Measuring the complexity of hours at work: the weekly work grid

A new 'workweek grid' that allows researchers to pinpoint actual time at work, finds less than a third of French workers describe a regular 9- to-5 schedule; it also may account for the persistent discrepancy between standard workweek estimate questions and more detailed methods of measuring the length of one's workweek

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Accurate measures of time spent at work are becoming more crucial in the information societies of the 21st century. Variations in the number of hours that individuals spend working provide important evidence in comparisons of the quality of employment across occupations, countries, and time.

Thus, considerable academic and policy debate has centered on whether American workers, or workers in other countries are working more hours than workers did in the past.[1] Similar controversies have arisen about how work hours generate differential time pressures on women, versus men. Precise measures of work hours are also an important factor in determining worker productivity levels and trends—as in a recent study by the Bureau of Labor Statistics and the Bureau of Economic Analysis, which indicates that productivity measures constructed from surveys of employees showed similar growth rates to those constructed from employees' records.[2]

In various countries, and for many decades, government and other surveys have routinely asked workers simply to estimate how many hours they work either "per week," last week," or in a "typical week." Questions have arisen about the utility and interpretation of survey work-hour data using these standard work-hour estimate questions. Included in such discus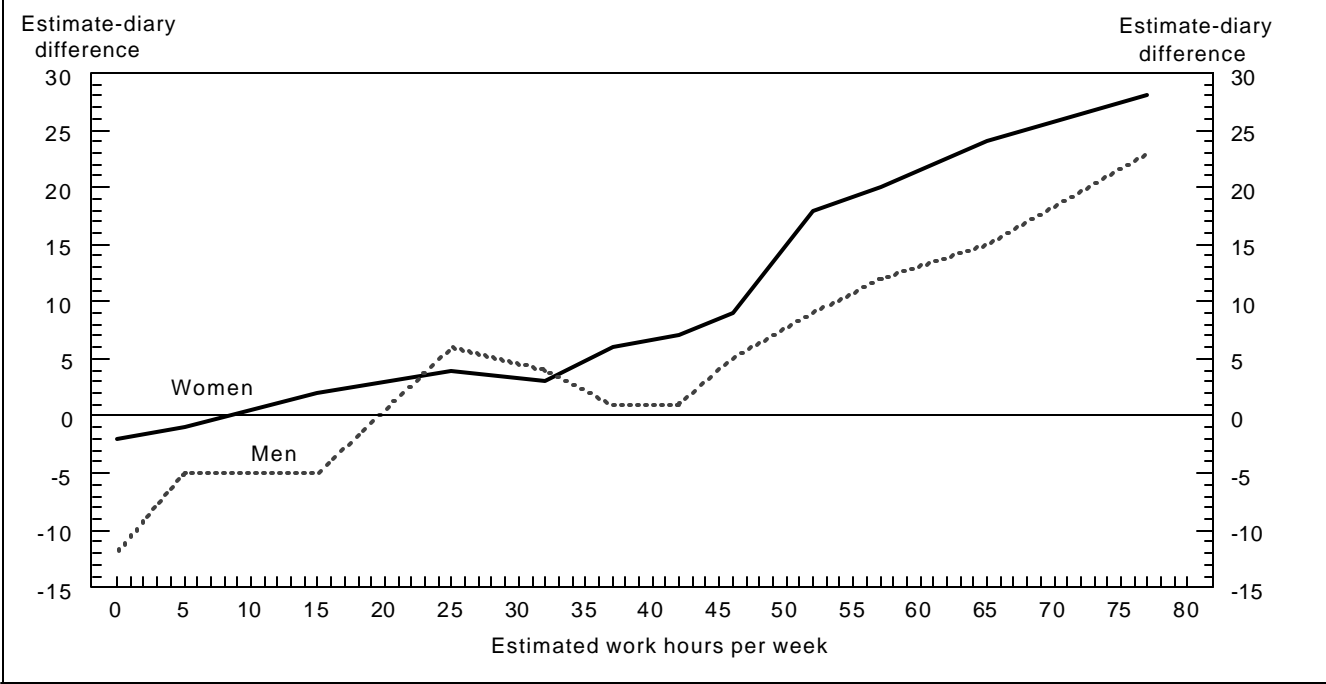sions are concerns about how to handle paid breaks, meal-times, and the commute to work—as well as how many hours the worker has to be at work (even if some of it is idle time), and other ways that "time spent at work" differs from "actual time spent working, or "expected time working."

In the United States, it appears that survey respondents answer these standard questions in less than 10 seconds—either due to the perceived similarity of their work hours from day-to-day or week-to-week, because of implied work arrangements with employers, or because workers provide answers in rough standardized hours based on societal or industry norms, like the 40-hour or 35-hour workweek.[3] Significant and consistent disparities have been found between these workweek estimates and the figures derived from comprehensive reports of work in worker "time-diaries" that detail all of their work during a typical day. These results have been replicated using data from nine other countries in which time-diary data were available to compare directly with work estimates.[4] (The estimate-diary discrepancy is graphically illustrated in chart 1.) Moreover, there is evidence that the gap between estimates and diary work hours have been increasing since the 1960s.[5]

Part of the reason for this gap may be the increased proportions of workers in the service sector of the economy, in which job requirements focus on nonstandardized tasks to be accom-

Chart 1. Values of the difference between estimated and diary work for men and women, 1985 data (in hours per week)

Estimate-diary difference | Estimate-diary difference

(Chart showing two curves labeled "Women" (solid line) and "Men" (dotted line). X-axis: "Estimated work hours per week" ranging from 0 to 80. Y-axis: Estimate-diary difference ranging from -15 to 30.)

plished rather than precise numbers of hours worked. This is a factor that is extremely important in gauging worker performance in traditional manufacturing and other factory jobs. As the time clock becomes a less applicable measure of work accomplished, however, workers' ability to estimate their work hours might become a more challenging task. Added to this can be the increased variation in daily hours required in an increasingly globalized economy and the shorter job tenure for workers as they transfer more frequently from job to job, or work fewer routine hours per week. In brief, there is reason to suggest that work schedules are becoming more complex in today's changing economy, and that may make it more difficult to estimate actual work hours accurately.[6]

Working for pay is not the only daily activity subject to measurement discrepancies using the estimate approach. Both M. Marini and B. Shelton and J. Press and E. Townsley have found even more inaccurate respondent reporting when survey respondents estimated the hours spent doing housework.[7] In contrast to the 10-percent to 15-percent overestimates of time spent at work in relation to the diary, both sets of authors have found that the housework estimate task was overestimated by up to 50 percent—even when respondents were asked to estimate times doing specific housework tasks (for example, how long it takes to cook or do laundry) rather than the accumulated general hours doing housework overall. Far greater overestimation occurs when respondents are asked to estimate the time they spend doing volunteer work.

Thus, in societies in which work hours and job tenure seem to become more variable than previously, there is a need for more appropriately designed and more detailed survey instruments; methods that would help workers participating in employment surveys to recall their work hours more systematically and accurately. Current workweek estimate questions implicitly assume that survey respondents are able to add up accurately the hours they spend on each of the 7 days of the week in order to provide accurate estimates of their workweek. The 3 to 10 seconds that most respondents take to answer such questions suggest that:

• Few workers take the effort and time to recollect each day's activity across the previous week—that is, to sum up their weekly hours in order to provide a complete, thoughtful, and accurate estimate

• Worker respondents resort to "satisficing" techniques to provide these weekly estimates, such as relying on general societal/organization norms or informal agreements with their employers about what work time is expected

These shortcuts would not represent unusual strategies for survey respondents. Indeed, J. Krosnick has developed a general model of respondent satisficing to explain many of the disparate findings in the voluminous literature on the sources of problems that arise when survey respondents encounter and attempt to navigate through the broad mixture

of questions that arise in the survey context.[8]

Problems with time estimates

The various steps survey respondents take in answering the standard time-estimate questions may cause various problems in producing accurate estimates. Asking someone, "How many hours do you work?" implicitly assumes that each respondent:

- Interprets "work" the same way
- Separates work as the most important activity (the primary activity) from other activities that are taking place simultaneously, but are ancillary or less important than other activities (secondary activities), such as socializing or attending to the media, while doing housework
- Undertakes a searching of memory for all episodes of work for each "yesterday" over the prior week
- Is able to properly add up all the episode lengths across the 7 yesterdays compromising the last week
- Feels comfortable describing this duration to an interviewer when it may not be a typical day or week
- Avoids reverting to social norms, stereotypes, or images of themselves about how much a "normal" person or "good worker"ought to work, like the normal 40-hour workweek

Any of these obstacles may be problematic in obtaining completely accurate responses regarding time use. This is particularly true in the survey context, in which respondents are expected to provide on-the-spot answers in a few seconds. What seems at first to be a simple estimate task turns out to involve several steps that are quite difficult to perform, even for a respondent with regular and clear work hours and a repetitive daily routine.

One consequence is that, when asked to provide daily and weekly estimates of a full range of daily activities, survey respondents give estimates that add up to considerably more than the 168 hours of time each person has available each week. In the studies of L. Verbrugge and D. Gruber-Baldine, average estimated weekly time across a comprehensive spectrum of behaviors totaled 187 hours, even though their list of activities did not include activities such as attending religious services, shopping for durable goods or professional services, and participating in adult education.[9] In another national survey, Hawes and others estimated weekly activities that averaged more than 230 hours; and, in total time-estimate studies of college students, the totals often exceeded more than 250 hours per week.[10] Thus, the survey estimate approach seems to have a built-in bias toward over-reporting, particularly for more socially desirable activities such as working or volunteering.

Basically, time-estimate questions yield the same types of problems that arise from expecting respondents to answer any "simple" question put to them. Survey research practice customarily involves accepting answers from respondents on almost any type of question. Often, these answers provide quite misleading results, as in the case of the survey question—"Where do you get most of your news information?" Although most respondents answer, "television," more detailed studies of actual information acquisition find television viewers turned out to be *less* likely than users of other media to have received news information from television.[11] This "simple" estimate question, then, asks for multiple and complex information and judgments (such as comparing news information across media or summing work hours across 7 days) that seems largely beyond the ability of most survey respondents to recall accurately in the manner expected.

Because of these difficulties, time-diary studies take a "micro-behavioral" approach to such questions, breaking each part of the question into easier and more answerable components of that micro-level behavior. Rather than ask about a vague or lengthy reference period, such as an "average" week, a "typical" day, or even "last week," respondents are asked to provide a step-by-step account of all their activities "yesterday;" the complete day freshest in their memory.

As an example, the popular survey question, "How many hours of TV do you watch on an average day?" (used in surveys by the Roper Organization, the General Social Survey among other survey firms) has consistently generated an average estimate of about 3 hours a day. However, when one study also asked these same respondents, "How many hours of TV did you watch yesterday?" and included all days of the week, the average was closer to 2.5 hours for that "average day."[12] One possible reason for this response discrepancy in the two questions was that more respondents reported zero hours "yesterday" than on an average day, indicating that these respondents translated the "average day" question frame of reference into "the average day *that you watch TV*." The "average" day thus becomes one in which television is viewed and not the occasional day when none was seen. These subtle respondent behaviors subvert the ability of researchers to provide accurate estimates.

Improving the workweek measures

To overcome problems with the work estimate question by making the respondent's task more micro-behavioral and thus more manageable (and by addressing concerns about respondent satisficing),[13] a Eurostat committee studying time use in general developed a "workweek grid" that implicitly met the following criteria to improve the workweek measure:

- Broke the reporting task into a more manageable and com-

Exhibit 1. Replica of Eurostat work grid

Week Schedule

When and for how long are you working?
Please mark this in the grid below, starting with the first diary day and seven days ahead. (You will find the date of the day on the cover of the first diary.)

Day of first diary day

Day Month

Did not work this week □

By work we mean gainful employment, first and second job (if any) self-employment and help in a business/farm which belongs to a family member. Also, include work brought home.

Don't mark unpaid breaks (e.g. lunch breaks) and commuting.

Please have a look at the example below before you start.

Person No.

| | Night | | Morning | | | Midday | | Afternoon | | Evening | | |

Day 1 0 1 2 3 4 5 6 7 8 9 10 11 12 01 02 03 04 05 06 07 08 09 10 11 12

Day 2

Day 3

Day 4

Day 5

Day 6

Day 7

0 1 2 3 4 5 6 7 8 9 10 11 12 01 02 03 04 05 06 07 08 09 10 11 12

Example:
Worked 08:15 am to 4:45 pm with a half hour break 11:00 to 11:30 am the 17ʰ of October

| | | Morning | | Midday | | Afternoon | | Evening | | |

Day X 0 1 2 3 4 5 6 7 8 9 10 11 12 01 02 03 04 05 06 07 08 09 10 11 12

1 7 1 0

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prehensible "per day" basis, rather than asking respondents to recall events over the entire 168 hours of the week

• Focused on each specific day over a *particular* 7-day period

• Asked respondents to record only the time each work-day began and ended (rather than asking them to make the (usual p.m. minus a.m. subtraction) time calculation them-selves

• Provided room on the survey to isolate lunch breaks and other episodes of nonwork during the day

• Used graphic reporting forms to allow visual ease of re-porting to improve respondent comprehension of the report-ing task required

Exhibit 1 shows a general work grid, based on recommen-dations from the Eurostat time-use committee. The work grid can be used to address these criteria in the following ways. First, respondents are shown an overview of the week and then asked to report their workweek in that 168-hour daily context. They are only required to report beginning and end-ing times at work each day (thus removing any respondent ambiguity about including commuting hours as part of work), with explicit provision of instructions to exclude lunch and other work breaks.

In the French study, respondents received a slightly modi-fied work grid prior to the survey week, so they could fill it

out for each day of the following week, and mail back the com-pleted forms in a self-addressed envelope at the end of the week. The first day of reporting was for the interviewer to visit the respondent. Each of the 7 reporting days had quarter-hour segments in cumulative "military time," from 0 (midnight) through 12 (noon) through 24 (the next midnight). Respon-dents were asked to mail the survey back to the firm, along with the surveys from each working member of the house-hold. Each worker in the household, then, was expected to keep an exact account of work hours for each day. (Note in exhibit 1, the instructions explicitly inform respondents that they are not to include meals, breaks, or commute times as part of work, and the example line at the bottom of exhibit 1 shows a work day that is divided into two segments. That respondents understood this need to break up workdays is evidenced in the complex patterns found in the b and c por-tions of exhibit 2.) French respondents also were asked whether the week in question was a normal workweek, was it devoted to meetings, or was it otherwise irregular.

Eurostat and the week grid. The idea of incorporating a workweek grid in time-use surveys originated from a Eurostat meeting of the Unit on Employment of the European Commu-nity Commission (Group V) in 1994. These researchers, in pre-paring and coordinating the European Time Use Surveys

(ETUS) planned to begin in most European countries in 1999, were interested in measuring *patterns* of weekly working hours as well as amounts. The weekly grid was created in co-operation with Statistics Sweden and pretested in Sweden and Italy in 1995. After a successful pretest, the weekly grid was included in the pilot surveys of several European countries during the 1996–97 period. Employed respondents started the grid on the first (diary) day and estimated their work hours for the prior 6 days. A total of 1,604 persons (aged 15 and older) filled a weekly grid and at least one comparable 1-day complete time diary. After the pilot survey, certain countries, such as France and Finland, decided to include the weekly grid in their diary survey. For this analysis, the French 1998–99 national data represent the first Eurostat diary study available.

The 1998–99 French time-use survey.   The French time-use survey, conducted between February 1998 and February 1999, was originally designed to include 20,000 individuals aged 15 and older in its sample. If any employed person lived in the household, the interviewer presented the workweek grid schedule and provided oral instructions about excluding lunch, work breaks, and commuting time from work time and including work brought home, self-employment, and help in family business. The respondents were asked to fill in the work grid, first for the interview day, and then asked to complete each day for 6 subsequent days. Respondents then mailed the grid back via pre-paid postage to the National Statistical Institute (Institut National de la Statistique et des Etudes Economique, or INSEE) 7 days later. This process relied less upon the respondents' recollection than did the Eurostat retrospective grid. Among those employed persons who completed a 1-day diary and who were reminded by telephone to do so, 79 percent (or about 60 percent of the original sample) returned the week grid to the National Statistical Institute. The estimate workweeks of those who responded differed little from those who did not.

The numbers of responses to the 1-day diary and to the workweek grid appear in table 1.

Results

Overall averages.   Comparisons of three measures of hours per week—diary, work grid, and estimate—indicate that the largest average was from the estimate (39.4 hours), the lowest for the diary (35.8 hours), with the work grid in between (37.1 hours). (See table 2.) Thus, the grid and diary figures are within 1.3 hours of each other, but the grid is 2.3 hours lower than the estimate and the diary is 3.6 hours lower. This provides independent evidence that simple workweek estimate questions provide overestimates, here, more like 6 percent, versus about 10 percent in relation to the diary.

The next 4 rows in table 2 show the grid and diary figures relative to the estimate figures for full-time, versus part-time

Table 1.	Final sample disposition for French Diary Survey, 1998–99		
		Work week grid	
	Total	Grid	No grid
Total	20,370	6,357	13,613
Nonrespondent[1]	5,286	...	5,286
Employed respondent	8,023	6,357	1,666
Nonemployed	7,061	...	7,061

 [1] Individuals who failed to mail back the diary survey.

 SOURCE: Institut National de la Statistique et des Etudes Economique, (National Statistical Institute, or INSEE).

workers, and for men, versus women. On the one hand, the disparity is much greater for full-time workers than for part-time workers, and indeed is not found (or is negative) among part-time workers—consistent with the earlier comparisons between the estimate and diary figures shown in chart 1 for American workers.[14]

On the other hand, the gaps are rather similar for male and female workers overall in the next two rows of table 2. The last four rows of table 2 compare full-time and part-time workers among men and women. These figures also show that among full-time employed workers, the gaps between estimates and the diary and grid for women are about as hour higher than for men.[15] In other words, the workweek estimates of full-time employed women are further from those of the diary/grid figures, compared with those figures found among full-time employed men. Female workers seem slightly more prone to over-estimate. Among part-time workers, however, a rather different pattern emerges. For women, there is a notable consistency in three sets of figures, whereas for men, the workweek estimates are strikingly lower (24.5 hours from the estimate, versus 31 hours both for the diary and grid). This reinforces earlier U.S. studies that found that men who are "underemployed" do report working more hours in time diaries than they estimate.

Chart 2 graphically presents the disparities between the estimated hours and both the diary and the workweek grid hours from the French sample. The work grid picks up much the same pattern ("The greater the estimate, the greater the overestimate.") found for diary-estimate data in chart 1.[16] The pattern is, again, slightly different for women than for men. For respondents who estimate working 50 hours or more per week, the diary figures are higher than the grid figures for men, whereas the grid figures are higher than the diary figures for women working more than 50 hours. At lower estimated work hours, the grid figures are slightly higher than diary figures relative to estimates for both men and women. Nonetheless, the same patterns found in chart 1, based on earlier U.S. diary-estimate discrepancies, are in evidence for diary-estimate and grid-estimate discrepancies in these 1998–99 French data. This provides independent evidence of the problems of probable overestimation in the workweek esti-

Characteristic	Length of paid work			Gaps between—		
	Number	Diary[1]	Work week grid[2]	Estimated[3]	Estimated and diary	Estimated and work week grid
Total sample	6,349	35.8	37.1	39.4	3.6	2.3
Full time	5,191	38.3	39.7	42.7	4.4	3.0
Part time	1,158	25.0	25.6	24.7	−.3	−.9
Men	3,455	39.4	40.9	43.0	3.6	2.1
Women	2,894	31.4	32.5	34.9	3.5	2.4
Men, full time	3,278	39.9	41.4	44.0	4.1	2.6
Men, part time	177	31.4	31.2	24.5	−6.9	−6.7
Women, full time	1,913	35.5	36.6	40.3	4.8	3.7
Women, part time	981	23.8	24.6	24.8	1.0	.2

[1] Only days are observed in the 1-day diary; here, the length of work for 1 week is the sum of the 7 observed means covering all the days of the week (Monday, Tuesday, and so forth).

[2] Length of work in the week grid.

[3] Self-estimated length of paid work (hours per week, source: question arithmetic mean of two estimates, one minimum and one maximum).

SOURCE: Institut National de la Statistique et des Etudes Economique, (National Statistical Institute), INSEE, 1998–1999 Time Use Survey (weighted data).

Chart 2. Differences between estimated and diary work hours and estimated and workweek grid hours, 1998–99 French Time-Use Survey sample
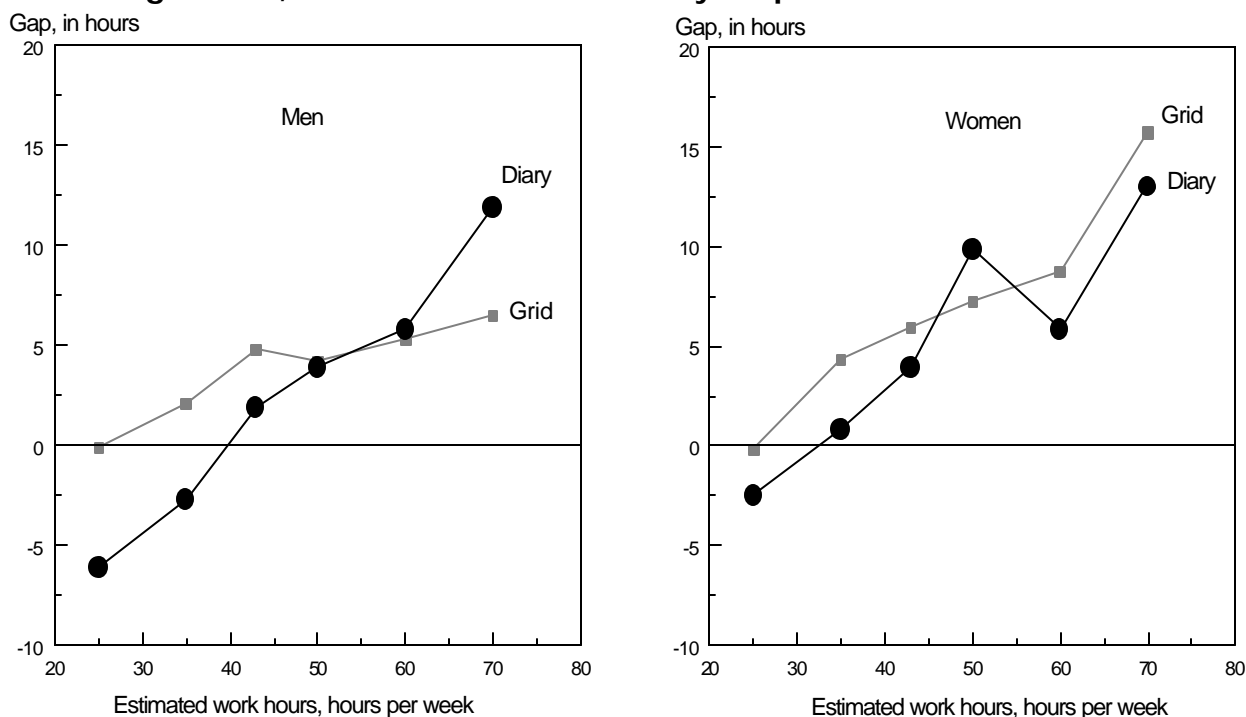
SOURCE: The National Statistical Institute (Institut National de la Statistique et des Etudes Economique or INSEE), 1998–99 Time Use Survey.

mate question. A possible reason for these discrepancies based on other work grid evidence is examined next.

Patterns of individual workweeks. In addition to providing an independent measure of the length of the workweek, the completed work grid contains an extremely rich and com-

plex set of information about each respondent's workweek. An analysis of these schedules was undertaken, with special attention to the question of the regularity of workweek schedules and the proportion of workers who followed a traditional and stereotypical "9-to-5" type schedule. One approach, which involved four criteria to define such regularity, was applied to the entire sample of more than 6,300 work grids. These criteria were:

- Workweek lengths between 35 and 44 hours
- Five consecutive days of work, Monday through Friday
- No night work
- No weekend work

Using these criteria, only 27 percent of full-time workers had a "regular" workweek. If the consecutive days were to include a Saturday or Sunday, the proportion rises to 32 percent. If stricter criteria were applied, such as a rigid 9 a.m. to 12 a.m. (noon) and 1 p.m. to 4 p.m. each day, the rate of regularity becomes close to zero.

It is possible to illustrate these patterns in exhibit 2. Because of the time-consuming and somewhat arbitrary nature of this process, however, it was necessary to limit such analyses to a small random subset of the obtained work grids. Therefore, a random sample of 50 of these grids was selected and was subjectively sorted into three work-pattern categories, described as "regular," "less regular," and "irregular." Subsequent random samples of 50 were drawn that produced similar results, with about a third of grids falling in each category.

Exhibit 2 provides a sample of 17 of these 50 grids that typify the three categories. In the "regular" category (a), the two respondents with the closest to 9-to-5 patterns are an information operator and a vocational teacher. Respondents in the other three occupations show notable departures from complete predictability day-to-day. In the "less regular" work-pattern category (b), the five patterns seem to vary markedly from day to day among most of the respondents. In the final irregular work-pattern category (c), the seven daily patterns among the respondents diverge even more markedly. In other words, about as many workers reported rather irregular schedules as regular schedules, and the remainder reported schedules that were at least somewhat irregular.

Thus, it is clear that most of these French employed respondents who might be asked on the spot to provide an overall estimate of their hours of work over the selected weekly period are faced with a rather daunting task, given the large number of "workdays" in which no work is reported offset by the large number of days in which the workday exceeds 8 hours. If respondents choose the simple heuristic, which we may presume they would use (such as calculating some average hour-per-day figure and multiply it by the number of days worked), many of them would have to calculate a so-

phisticated average across workdays—days that vary markedly in character and duration.

It would not be surprising, then, that to reasonably answer the question, "How many hours did you work during the week?," they would likely need to fall back on simple normative responses or employer expectations (like the standard 35- to 40-hour figure) in replying to the question. Moreover, so few respondents in have the luxury of regular schedules (as illustrated in exhibit 2) that researchers should not expect accurate estimates—even from respondents conscientious enough to simply multiply average daily hours by days worked.

Values of the grid

Analysis of a new and more detailed approach to measuring hours at paid work indicates that graphic techniques, such as the work grid, can help to make the definition of actual work time (which excludes commuting, lunch, and other break times) more expilcit. More importantly, graphic techniques can be used to document what appears to be work days that are unusually short or long in the context of the worker's full workweek.

The weekly grid thus suggests that there is great day-to-day variation in work hours both within and across individuals. Less than a third of respondents in the French national survey worked a schedule that could be characterized as "regular," and only 7 out of a randomly sampled 50 employees describe something close to the stereotypical 9- to-5 weekday schedule, presumed to apply to most workers. Instead, most work schedules fit into rather irregular patterns, which may explain why workers have difficulty answering the standard workweek question typically used in employment and more general surveys (particularly in the 3- to 10-second response period that respondents in U.S. surveys use to reply).

These findings reaffimed results from earler time-diary studies conducted in the Netherlands, which reveal that work-weeks in modern societies follow a bewildering variety of patterns—schedules that make it difficult for survey respondents to come up with reasonably accurate estimates of the hours they work.[17] As more workers work in less standardized environments, in time-intensive service industries, for multiple employers, in a 24-hour 7-day global economy, and under varying seasonal conditions, answering simple, traditional workweek estimate questions will become more difficult for them. Thus, the workgrid is a very useful survey vehicle, which could be used to examine whether workweeks in the United States are as diverse as they are in Western Europe.

As with the most detailed time-estimatimg procedures of the full-time diary, work hours reported in the grid are significantly lower than those reported in response to traditional workweek estimate questions. Moreover, work grids show the

Exhibit 2. Examples of randomly selected workweek grids, grouped into three categories of work-week regularity, 1998–99 French Time-Use Survey

a) Regular workweeks

Dia[1]	We[2]	We7[3]	Est[4]	D[5]	Occupation
		90.0	73		**Farmer**
...	12.5	...	...	1	-- wwwwww- wwwwwwwwwwwwwwwww- - wwwwwwwwwwwwwwwww----------------
...	12.5	...	...	2	-- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------
...	12.8	...	...	3	-- wwwwww- wwwwwwwwwwwwwwww- - wwwwwwwwwwwwwwwww-----------------
12.8	13.8	...	...	4	-- wwwwww- - wwwwwwwwwwwwwwwwwwwwwwwwwwwww------------------
...	12.8	...	...	5	-- wwwwww- wwwwwwwwwwww- wwwwwwwwwwwwwwww-----------------
...	12.5	...	...	6	-- wwwwww- wwwwwwwwwwww- - wwwwwwwwwwwwwwwww----------------
...	13.3	...	...	7	-- wwwwww- wwwwwwwwwwww- wwwwwwwwwwwwwwww-----------------
		65.5	60		**Cattle breeder**
...	8.5	...	...	1	----------------------- wwwwww- - wwwwwwwwwwww- - - - - - wwwwwwwwwwwwww---------------------------
...	9.5	...	...	2	----------------------- wwwwww- - wwwwwwwwwwww- - - - - - wwwwwwwwwwww-------------------- wwww-
...	8.5	...	...	3	----------------------- wwwwww- wwwwwwwwwwww- - - - - - wwwwwwwwwwww---------------------------
...	11.5	...	...	4	---------------- wwwwwwwwwwwwww- - wwww- - wwwwwwwwww- - wwwww- - - - - - - wwwwwwwwwwww----------------- wwww-
10.3	9.5	...	...	5	----------------------- wwwwww- wwwwwwwwwwww- - - - - - wwwwwwwwwwww----------------- wwww-
...	8.5	...	...	6	----------------------- wwwwww- wwwwwwwwwwww- - - - - - wwwwwwwwwwww---------------------------
...	9.5	...	...	7	----------------------- wwwwww- wwwwwwwwwwww- - - - - - wwwwwwwwwwww----------- wwww-
		40.0	38		**Information operator**
...	8.0	...	...	1	------------------------------------- wwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------------
...	8.0	...	...	2	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
...	8.0	...	...	3	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
...	8.0	...	...	4	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
7.8	8.0	...	...	5	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
...	.0	...	...	6	--
...	.0	...	...	7	--
	...	40.0	18		**Vocational teacher**
...	8.0	...	...	1	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwwww-----------------------
8.0	8.0	...	...	2	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
...	8.0	...	...	3	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
...	8.0	...	...	4	------------------------------------- wwwwwwwwwwww- - wwwwwwwwwwww-----------------------
...	8.0	...	...	5	------------------------------------- wwwwwwwwwwww- - - wwwwwwwwwwww-----------------------
...	.0	...	...	6	--
...	.0	...	...	7	--
		79.0	50		**Farmworker**
...	12.0	...	...	1	--------------------------- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwwwwwww-----------------
...	12.0	...	...	2	--------------------------- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------
...	12.0	...	...	3	--------------------------- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------
...	12.0	...	...	4	--------------------------- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------
...	12.0	...	...	5	--------------------------- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------
...	12.0	...	...	6	--------------------------- wwwwww- wwwwwwwwwwwwwwww- - - wwwwwwwwwwwwwwww-----------------
7.0	7.0	...	...	7	--------------------------- wwwwww- wwwwwwwwwwwwwwww-------------------- wwwwww-----------------

b) Less regular workweeks

Dia[1]	We[2]	We7[3]	Est[4]	D[5]	Occupation
		18.5	16		**High school administrator**
...	.0	...	...	1	--
...	2.5	...	...	2	--- wwwwwwwwwww--------------------------------------
.0	8.0	...	...	3	----------------------------------- wwwwwwwwwwww- - - - - - - wwwwwwwwwwwwwww-----------------
...	8.0	...	...	4	----------------------------------- wwwwwwwwwwww- - - - - - - wwwwwwwwwwwwwww-----------------
...	.0	...	...	5	--
...	.0	...	...	6	--
...	.0	...	...	7	--

See notes at end of exhibit.

Exhibit 2. Continued—Examples of randomly selected workweek grids, grouped into three categories of workweek regularity, 1998–99 French Time-Use Survey

b) Less regular workweeks

Dia[1]	We[2]	We7[3]	Est[4]	D[5]	Occupation
...		21.5	30		**English teacher**
...	5.0	... ...		1	--- WWWWWWWW- - - - WWWW- - - - - WWWWWWWW- -
...	3.3	... ...		2	--- WWWWWWWWWW- -
...	.0	... ...		3	---
...	5.8	... ...		4	--- WWWWW- - - - - - WWWWW- - - WWWWWWWWWWW- -
4.3	4.3	... ...		5	--- WWWWWWWWWW- -
...	3.3	... ...		6	--- WWWWWWWWWW- -
...	.0	... ...		7	---
...	...	30.0	35		**Nurse**
...	7.0	... ...		1	WWWWWWWWWWWWWWWWWWWWWWWWWWWW- -
...	.0	... ...		2	---
...	3.0	... ...		3	-- WWWWWWWWWWWW
9.5	10.0	... ...		4	WWWWWWWWWWWWWWWWWWWWWWWWWWWWWW- WWWWWWWWWWWW
...	7.0	... ...		5	WWWWWWWWWWWWWWWWWWWWWWWWWWWW- -
...	.0	... ...		6	---
...	3.0	... ...		7	--- WWWWWWWWWWWW
...	...	31.3	35		**Nurse supervisor**
...	6.5	... ...		1	-- WWWWWWWWWWWWWWWWWW
9.8	7.5	... ...		2	--- WWWW- - - - - - - - - - WWWWWWWWWWWWWWWWWW
...	7.3	... ...		3	- - - - WWW- WWWWWWWWWWWWWWWWWW
...	8.3	... ...		4	WWWWWWWW- WWWWWWWWWWWWWWWWWW
...	1.8	... ...		5	WWWWWWWWW- -
...	.0	... ...		6	---
...	.0	... ...		7	---
...	...	28.0	30		**Arts professor**
...	5.3	... ...		1	--- WWWW- - - - - - - - - - - - WWWWWWWWWWWWWWWW- -
...	7.8	... ...		2	--------------------------------- WWWWWWWWWWWWWWW- - - - - - WWWWWWWWWW- - - WWWWWWW- -
...	4.5	... ...		3	--- WWWWWWWWWWWWWWW- -
5.5	6.3	... ...		4	--- WWWWWWWWW- WWWWWWWWWWWWWWW- - - - - - - - - - - - - - - - - - - W- - - - - - - - - - - - -
...	4.3	... ...		5	--- WWWWWWWWWWWW- -
...	.0	... ...		6	---
...	.0	... ...		7	---

c) Irregular workweeks

Dia[1]	We[2]	We7[3]	Est[4]	D[5]	Occupation
...		32.3	40		**German teacher**
...	7.8	... ...		1	-- WWWWWWWWWWWWWWWW- WWWWWWWWW- - - - - - WWWWWWW- - - - - - - - - - - - - - - - - - -
...	8.0	... ...		2	--- WWWWWWWWWWWWWWW- - - - - WWWW- - - - - - - - - - - - - - - WWWWWWWWWWWWWW- - -
...	2.8	... ...		3	--- WWWWWWW- - - - - - - - - - - - - - - - - WWWWW- - - - - - - - - - - - -
8.7	7.3	... ...		4	--------------------------------------- WWWWWWWWW- WWWWWWWW- - - WWWW- -
...	4.5	... ...		5	--- WWWWWWW- - - - - - - - - - - - - - WWWWWWWWWWWWWW- - -
...	.0	... ...		6	---
...	2.0	... ...		7	--- WWWWWWWWW- -
...	...	36.0	37		**Clerk**
...	.0	... ...		1	---
...	7.3	... ...		2	--- WWWWWWWWWWWWWW- - - WWWWWWWWWWWWWW- - - - - - -
8.0	8.0	... ...		3	--- WWWWWWWWWWWWWW- - - - - WWWWWWWWW- - - - - - - - - - -
...	4.5	... ...		4	--- WWWWWWWWWWWWW- - - - - - - -
...	9.0	... ...		5	--- WWWWWWWWWWWWWWWW- - - - - - WWWWWWWWWWWWWWW- - - - - - - - - - - -
...	7.3	... ...		6	--- WWWWWWWWWWWWW- - - WWWWWWWWWW- - - - - - - - - - - - - - - - - - - -
...	.0	... ...		7	---

See notes at end of exhibit.

c) Irregular workweeks

Dia[1]	We[2]	We7[3]	Est[4]	D[5]	Occupation
...	...	39.8	35		**Glassworker**
...	8.3	...	...	1	- - WWWWWWWWWWWWWWW --- WWWWWWWWWWWWWW
...	4.3	...	...	2	- - WWWWWWWWWWWW --
...	.0	...	...	3	---
...	7.5	...	...	4	----------------- WWWWWWWWWWWWWWWW - WWWWWWWWWWWW -------------------------------
...	7.5	...	...	5	----------------- WWWWWWWWWWWWWWW - WWWWWWWWWWWW --------------------------------
...	4.0	...	...	6	-- WWWWWWWWWWWW
7.0	8.3	...	...	7	- - WWWWWWWWWWWWWWW --- WWWWWWWWWWWW
...	...	51.5	39		**Machine operator**
...	8.3	...	...	1	WWWWWWWWWWWWWWWWWW- -- - WWWWWWWWWW
...	8.3	...	...	2	WWWWWWWWWWWWWWWWWW- -- - WWWWWWWWWW
...	.0	...	...	3	---
8.0	9.0	...	...	4	------------- WWWWWWWWWWWWWWWWWWWWWW --
...	9.0	...	...	5	------------- WWWWWWWWWWWWWWWWWWWWWW --
...	9.0	...	...	6	------------- WWWWWWWWWWWWWWWWWWWWWW --
...	8.0	...	...	7	WWWWWWWWWWWWWWWWWW- -- - WWWWWWWWWW
...	...	40.5	39		**Oven operator**
...	4.3	...	...	1	-- WWWWWWWWWWWWWWWW
...	4.0	...	...	2	WWWWWWWWWWWWWWWW- ---
...	8.3	...	...	3	----------------- WWWWWWWWWWWWWWWWWWWWWW --
...	8.3	...	...	4	--- WWWWWWWWWWWWWWWWWWWWWW ----------------
...	.0	...	...	5	---
...	8.0	...	...	6	----------------- WWWWWWWWWWWWWWWWWWWW ---
7.8	7.8	...	...	7	--- WWWWWWWWWWWWWWWWWWWW -----------------
...	...	59.3	35		**Fitter**
...	8.3	...	...	1	------------------- WWWWWWWWWWW- WWWWWWWWWWW- WWWWWWWWWW ---------------------------
...	8.5	...	...	2	-- WWWWWWWWWWW- - WWWWWWWWWWWWWWW-
9.0	9.0	...	...	3	--- WWWWWWWWWWW- - WWWWWWWWWWWWWWW-
...	8.5	...	...	4	--- WWWWWWWWWWW- - WWWWWWWWWWWWWWW-
...	8.5	...	...	5	--- WWWWWWWWWWW- - WWWWWWWWWWWWWWW-
...	8.3	...	...	6	----------------- WWWWWWWWWWW- WWWWWWWWWWW- WWWWWWWWWW -----------------------------
...	8.3	...	...	7	------------------- WWWWWWWWWWW- WWWWWWWWWWW- WWWWWWWWWW ---------------------------
...	...	56.5	38		**Quality controller**
...	12.3	...	...	1	--------------------------- WWWWWWWWWWWWW- - - - - - - WWWWWWWWWWWWWWWWWW- - - - - - -
...	8.5	...	...	2	-- WWWWWWWWWWWWWWWWWW- - - - - - -
...	8.3	...	...	3	------------------- WWWWWWWWWWWWW- ---
9.5	7.0	...	...	4	------------------- WWWWWWWWWWWWW- ---
...	0.0	...	...	5	---
...	9.3	...	...	6	----------------------------- WWWW- ---------- WWWWWWWWWWWWWWWWWW- -------------
...	11.3	...	...	7	-------------------- WWWWWWWWWWWWW- ---------- WWWWWWWWWWWWWWWWWW- -------------

[1] Dia = Length of paid work (source: diary), hours per day.
[2] We = 1-day length of paid work (source: week grid), hours per day.
[3] We7 = Total length of paid work (source: week grid), hours per week.
[4] Est = Self-estimated length of paid work (source: questionnaire), hours per week.
[5] D = Day of the week (1= Monday, 2 = Tuesday, and so forth).

NOTE: 1-day sequence ("----" = not working. "WWWWW" = working).

SOURCE: National Statistical Institute (Institut National de la Statistique et des Etudes Economique or INSEE, 1998–1999 Time Use Survey.

same tendency for progressively greater overestimating among workers estimating longer workweeks (charts 1 and 2). Such overestimating patterns cannot be explained simply by "regression to the mean," because they are found, whether the workweek estimate question bases "last week," a "typical week," or "in general" as the reference period.[18] Moreover, "the regression to the mean" argument cannot explain why the gap between estimates and diary measures has been increasing across time.[19] Furthermore, as noted in the introduction, the pattern is also found for estimate questions regarding housework (and at a much more serious level for these activities), and thus appears as a function of time estimate questions generally.[20]

Workers who estimate longer hours *do* report working longer hours in both diaries and work grids. Thus, current workweek estimate questions may serve to separate workers with longer workweeks from those with shorter workweeks. However, the estimate data should not be accepted at face value as reflecting actual hours worked.

Another advantage of the graphic workweek grid is that it provides particularly enlightening insights into the lives of married couples, some of whom followed rather similar and synchronous husband and wife patterns—although, most did not. These are reviewed in the following article in this

Notes

[1] John P. Robinson and Ann Bostrom, "The overestimated workweek? What time diary measures suggest," *Monthly Labor Review,* 1994 August, pp. 11–23; J. Jacobs, Measuring time at work: are self-reports accurate? *Monthly Labor Review*, 1998 December, pp. 42–53; and J. Schor, *The Overworked American* (New York, Basic Books, 1991).

[2] Lucy Eldridge and others, "Hours Data in Productivity Measures," a paper presented at the Federal Economic Statistics Advisory Committee meetings, June 7–8 2001.

[3] F. T. Juster and F. Stafford, eds., *Time, Goods and Well Being* (Ann Arbor, Institute for Social Research, University of Michigan, 1985).

[4] J. Robinson and J. Gershuny, "Measuring Hours of Paid Work: Time-Diary vs. Estimate Questions," *Bulletin of Labor Statistics*, xi – xvii (Geneva, International Labor Office, 1995).

[5] Robinson and Bostrom, "The overestimated workweek?," 1994.

[6] Robinson and Gershuny, "Measuring Hours of Paid Work," 1995.

[7] M. Marini and B. Shelton, "Measuring Household Work: Recent Experience in the United States," *Social Science Research*, 1994, pp. 361–85 and J. Press and E. Townsley, "Wives' and Husbands' Housework Reporting: Gender, Class and Social Desirability," *Gender and Society,* 1998, vol., 12, pp. 188–218.

[8] J. Krosnick, "Maximizing Questionnaire Quality," in J. Robinson and others, eds., *Measures of Political Attitudes* (San Diego, Academic Press, 1999).

[9] L. Verbrugge, and D. Gruber-Baldine, *Baltimore Study ofActivityPatterns* (Ann Arbor, Institute of Gerontology, University of Michigan, 1993).

[10] D. Hawes, W. Talarzyk, and R. Blackwell. "Consumer Satisfactions from Leisure Time Pursuits," in M. Schlinger, ed., *Advances in Consumer Research* (Chicago, Association for Consumer Research, 1975).

[11] J. Robinson, and M. Levy, *The Main Source: Learning from Television News* (Beverly Hills, CA, Sage Publications, 1986).

[12] J. Robinson, and G. Godbey, *Time for Life: The Surprising Ways Americans Spend Time* (State College, Penn State Press, 1999).

[13] Krosnick, "Maximizing Questionnaire Quality," 1999.

[14] Robinson and Bostrom, "The Overestimated Workweek?" 1994.

[15] Robinson and Bostrom, "The Overestimated Workweek?" 1994 and Robinson and Gershuny, "Measuring Hours of Paid Work," 1995.

[16] Robinson and Bostrom, "The Overestimated Workweek?" 1994 and Robinson and Gershuny, "Measuring Hours of Paid Work," 1995.

[17] Robinson and Godbey, *Time for Life*, 1999.

[18] Robinson and Godbey, *Time for Life*, 1999.

[19] Jacobs, "Measuring time at work," 1998.

[20] In 2004, the Bureau of Labor Statistics plans to release hours estimates from its American Time Use Survey. Information provided from this source will help in understanding and explaining the perception that persons are working longer hours. See other articles on the American Time Use Survey in the February 2002 *Monthly Labor Review.*