 as opposed to an average of 10. Also, ATUS coders assign a six-digit classification code to each diary activity, rather than the three-digit code commonly used in other time-use surveys. The first two digits represent the major activity categories, the next two digits represent the second-tier level of detail, and the final two digits represent the third—the most detailed level of activity. The final code in every tier is 99, which represents activities classified in each tier's relevant activity, but which are not elsewhere classified.

For example, the ATUS code for “making the bed” is 020101. “Making the bed” appears in the coding application as an

Major analytical activity categories, 2003

- Personal care
- Eating and drinking
- Household activities
- Purchasing goods and services
- Caring for and helping household members
- Caring for and helping nonhousehold members
- Working and work-related activities
- Educational activities
- Organizational, civic, and religious activities
- Leisure and sports
- Telephone calls, mail, and e-mail
- Other activities, not elsewhere classified (n.e.c.)

example under the third-tier category, *interior cleaning*, which is part of the second tier category, *housework*, which falls under the *household activities* major category:

- 02 Household activities
 - 01 Housework
 - 01 Interior cleaning
 - making the bed*
 - 02 Laundry
 - 03 Sewing, repairing, and maintaining textiles
 - 04 Storing interior household items, including food
 - 99 Housework, n.e.c.

The adoption of a 6-digit classification code has the advantage of enabling greater flexibility than 3-digit systems in adding new subcategories under major and second-tier categories. Although most categories have nine or fewer subcategories, some, such as sports participation, have many more, taking advantage of this flexibility. The 99 options under each tier leave the door open for future revisions.

An important note about the ATUS interview: only *primary*

activities are systematically collected and coded. Respondents are not systematically questioned about simultaneous activities; however, if they volunteer that two or more activities were done simultaneously, the interviewer probes for the main—or primary—activity, which is recorded first in the activity field.¹⁰ The coding staff is instructed to assign an activity code only to the primary activity; in this way, each respondent’s day adds up to no more than 24 hours.

Coding versus publication activity categories

The central concerns influencing the development of the coding lexicon were the need for coding consistency and the need for analytical flexibility. The lexicon categories are conceptually and operationally distinct to enable consistency, but they are not necessarily the best categories for analytical reporting. In the first publication of ATUS data, composites of the original coding lexicon categories were developed into analytical categories to describe how people use their time. (See the box for the major analytical activity categories.) Appendix A provides definitions of the major categories used in the first published tables (as part of the September 2004 news release¹¹) and appendix B “crosswalks” those categories to the lexicon categories described earlier.¹²

IN SUMMARY, the ATUS classification system is characterized by its detail and flexibility. These characteristics, while important for maximizing the survey’s use to analysts of the data, also increase the complexity for coders. Understanding how ATUS data are collected and classified, as well as understanding the special coding challenges, represent an important first step for researchers who wish to develop meaningful analyses, including comparisons of time-use data collected through other surveys. □

Notes

¹ For a detailed description of the evolution of ATUS, see Diane Herz and Michael Horrigan, “Planning, designing, and executing the BLS American Time Use Survey” *Monthly Labor Review*, October 2004, pp. 3–19.

² Alexander Szalai, *The use of time: Daily activities in urban and suburban populations in twelve countries* (The Hague, Mouton, 1972).

³ Dagfinn Aas, “Studies of Time-Use: Problems and Prospects,” *Acta Sociologica*, vol. 2, 1978, pp. 125–141; Dagfinn Aas, “Designs for Large Scale Time-Use Studies of the 24-Hour Day,” *Its About Time* (International Research Group on Time Budgets and Social Activities, 1982); and Iris Niemi, Salme Kiiski, and Mirja Liikkanen, *Use of Time in Finland 1979* (Helsinki, Central Statistical Office of Finland, 1986).

⁴ Szalai, *The use of time*, 1972.

⁵ This software was developed by Statistics Netherlands and is the standard for both survey and coding applications at the Census Bureau.

⁶ A “dress rehearsal,” conducted during April–July of 2002, marked the first time all components (the collection instrument, the coding instrument, operations procedures, and so forth) of the ATUS were tested at one time, and was designed to mimic full production survey conditions, including live interviewing. Pre-fielding followed the dress rehearsal, and took place from August until full production began in January of 2003. Pre-fielding provided an opportunity to refine operations, interviewing and coding processes, and collect preliminary data for analysis.

⁷ See Herz and Horrigan, “The BLS American Time Use Survey,” 2004, for more information on the ATUS work summary questions.

⁸ In 2002, BLS contracted with the National Opinion Research Center to conduct cognitive research on how respondents identified

the purpose of travel episodes. Research conclusions pointed to the difficulties in collecting accurate and consistent information on travel purposes. For example, respondents often reported on the purpose of their next activity, not the travel episode: The question, “What was your purpose in driving to the gym?” might elicit a response of “Because I want to lose weight.” For this reason, ATUS interviewers are not instructed to probe for the main purpose for travel episodes, but rather deduce it from the nature of the activity reported following the travel episode.

⁹ The travel category had, like all other categories in the lexicon,

a “waiting” category at the third tier for each second tier category.

¹⁰ See Herz and Horrigan, “The BLS American Time Use Survey,” 2004, for more information on the decisions made about the collection and coding of simultaneous activities.

¹¹ See “Economic News Releases” on the ATUS Web site at www.bls.gov/tus/home.htm for the September 2004 news release.

¹² The complete 2003 ATUS Activity Coding Lexicon is available on the Internet at: www.bls.gov/tus/lexiconwex2003.pdf.

APPENDIX A: Activity categories and definitions

Personal care activities. Personal care activities include sleeping, bathing, dressing, grooming, health-related self-care, and personal or private activities. Receiving unpaid personal care from others (for example, “my sister put polish on my nails”) is also captured in this category. Respondents are not asked *who* they were with or *where* they were for personal activities, as such information can be sensitive. The following list illustrates sample activities that respondents report and the category into which the interviewer/coder placed those activities.

<i>Reported activity</i>	<i>Lexicon category</i>
Tossing and turning in bed	Sleeplessness
Blow-drying my hair	Washing, dressing, and grooming
My sister braided my hair	Washing, dressing, and grooming
Doing childbirth exercises	Health-related self-care
Cuddling partner in bed	Personal/private activities

Household activities. Household activities are those done by respondents to maintain their households. These include housework; cooking; yard care; pet care; vehicle maintenance and repair; and home maintenance, repair, decoration, and renovation. Food preparation, whether or not reported as done specifically for another household member, is always classified as a household activity, unless the respondent identified it as a volunteer, work, or income-generating activity. For example, “making breakfast for my son” is coded as a household activity, not as childcare. Household management and organizational activities—such as filling out paperwork, balancing a checkbook, or planning a party—also are included in this category.

Although all mail and e-mail activities are originally classified in the household activities category during coding, these activities are pulled out of the household activities and included in the composite category Telephone, Mail, and E-mail category in published tables. The following list is a sample of reported household activities and the categories into which they belong.

<i>Reported activity</i>	<i>Lexicon category</i>
Putting away groceries	Storing interior items
Hemming a skirt	Sewing, repairing, and maintaining textiles
Boiling water for tea	Food and drink preparation
Putting up bookshelves	Interior arrangement, decoration, and repair
Loading software on PC	Appliance and tool set-up and repair
Cleaning the pool	Ponds, pools, and hot tubs
Filling out tax forms	Financial management

Caring for and helping household members. Time spent doing activities to care for or help any child or adult in the respondent’s household, regardless of relationship to the respondent or the physical or mental health status of the person being helped, are classified here. Caring and helping activities for household children and adults are coded separately in subcategories. Household members are considered children if they are under 18.

Primary childcare activities include physical care; playing with children; reading to children; assistance with homework; attending children’s events; taking care of children’s health care needs; and dropping off, picking up, and waiting for children. Passive childcare done as a primary activity (such as “keeping an eye on my son while he swam in the pool”) also is included. A child’s presence during the respondent’s activity is not enough in itself to classify the activity as childcare. For example, “watching television with my child” is coded as a leisure activity, not as childcare.

Secondary childcare is care for children that is done while doing something else. This information is collected by asking the respondent about times when “a child was in your care” while doing something else as a primary activity, and is available in published ATUS tables and in the ATUS public use data files. It is not part of the ATUS coding lexicon.

Caring for and helping household members also includes a range of activities done to benefit adult members of households, such as providing physical or medical care or obtaining medical services. Doing something as a favor for, or helping another household adult does not automatically result in classification as a helping activity. For example, a report of “helping my wife cook dinner” is considered a household activity (food preparation), not a helping activity, because cooking dinner benefits the household as a whole. By contrast, doing paperwork for another person usually benefits the individual, so a report of “filling out an insurance application for my husband” is considered a helping activity. For example, the following list shows the reported caring or helping activity on the left and the coded activity on the right.

<i>Reported activity</i>	<i>Lexicon category</i>
Tucking my son in bed	Household childcare: physical care
Riding bikes with my kids	Household childcare: playing sports
Waiting for the school bus with my child	Household childcare: waiting for or with household child
Talking to my child’s teacher	Household childcare: meetings and school conferences (child’s education)

Meeting with my mother's adult care provider (mother is household member)	Household adult care: obtaining medical and care services
Packing a suitcase for my wife	Helping household adults: organization and planning
Dropping my husband off at work	Helping household adults: picking up or dropping off

Caring for and helping nonhousehold members. Activities done to care for or help any child or adult who is not part of the respondent's household, regardless of the relationship to the respondent or the physical or mental health status of the person being helped, are classified in this category. Caring and helping activities for nonhousehold children and adults are coded separately in subcategories. Nonhousehold members are considered children if they are under 18. When done for or through an organization, time spent helping nonhousehold individuals is classified as volunteering rather than as helping nonhousehold members. Non-household childcare, even done as a favor or a helping activity for another adult, is always classified as nonhousehold childcare, not as helping another adult.

The activity classifications for this category parallel those for the caring for, and helping household members category, with one notable exception. The subcategory of helping nonhousehold adults is expanded to include more activities that the respondent identifies as "helping;" this subcategory is further broken into broad shopping and household activity groupings. The following list shows examples of these activities and categories.

<i>Reported activity</i>	<i>Lexicon category</i>
Attending my niece's school play	Nonhousehold childcare: attending children's events
Dropping off my friend's son at school	Nonhousehold childcare: dropping off/picking up children
Grocery shopping for my mother	Helping nonhousehold adult: housework, cooking, and shopping assistance
Filling out a form for my neighbor	Helping nonhousehold adult: household management and paperwork assistance
Waiting with my friend at the emergency room	Caring for nonhousehold adult: waiting associated with caring
Feeding my neighbor's cat	Helping nonhousehold adults: animal and pet care assistance

Working and work-related activities. This category includes time spent working, doing activities as part of one's job, engaging in income-generating activities (not as part of one's job), and job search activities. "Working" includes hours spent doing the specific tasks required of one's main or other job, regardless of location or time of day. Activities done outside of regular work hours are classified as work if identified by respondents as part of their jobs. "Work-related activities" include activities that are not obviously work but are identified by the respondent as being done as part of one's job, such as having a business lunch or playing golf with clients. "Other income-generating activities" are those done "on the side" or under informal arrangement and are not part of the respondent's regular job. Such activities might include selling homemade crafts, babysitting, maintaining a rental property, or having a yard sale. Respondents identify these activities as ones they "are paid for or will be paid for."

Work and work-related and income-generating activities are identified during data collection by the respondent and flagged as such with an M, O, or P in the instrument that coders use to assign activity codes. The following list shows examples of these reported work activities and the categories into which they belong (M = done as part of main job; O = done as part of other job; and P = done as income-generating activity).

<i>Reported activity</i>	<i>Lexicon category</i>
Grading papers at home (M)	Working, main job
Telephoning a coworker (M)	Working, main job
Attending a conference (M)	Working, main job
Using computer to write memos (O)	Working, other job
Enrolling in work-related training (M)	Working, main job
Having lunch with clients (O)	Work-related: eating and drinking as part of job
Playing piano in a wedding (P)	Income-generating activities: performances
Mowing the neighbor's lawn (P)	Income-generating activities: services
Selling stuff at a yard sale (P)	Income-generating activities: other, n.e.c.
E-mailing resumes to employers	Job search and interviewing: active job search
Preparing for a job interview	Job search and interviewing: interviewing

Educational activities. Educational activities include taking classes (including Internet or other distance learning courses); doing research and homework; and taking care of administrative tasks, such as registering for classes or obtaining a school identification card. For high school students, before- and after-school extracurricular activities (except sports) are also classified as educational activities. Activities are classified separately by whether the educational activity was for a degree or for personal interest. Educational activities do not include time spent for classes or training that respondents identified as part of their jobs. Time spent helping others with their education-related activities is classified in the *Caring for and helping* categories. The following list shows examples of reported educational activities and the lexicon categories into which they are classified (PI = personal interest and D = degree).

<i>Reported activity</i>	<i>Lexicon category</i>
Attending a seminar (PI)	Taking class: for degree
Taking an exam (D)	Taking class: for degree
Talking to a professor about a paper (D)	Taking class: for degree
Taking a parenting class (PI)	Taking class: for personal interest
Taking driving lessons (PI)	Taking class: for personal interest
Waiting for class to start (D)	Waiting associated with taking classes
E-mailing homework to teacher (D)	Research/homework: for class for degree
Meeting with the Science Club—DP is high school student (D)	Extracurricular school activities: club activities

Organizing class notes (D) Research/homework: for class for degree
 Paying fees during registration (PI) Registration/administration activities: for class for personal interest

Looking at apartments to rent Activities related to purchasing/selling real estate
 Talking to a real estate agent Activities related to purchasing/selling real estate
 Paying for veterinary services Using veterinary services

Purchasing goods and services. This category includes the purchase of consumer goods as well as the purchase or use of professional and personal care services, household services, and government services. Most purchases and rentals of consumer goods, regardless of mode or place of purchase or rental (in person, via telephone, over the Internet, at home, or in a store) are classified in this category. Gasoline, grocery, other food purchases, and all other shopping are further broken out into subcategories. The following list shows examples of respondents' reported activity and the lexicon category for purchasing goods and services.

Time spent arranging for and purchasing household services provided by someone else also is classified in this category. Household services include housecleaning; cooking; lawn care and landscaping; pet care; tailoring, laundering, and dry cleaning; vehicle maintenance and repairs; and home repairs, maintenance, and construction. Some of the sample activities are included in the following list.

<i>Reported activity</i>	<i>Lexicon category</i>
Ordering groceries over the Internet	Grocery shopping
Talking to the produce manager	Grocery shopping
Pumping gas	Purchasing gas
Paying for pizza delivery	Purchasing food (not groceries)
Buying fast food	Purchasing food (not groceries)
Browsing at the department store	Shopping, except groceries, food, and gas
Renting a rug shampooer	Shopping, except groceries, food, and gas
Returning videotapes to rental store	Shopping, except groceries, food, and gas
Picking up film	Shopping, except groceries, food, and gas
Comparison shopping	Researching purchases
Waiting in line at the grocery store	Grocery shopping

<i>Reported activity</i>	<i>Lexicon category</i>
Paying the housecleaning service	Interior cleaning services
Hiring carpet cleaners	Interior cleaning services
Meeting with a caterer	Meal preparation services
Dropping clothes at the dry cleaner	Clothing repair and cleaning services
Hiring a building contractor	Home maintenance, repair, decoration, and construction services
Talking to the furniture movers	Home maintenance, repair, decoration, and construction services
Hiring a pet trainer	Pet services
Paying the landscaper	Lawn and garden services
Waiting while car oil is changed	Vehicle maintenance and repair services

This category also captures the time spent obtaining government services—such as applying for food stamps—and purchasing government-required licenses or paying fines or fees. Some other examples of these activities and categories are:

Time spent obtaining, receiving, and purchasing professional and personal care services provided by someone else also is classified in this category. Professional services include childcare, financial services and banking, legal services, medical and adult care services, real estate services, and veterinary services. Personal care services include day spas, hair salons and barbershops, nail salons, and tanning salons. Activities classified here include the time respondents spent paying, meeting with, or talking to service providers, as well as time spent receiving the service or waiting to receive the service. The following list shows examples of respondents' reported activities regarding purchases of professional services and the lexicon category into which they are categorized.

<i>Reported activity</i>	<i>Lexicon category</i>
Talking to a police officer	Police and fire services
Waiting while the fire department detects for carbon monoxide	Police and fire services
Applying for food stamps	Social services
Meeting a social worker	Social services
Getting a passport	Obtaining licenses and paying fines, fees, and taxes
Paying a speeding ticket	Obtaining licenses and paying fines, fees, and taxes

<i>Reported activity</i>	<i>Lexicon category</i>
Interviewing a nanny	Using childcare services
Paying for a child's day camp	Using childcare services
Checking out a daycare facility	Using childcare services
Using the bank ATM	Banking
Meeting with a tax advisor	Using financial services
Sitting in the doctor's waiting room	Using health and care services outside the home

Eating and drinking. All time spent eating and drinking (except when identified by the respondent as part of a work or volunteer activity), whether alone, with others, at home, at a place of purchase, in transit, or somewhere else, is classified in this category. Time spent purchasing or talking related to purchasing meals, snacks, and beverages is not counted as part of this category; time spent doing these activities is classified under *Purchasing goods and services*. The following list provides examples of eating and drinking activities and the categories into which they are classified.

<i>Reported activity</i>	<i>Lexicon category</i>
Sipping tea	Eating and drinking
Waiting for a restaurant table	Waiting associated with eating and drinking
Snacking on pretzels	Eating and drinking
Drinking some brews	Eating and drinking
Eating a bite	Eating and drinking
Waiting for pizza delivery	Waiting associated with eating and drinking

Organizing coin collection	Collecting as a hobby
Attending the ballet	Arts and entertainment: performing arts
Visiting an art gallery	Arts and entertainment: attending museums
Horseback riding	Participating in sports, exercise, or recreation: participating in equestrian sports
Watching a soccer game (not TV)	Attending sporting, recreational events: watching soccer

Leisure and sports. The leisure and sports category includes sports, exercise, and recreation; socializing and communicating; and other leisure activities. Socializing and communicating includes face-to-face social communication and hosting or attending social functions. Time spent communicating with others using the telephone, mail, or e-mail is not part of this category. These activities are included in the separate *Telephone calls, mail and e-mail* category. Leisure activities include watching television; reading; relaxing or thinking; playing computer, board, or card games; using a computer or the Internet for personal interest; playing or listening to music; and other activities, such as attending arts, cultural, or entertainment events.

Participating in—as well as attending or watching—sports, exercise, and recreational activities, whether team or individual and competitive or noncompetitive, fall into this category. Some sample activities are in the following list.

<i>Reported activity</i>	<i>Lexicon category</i>
Hanging out with the family	Socializing and communicating with others
Chatting with my neighbors	Socializing and communicating with others
Spending time with my friends	Socializing and communicating with others
Attending a friend's graduation	Attending/ hosting parties, receptions, ceremonies
Attending a senior citizens meeting	Attending meetings for personal interest
Sunbathing	Relaxing, thinking
Daydreaming	Relaxing, thinking
Watching my wife garden	Relaxing, thinking

Organizational, civic, and religious activities. This category is a composite of several coding lexicon categories and captures time spent volunteering for or through an organization, performing civic obligations, and participating in religious and spiritual activities. Civic obligations include government-required duties, such as serving jury duty or appearing in court, and activities that assist or influence government processes, such as voting or attending town hall meetings. Religious activities include those normally associated with membership in or identification with specific religions or denominations, such as attending religious services; participating in choirs, youth groups, orchestras, or unpaid teaching (unless identified as volunteer activities); and engaging in personal religious practices, such as praying. Reading the Bible or other holy text or scriptures is classified as reading under *Leisure and sports*. The following list shows sample reported activities and the lexicon category into which they belong (V = Volunteer activities).

<i>Reported activity</i>	<i>Lexicon category</i>
Attending a church revival	Attending religious services
Praying alone	Participating in religious practices
Designing a Web site (V)	Volunteer activities: administrative and support activities
Participating in a government survey	Civic obligations and participation
Baking cookies for the PTA bake sale (V)	Volunteer activities: social service and care activities
Emceeding a charity function (V)	Volunteer activities: Participating in performance and cultural activities

APPENDIX B: Crosswalk between ATUS coding lexicon major categories and published tables major categories, 2003

Published tables: major categories	Code	Coding lexicon categories
Personal care	01 1701	Personal care activities Travel related to personal care
Eating and drinking	11 1711	Eating and drinking Travel related to eating and drinking
Household activities	All 02, except (020903 020904) 1702	Household activities (Household and personal mail and messages Household and personal e-mail and messages) Travel related to household activities

Appendix B: Continued—Crosswalk between ATUS coding lexicon major categories and published tables major categories, 2003

Published tables: major categories	Code	Coding lexicon categories
Purchasing goods and services	07	Consumer purchases
	08	Professional and personal care services
	09	Household services
	1001	Using government services
	100301	Waiting associated with using police/fire services
	100302	Waiting associated with obtaining licenses
	100399	Waiting associate with using government services or civic obligations, n.e.c.
	1004	Security procedures related to government services/civic obligations
	1099	Government services, n.e.c.
	1707	Travel related to consumer purchases
	1708	Travel related to using professional and personal care services
	1709	Travel related to using household services
	171001	Travel related to using police/fire services
	171002	Travel related to using social services
	171003	Travel related to obtaining licenses and paying fines/fees
171099	Travel related to government services and civic obligations, n.e.c.	
Caring for and helping household members	03	Caring for and helping household members
	1703	Travel related to caring for and helping household members
Caring for and helping nonhousehold members	04	Caring for and helping nonhousehold members
	1704	Travel related to caring for and helping nonhousehold members
Working and work-related activities	05	Working and work-related activities
	1705	Travel related to working and work-related activities
Educational activities	06	Education
	1706	Travel related to education
Organizational, civic, and religious activities	14	Religious and spiritual activities
	15	Volunteer activities
	1002	Civic obligations and participation
	100303	Waiting associated with civic obligations and participation
	1714	Travel related to religious and spiritual activities
	1715	Travel related to volunteer activities
171004	Travel related to civic obligations and participation	
Leisure and sports	12	Socializing, relaxing, and leisure
	13	Sports, exercise, and recreation
	1712	Travel related to socializing, relaxing, and leisure
	1713	Travel related to sports, exercise, and recreation
Telephone calls, mail, and e-mail	16	Telephone calls
	1716	Travel related to telephone calls
	020903	Household and personal mail and messages
	020904	Household and personal e-mail and messages
Other activities, not elsewhere classified	1717	Security procedures related to traveling
	1799	Traveling, n.e.c.
	50	Data codes