# Synchronicity in the work schedules of working couples

*The work grids collected by the National Statistical Institute (INSEE) in France reveal a wide variety of ways that dual-earner couples schedule their work and family lives; also, a new index can be used to measure the extent of synchronicity in a couple's work hours*

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and
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To provide insights into the divergent life schedules of married couples in modern societies, researchers in Europe developed a graphic work grid as a useful alternative to traditional work estimate questions.[1] One of the great values of having work grid schedules from both spouses in dual-earner households is that researchers can determine how married couples who have similar or different patterns of work hours engage in other activites.

This article illustrates one of many uses of work grid data. In addition, to determine the extent of any disparities between couples, this article presents a dissimilarity index, which quantifies gaps in work schedules. It analyzes dissimilarities across demographic characteristics and compares work patterns of "real couples," versus "random couples."

## Work patterns of couples

Based on work grid data from the 1998–99 French Time-Use Survey from the National Statistical Institute (INSEE), exhibit 1 illustrates four types of husband-wife work grid patterns reflected in hours per week. The patterns range from couples having rather similar, synchronized schedules in part (A) to those having rather disparate, asynchronized schedules in part (D).

Thus, in exhibit 1 part (A), containing the most synchronized or congruent patterns, one can see two highly overlapping patterns, first for a husband who is a technician and his wife, a secretary—both of whom worked a 4-day week of about 34 hours. The next couple in part (A) is a foreman and a nurse, both of whom worked about a 44-hour workweek of 5 days. The highly synchronous nature of work schedules for both couples is clearly evident.

In contrast, the first CEO-lawyer couple in part (B) of exhibit 1 both work 6-day weeks of 45 hours or more, with hours on Sunday evening apparently used by both to prepare for the upcoming week. She has Wednesday off (while he is working), but both have considerable overlap on the other 4 weekdays (outside of her evening work). In the case of the second couple in part (B) (who each work about 40 hours), the cleaning-woman wife works later into the evening and on Saturday, compared with the schedule of her train-driver husband—but she has Monday afternoon off.

By contrast, the couples in parts (C) and (D) of exhibit 1 show far less overlap in their workweeks. For the first couple in part (C), the husband worked almost 100 hours over 7 days, while his wife worked 36 hours over 5 days. Her work hours all occurred during his work hours, but there are obviously many more hourly periods when he worked and she did not. The same is true for the second couple, a farm household in which the husband worked more than 60 hours and the wife worked less than 20 hours—although both put in a 6-day workweek. (Apparently in this case, the wife spends a considerable

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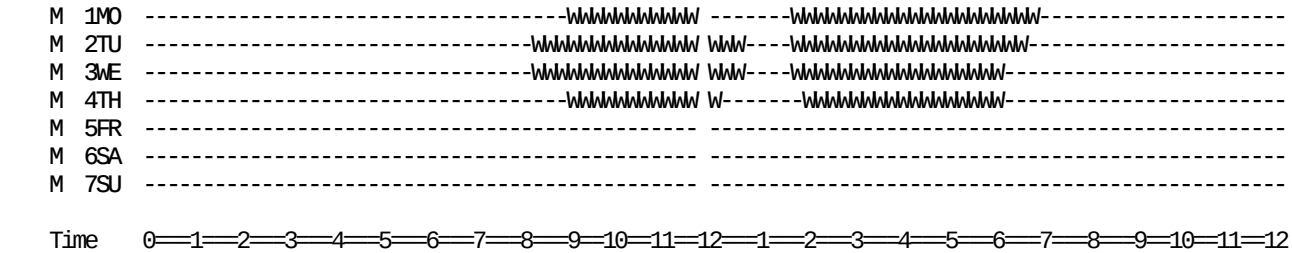
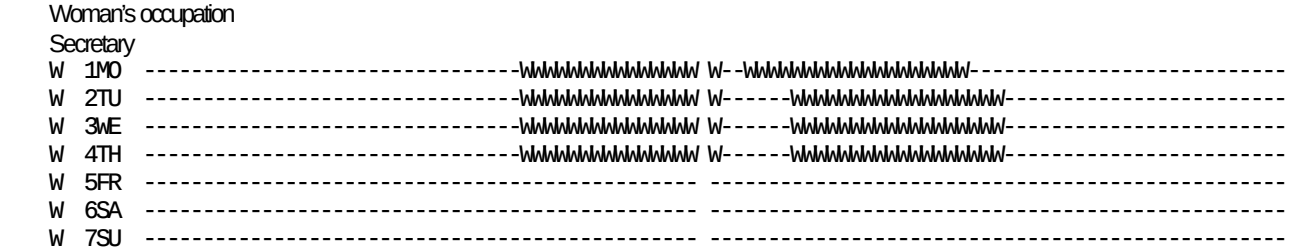
## Exhibit 1. Workweek grid of eight couples, categorized into four types of husband-wife synchronization schedules, 1998–99 French Time-Use Survey

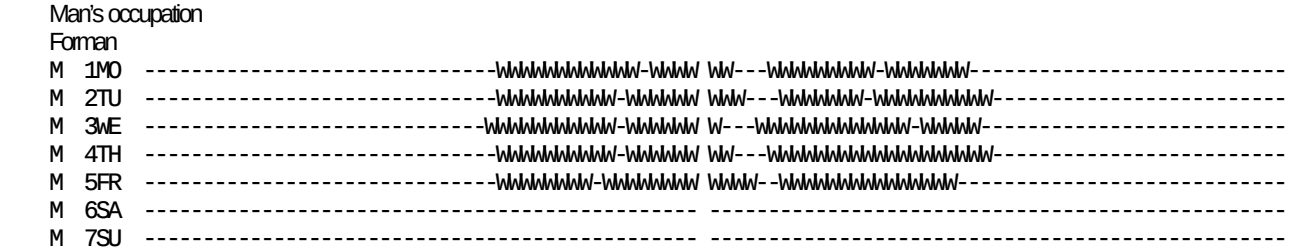
**A. Two symmetrical synchronous couples**

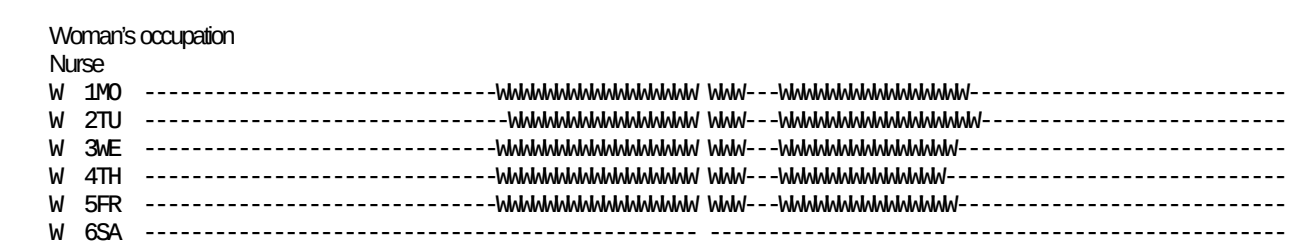
| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 33.5 | 34.3 | 12 | 1 | 11 |




| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 44.5 | 44.0 | 10 | 1 | 9 |



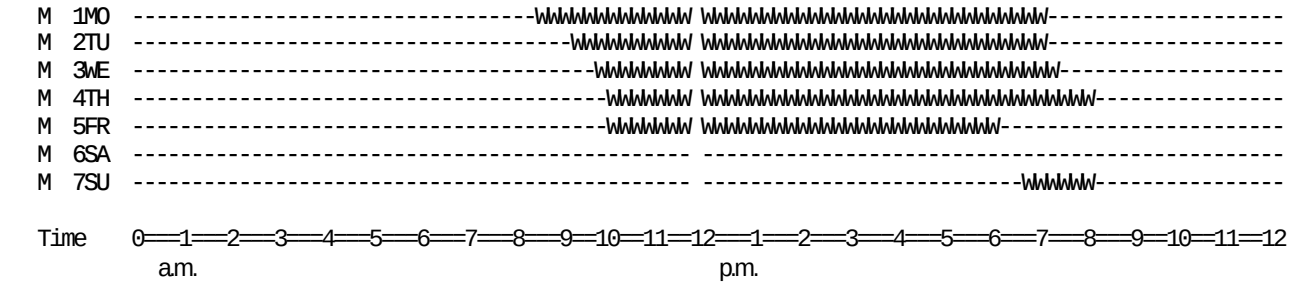



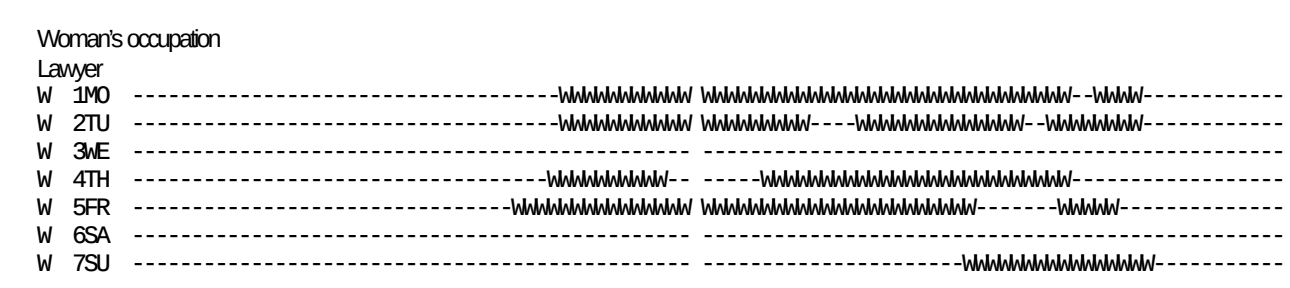

See footnotes at end of exhibit.

## Exhibit 1. Continued—Workweek grid of eight couples, categorized into four types of husband-wife synchronization schedules, 1998–99 French Time-Use Survey

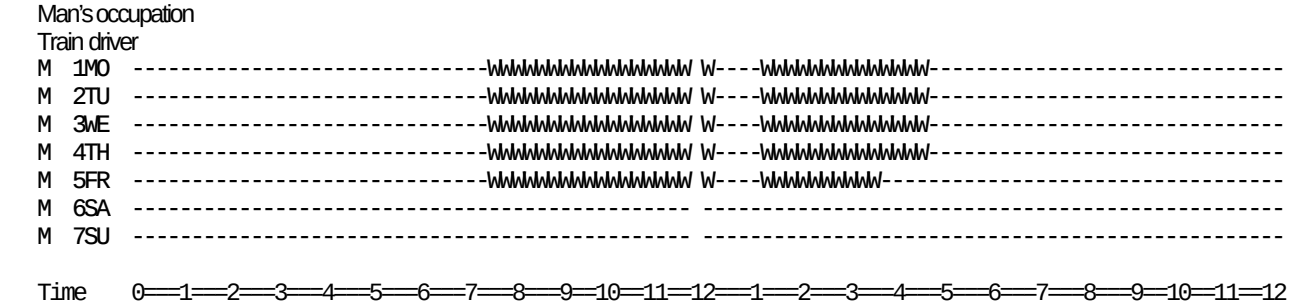
**B. Two symmetrical semi-synchronous couples**

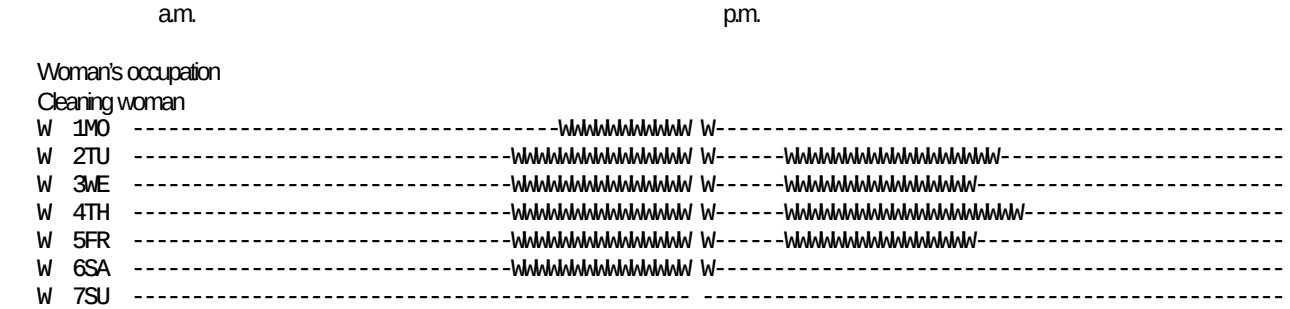
| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 49.3 | 45.8 | 37 | 5 | 32 |




| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 39.0 | 40.5 | 32 | 2 | 30 |



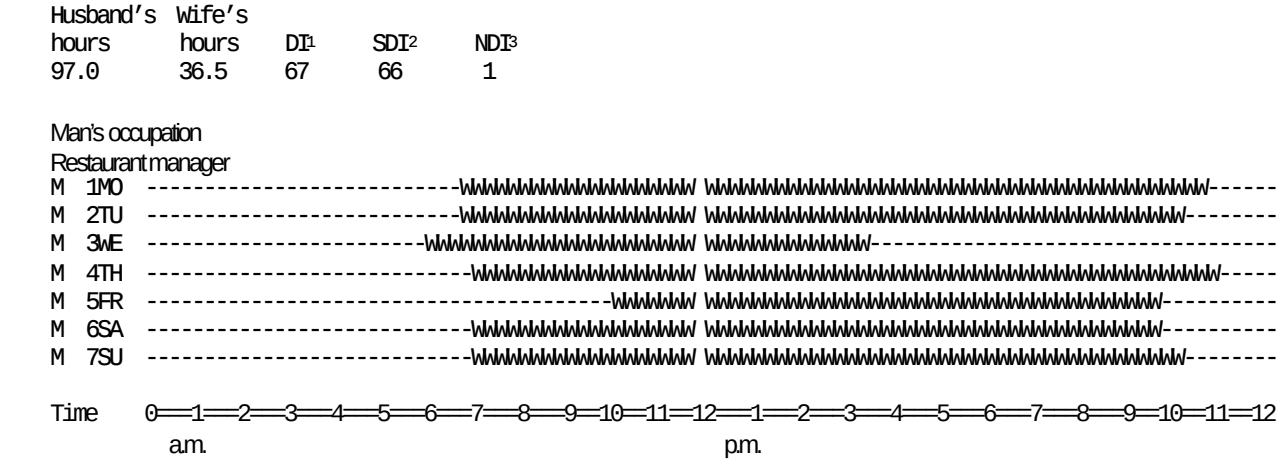




See footnotes at end of exhibit.

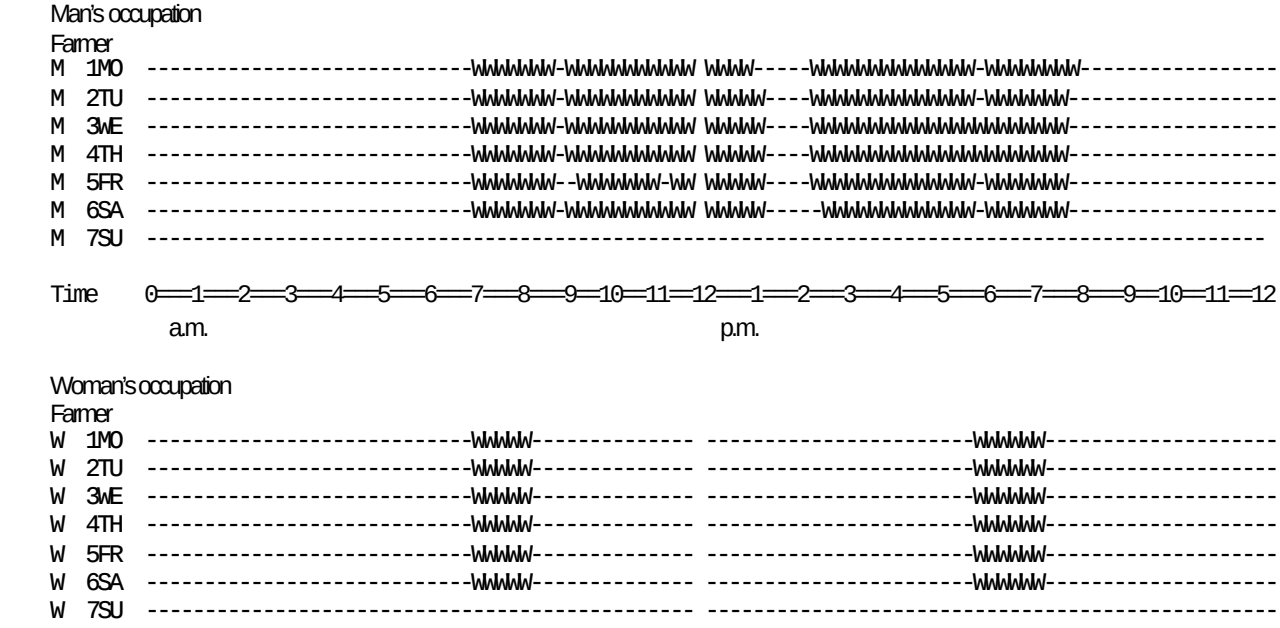
## Exhibit 1. Continued—Workweek grid of eight couples, categorized into four types of husband-wife synchronization schedules, 1998–99 French Time-Use Survey

**C. Two dissymmetrical synchronous couples**

| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 97.0 | 36.5 | 67 | 66 | 1 |




| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 65.5 | 16.5 | 74 | 71 | 3 |




**See footnotes at end of exhibit.**

## Exhibit 1. Continued—Workweek grid of eight couples, categorized into four types of husband-wife synchronization schedules, 1998–99 French Time-Use Survey

**D. Two asynchronous couples**

| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 33.0 | 28.8 | 115 | 8 | 107 |

Man's occupation
Factory worker

```
M  1MO  ------------------------------------------------ ----------------------------------------WWWWWWWW
M  2TU  WWWWWWWWWWWWWWWWWWWWWWW-------------------- ----------------------------------------WWWWWWWW
M  3WE  WWWWWWWWWWWWWWWWWWWWWWW-------------------- ------------------------------------------------
M  4TH  ------------------------------------------------ ------------------------------------------------
M  5FR  ----------------------WWWWWWWWWWWWWWWWWWWW W-WWWWWW----------------------------------------
M  6SA  ------------------------------------------------ ----------------------------------------WWWWWWWW
M  7SU  WWWWWWWWWWWWWWWWWWWWW-------------------- ------------------------------------------------

Time    0---1---2---3---4---5---6---7---8---9--10--11--12---1---2---3---4---5---6---7---8---9--10--11--12
          a.m.                                          p.m.
```

Woman's occupation
Postal employee

```
W  1MO  ------------------------------------------------ ------------------------------------------------
W  2TU  ------------------------------------------------ -WWWWWWWWWWWWWWWWWWWWWWW--------------------
W  3WE  -------------------------WWWWWWWWWWW------- ----------WWWWWWWWWWWWWWWWW--------------------
W  4TH  ------------------------------------------------ -WWWWWWWWWWWWWWWWWWWWWWW--------------------
W  5FR  ------------------------------------------------ -WWWWWWWWWWWWWWWWWWWWWWW--------------------
W  6SA  ------------------------------------------------ ------------------------------------------------
W  7SU  ------------------------------------------------ ------------------------------------------------
```

| Husband's hours | Wife's hours | DI[1] | SDI[2] | NDI[3] |
|---|---|---|---|---|
| 34.3 | 30.8 | 115 | 7 | 109 |

Man's occupation
Welder

```
M  1MO  ------------------------------------------------ ------------------------------------------------
M  2TU  ------------------------------------------------ ----------WWWWWWWWWWWWWWW--WWWWWWWWWWWWWWW--
M  3WE  ------------------------------------------------ ----------WWWWWWWWWWWWWWW--WWWWWWWWWWWWWWW--
M  4TH  ------------------------------------------------ ----------WWWWWWWWWWWWWWW--WWWWWWWWWWWWWWW--
M  5FR  ------------------------------------------------ ----------WWWWWWWWWWWWWWW--WWWWWWWWWWWWWWW--
M  6SA  ------------------------------------------------ ------------------------------------------------
M  7SU  ------------------------------------------------ ------------------------------------------------

Time    0---1---2---3---4---5---6---7---8---9--10--11--12---1---2---3---4---5---6---7---8---9--10--11--12
          a.m.                                          p.m.
```

Woman's occupation
Nurse's aid

```
W  1MO  ------------------------------------------------ ------------------------------------------------
W  2TU  ------------------------------------------------ ------------------------------------------------
W  3WE  ----------------------WWWWWW-WWWWWWWWWWWWW W--WWWWWWW----------------------------------
W  4TH  ------------------------------WWWWWWWWWWWWW W--WWWWWWWWWWWWWW----------------------------
W  5FR  ----------------------WWWWWW-WWWWWWWWWWWWW W--WWWWWWW----------------------------------
W  6SA  ----------------------WWWWWW-WWWWWWWWWWWWW WWWWWW------------------------------------
W  7SU  ------------------------------------------------ ------------------------------------------------
```

1 DI = Dissimilarity index. (See appendix.)

2 SDI = Structural dissimilarity index.

3 NDI = Net dissimilarity index.

NOTE: Each line beginning with an expression, such as 'M 1MO' (which stand for man, Monday) describes a daily sequence of 96 quarters of an hour ("----" = 1 hour not working. "WWWW" = 1 hour of paid work).

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

amount of time doing unpaid work or home chores during times her husband is doing income-producing farm chores).

Part (D) illustrates the "ships passing in the night" model of working couples. In the first case, there is a factory-worker husband putting in night shift hours on Tuesday, Wednesday, and Sunday and day shifts on Friday—in contrast to his postal-worker wife who puts in her fairly regular afternoon hours on Wednesday through Friday. The main virtue of this arrangement, as far as their marriage is concerned, is that both only work about 30 hours a week. The same is true for the second couple, in which the welder husband works the evening shift Tuesday through Friday, while his wife works a day shift as a nurse's aide on Wednesday through Saturday.

Is there a simpler way to capture the overlaps and disparities apparent in these eight couples? In the analyses that follow, a formula is proposed to quantify the extent of dissimilarity or disparity between the various husband-wife patterns. That dissimilarity index (DI) is defined to have a range of values from 0 (when the couple works exactly the same schedules) to 200 (when there is absolutely no overlap in their schedules). The derivation of the formula for DI in the appendix to this article illustrates how the formula can be decomposed to show separate net differences (due to simple number of hours worked) and structural differences (due to pattern differences in schedules).

In the analyses below, the DI formula is used to identify:

- The demographic and background correlates of couples with more disparate workweeks, as reported in the French Time-Use Survey questionnaire.
- The differences in time-use and life style of couples that accompany those differences, as reflected in their time-diary reports
- How "real couple" work patterns differ from "randomly coupled" pairs of individuals in the sample

*Overall dissimilarity comparisons.* To display how values of DI differ, we examine how the eight couples in exhibit 1 differ in terms of their values of DI. Couples in part (A) obviously have maximal overlap and thus low values of DI—12 for the first couple and 10 for the second couple. In part (B), the values of DI rise to 37 and 32 respectively, mainly due to *net* differences in schedules—that is, when one spouse is working and the other is not (as defined in the appendix). In part (C), however, the wife works during the same hour periods as the husband does, but he just works more hours; these are reflected in DI values of 67 and 74, here mainly due to *structural* hour differences, as defined in the appendix. In contrast, the last pair of couples' highest DI scores of 115 are almost entirely due to times when the couples are working different periods of time, as was also the case for the part (B) couples.

## Demographic differences among groups

Different values of the dissimilarity index can be used to show differences among certain demographic factors (table 1). The total of 1,448 matched couples (from the National Statistical Institute or INSEE sample) who both returned work grids are divided into six categories based on increasing values of DI at 20-index point intervals starting from the lowest 0–20 (less than 20) grouping of DI to the highest values of DI (100 or more). This regular, but arbitrary, set of cutoffs includes 156 spouses in the 0–20 category, 333 spouses in the 20–39 group, and 224 spouses in the highest DI category. In the first row of calculations under the dissimilarity categories in table 1, it can be seen how the average values of DI in each category do rise about 20 points for each successive category (from 12 to 30 to 50 to 69 to 89 to 107 for the 100 or more category).

In terms of subdividing the index into structural and net differences, however, some different patterns occur—despite the fact that the overall DI value of 59 is comprised of virtually identical amounts of structural (29) and net (30) differences. As total dissimilarity increases, the two components diverge at the two highest DI values. For the highest DI group (100 or more), most of the difference is in terms of structural differences (65 out of 107); for the second highest group (80–99), by contrast, net differences are large (49 out 89). Some of these differences may account for differences in the demographic patterns between the couples.

*Demographic factors.* In the "paid work" section of table 1, differences in work hours (from the grid) are highest in DI values of 100 or more, and that is true among both men and women. Respondents with these highest values of DI report work grids with the shortest workweeks—29 average hours of work for men and 21 hours of work for women. For men, workweek length only declines notably for these highest DI category values. For women, workweek length steadily increases as DI declines. It appears, then, that higher values of DI can be expected when one of the spouses in a marriage works shorter weeks.

One reason for the higher values of DI among wives and husbands with shorter workweeks may be found in the next section of table 1, dealing with numbers of children, age, and income. With the exception of the 80–99 DI grouping, respondents with higher values of DI do have more children. In other words, presence of children seems to have something to do with asynchronous work schedules, making it more difficult for husbands and wives to have overlap in their work schedules. The data suggest perhaps that one way to maximize time with children is by having at least one parent at home (some time during the day).

The calculations by age for men and women show that the higher values of DI are found among younger respondents,

**Table 1. Husband-wife synchronization and background factors, derived from the French Time Use Survey, 1998–99**

| Variable | Dissimilarity index | | | | | | |
|---|---|---|---|---|---|---|---|
| | Total | Less than 20 | 20–39 | 40–59 | 60–79 | 80–99 | 100 or more |
| Number of couples[1] | 1,488 | 156 | 333 | 331 | 291 | 153 | 224 |
| **Dissimilarity** | | | | | | | |
| Net dissimilarity index (NDI) | 29 | 6 | 15 | 26 | 37 | 49 | 43 |
| Structural dissimilarity index (SDI) | 30 | 6 | 15 | 24 | 32 | 40 | 65 |
| **Paid work** | | | | | | | |
| Man (week grid, hours / week) | 41.5 | 42.5 | 44.2 | 45.1 | 44.1 | 40.3 | 29.0 |
| Woman (week grid, hours / week) | 32.7 | 40.9 | 38.7 | 34.5 | 31.0 | 28.2 | 21.0 |
| **Demographics** | | | | | | | |
| Number of children (under age 18) | 1.02 | .76 | .85 | 1.04 | 1.16 | 1.08 | 1.22 |
| Age, man | 42.5 | 42.9 | 43.4 | 43.1 | 42.7 | 40.7 | 40.7 |
| Age, woman | 40.4 | 40.8 | 41.3 | 41.2 | 40.1 | 38.7 | 38.8 |
| Income (100 francs per month and per consumer unit[2]) | 104 | 116 | 119 | 110 | 96 | 80 | 90 |

[1] All couples, all types of weeks.

[2] 100FF= about $18 in 1998–99.

SOURCE: Institut National de la Statistique et des Etudes Economique, INSEE (National Statistical Institute)1998–99 Time-Use Survey.

both men and women. This again may reflect the presence of children differences just noted. The age differences are only about 2 years between the top and bottom groups, however.

Lower incomes are also found among couples with more asynchronous schedules. Not only are lower wages a disadvantage for low-income families, then, but also the ability to spend nonwork time to be together.

*Lifestyle and activity differences.* In this analysis, we are able to take advantage of the rich time-diary data collected in the INSEE survey. Table 2 shows differences in certain daily activities as reported in the daily time diaries. Consistent with the estimated workweeks in table 1, table 2 first shows lower diary work hours among those in higher categories of DI. However, table 2 shows that the differences decline steadily (for both men and women) only past the second (20–39) category of DI values.

Also consistent with table 1 is the general increase in childcare time as DI increases for both men and women (this time difference indeed is almost entirely accounted for by presence of children). Paralleling this is the general (but irregular) increase in housework time for both men and women at higher levels of DI.

The figures for free time at home, however, show more complex patterns. For men, more free time is found for those being either in the highest category of DI (264 minutes per day, or 31 hours per week) and in the lowest values of DI (259 minutes). Among women, the free time amounts are only slightly higher, with higher category values of DI. Part of the reason for this lack of overall difference in free time amounts among women may be attributed to the lower paid work hours for both men and women, which are offset by higher childcare and housework hours found in the previous section of table 2.

The next section of table 2 provides a closer look into which activities (paid work, child care, or housework) are proportionately done by men. The data reveal that at higher levels of DI, men do more paid work (57 percent, versus 51 percent for lowest DI—less than 20—levels) as measured either by the grid or the diary. Gender differences in both childcare and housework are minimal across DI levels, as are free-time gender differences.

The last section of table 2 show differences in the gaps between estimates and diaries/grids. The largest gaps between estimated and diary/grid figures for work time show up in both the highest and lowest categories of DI—and with very little systematic difference for those in intermediate categories. This suggests that having asynchronous couple schedules may be a factor in less accurate workweek estimates.

*Comparisons with random couples.* Among the subsample of couples reporting that their work week grid was "normal" in the INSEE survey, the dissimilarity index is calculated in the third column of table 3. As expected, the DI index is lower in observed couples (53) than in male-female random pairs (63)—or in random male-male pairs (59) or female-female pairs (65), used as benchmarks. In other words, one can detect something of a "marriage effect," in that husbands and wives accommodate to each other's schedules more than randomly selected men and women from the population at large.

IN GENERAL, THE GRAPHIC INFORMATION gathered from the work grid can provide a variety of sociological data on married couples and workers in general. Our new index of dissimilarity

**Table 2. Male-female synchronization and time-use factors, French Time Use Survey, 1998–99**

| Variable | Total | Dissimilarity index | | | | | |
|---|---|---|---|---|---|---|---|
| | | Less than 20 | 20–39 | 40–59 | 60–79 | 80–99 | 100 or more |
| Number of couples | [1]1,488 | 156 | 333 | 331 | 291 | 153 | 224 |
| **Time (diary, minutes/day)** | | | | | | | |
| Paid work, man | 342 | 324 | 368 | 376 | 355 | 327 | 261 |
| Paid work, woman | 267 | 311 | 314 | 270 | 264 | 228 | 192 |
| Child care, man | 17 | 14 | 12 | 17 | 17 | 18 | 29 |
| Child care, woman | 41 | 26 | 27 | 40 | 44 | 44 | 67 |
| Housework, man | 138 | 131 | 123 | 122 | 134 | 141 | 196 |
| Housework, woman | 256 | 226 | 222 | 253 | 259 | 276 | 312 |
| Free time, man | 242 | 259 | 232 | 228 | 239 | 254 | 264 |
| Free time, woman | 196 | 186 | 184 | 193 | 198 | 214 | 210 |
| **Share (in percent)** | | | | | | | |
| Man's share of couple's paid work, week grid (percent) | 56.0 | 51.0 | 53.3 | 57.0 | 58.6 | 58.9 | 56.6 |
| Man's share of couple's paid work, diary (percent) | 56.2 | 51.0 | 54.0 | 58.2 | 57.3 | 58.9 | 57.6 |
| Man's share of couple's child care, diary (percent) | 29.9 | 35.1 | 30.1 | 30.1 | 27.5 | 28.5 | 30.5 |
| Man's share of couple's housework, diary (percent) | 35.1 | 36.7 | 35.6 | 32.6 | 34.0 | 33.8 | 38.5 |
| Man's share of couple's free time, diary (percent) | 55.3 | 58.2 | 55.8 | 54.2 | 54.8 | 54.3 | 55.7 |
| **Gap** | | | | | | | |
| 100*HM/(PAIDM*7/60) Men | 96.2 | 88.9 | 97.0 | 97.3 | 93.8 | 94.8 | 105.1 |
| 100*HW/(PAIDW*7/60) Women | 95.2 | 88.7 | 94.7 | 91.4 | 99.5 | 94.4 | 106.7 |

[1] All couples, all types of weeks.

SOURCE: Institut National de la Statistique et des Etudes Economique, INSEE (National Statistical Institute),1998–99 Time-Use Survey.

**Table 3. Dissimilarity index calculations between married couples and random pairs of men and women, French Time Use Survey, 1998–99**

| Grouping | Paid work (from workweek grid) | | Dissimilarity index | Structural dissimilarity index | Net dissimilarity index |
|---|---|---|---|---|---|
| | Men | Women | | | |
| Men and women, real couples (mean) | 44.8 | 36.5 | 53.0 | 21.2 | 31.9 |
| (Standard deviation) | (13.4) | (12.6) | (29.2) | (18.9) | (28.1) |
| Random pairs, men-women (mean) | 44.8 | 36.5 | 63.4 | 24.9 | 38.5 |
| (Standard deviation) | (13.4) | (12.6) | (25.2) | (20.1) | (26.9) |
| Random pairs, men-men (mean) | 45.0 | 45.0 | 59.3 | 21.0 | 38.3 |
| (Standard deviation) | (13.6) | (13.6) | (28.6) | (17.4) | (28.1) |
| Random pairs, women-women (mean) | 36.8 | 36.8 | 64.7 | 25.1 | 39.6 |
| (Standard deviation) | (13.0) | (13.0) | (23.1) | (19.7) | (24.3) |

SOURCE: Institut National de la Statistique et des Etudes Economique, INSEE (National Statistical Institute), 1998–99 Time-Use Survey.

(DI) seems to capture the disparity in these husband-wife pairings, and reveals greater overlap or synchronization of schedules among husbands and wives with fewer work hours, fewer children, lower age, and lower income. These results were largely confirmed using time-diary data, although synchronization did not seem related to the free time of either husbands or wives. Married couples seem to have about 20 percent more synchronous schedules than do randomly selected pairs of employed men and women. The DI index, also has the advantage of being decomposed conveniently into differences due to number of hours and due to schedule per se. □

## Note

[1] See John P. Robinson, Alain Chenu,and Anthony S. Alvarez, "Measuring the complexity of hours at work: the weekly work grid," *Monthly Labor Review*, April 2002, pp. 44–54.

## Appendix: Comparing two workweek schedules using the dissimilarity index

Assuming that Ai and Aj are any two persons who have filled the week diary on a normal week of work, and that:

Pi = Proportion of paid work time in Ai's grid

Pj = Proportion of paid work time in Aj's grid

Pij = Proportion of time for which Ai and Aj are both working (synchronized paid work length / total length of the week)

P'ij = Proportion of time for which Ai and Aj would be working if their both schedules where fixed at random, Pi and Pj being given (independence hypothesis)

Then,

Pi + Pj – 2 Pij is the proportion of nonsynchronized time, and

Pi + Pj – 2 P'ij = Pi + Pj – 2 Pi Pj is the proportion of nonsynchronized time under the independence hypothesis.

The dissimilarity index between two persons' grids, DIij, is defined in order to equal 100 when the two schedules are independent, and 0 when they are perfectly identical.

$$DIij = 100 (Pi + Pj – 2 Pij) / (Pi + Pj – 2 Pi Pj)$$

When Pi + Pj £ 1, the minimum value of Pij of 0; and the maximum value of DIij, 200, is reached when Pi = Pj.

In this formulation, one can distinguish structural dissimilarity from net dissimilarity. If we suppose Pi > Pj, Pij cannot be greater than Pj. The lowest possible value of DIij, reached when Pij = Pj, can be seen as a structural dissimilarity index, with

$$SDIij = 100 (Pi – Pj) / (Pi + Pj – 2 Pi Pj)$$

Therefore DIij can be split into SDIij and NDIij, structural and net dissimilarity indexes, with:

$$DIij = SDIij + NDIij,$$

$$NDiij = 200 (Pj – Pij) / (Pi + Pj – 2 Pi Pj)$$

When Pi = Pj, NDIij = Diij. That is, when husbands and wives have identical proportions of overlap, all of the disparity is net dissimilarity.

Thus, when both members of a couple work the same identical number of hours, SDI=0. The higher SDI is, the more asymmetrical the family workweek. NDI measures the couple's synchronization/ asynchronization level, net of the effects of its symmetry or asymmetry. Therefore SDI can be designated as a symmetry index, NDI as a net synchronization index.