

## Seasonal Effect on the Time Use Surveys in the Basque Country

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### **Introduction**

In keeping with the objective of setting out new methodologies for the analysis and comparison of information relating to studies on time use, we will try to combine, on one hand, the means of gathering the information and on the other, as the final data from the most recent data collection is not yet available, a brief analysis of the seasonal effect on time use with the last available results (1997-1998).

It should first be pointed out that Eustat, in this case a pioneer in official Spanish statistics, began its investigation into time use– Time Estimation Survey (EPT) – with a survey in 1992, with the objective of repeating it every five years. The third survey was completed at the start of this summer. At the end of this year Eustat will publish the main results of the survey as a whole.

In the section on methodology, we will present the chosen methodology, the questionnaires and main variables included and brief indications on the quality of the information gathering.

## **I. Methodology and quality indicators.**

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First of all, it should be stated that the Spanish Basque Country has around 2,100,000 inhabitants and 750,000 families and that since the end of the nineteen-seventies, it has benefited from a broad political and administrative autonomy. The availability of its own official statistics was one of the factors that made it necessary to create a specific institute, Eustat, which was founded with a vocation to produce the information demanded by a modern society.

Within the scheme of socio-demographic statistics, aside from classic population counts or specific socio-demographic surveys, a system to collect indicators of social habits and customs was created, beginning with a Living Conditions Survey (ECV) in 1989. This system was to be updated a minimum of every five years. Out of this came the first Time Estimation Survey.

Given that justifications cannot be made different to those behind the launch of any survey on the use of time, we will go on to describe the main characteristics of the survey.

### **1.1 Methodology.**

The Time Estimation Survey, to be carried out every five years, began with its first survey in 1992.

It is based on a sample of 5,000 households with a three-stage design: selection of census sections by a system of proportional stratification, by systematic samples with the same probability of households and selection of person per household, the person who will complete the journal. Since the sampling area is defined by a Population Register, the selection of the individual is also done at random. When the composition of the family in the dwelling as figures in the Register differs from that encountered by the researcher, another individual is chosen as laid out in the KISH table.

Although in the first two surveys carried out, the individual selected to fill in the journal was 16 years old or over, in the most recent one, adopting the methodology laid out in 'Guidelines for Harmonised European Time Use Surveys' (3.1 Sample design)<sup>1</sup>, it was fixed at 10 years old or over. This reduction in age limits is found in other survey experiences such as those relating to the availability and use of ICT – Information and Communication Technology – which in our case has lowered as far as 6 years old. The Census Office of the United States, in its 'Current Population Survey' collects information for people over three years old, analysing separately groups of 3 to 17 years old and those of 18 or more.<sup>2</sup>

In the case of refusals, or lack of coverage, the sample households will be substituted (previously and at random a list of replacement households is made and a substitute for each household of the initial sample). In substituting individuals the intention is to find people of similar characteristics. However, bearing in mind the bias caused by substitutions, Eustat is reconsidering the possibility of imputing all non-replies.

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<sup>1</sup> Eurostat. Guidelines for Harmonised European Time Use Surveys. Final Draft. May 2000.

<sup>2</sup> <http://www.census.gov/prod/2001pubs/p23-207.pdf>

In choosing a journal that would record every day of the week, or only one, the latter was chosen; the risk of the quality of the information diminishing as the week went on and the need to make strong incentives advised against the weekly journal. To make a quality record of the time dedicated to each activity, the days were distributed in four blocks: working days, Fridays, Saturdays and Sundays, chosen at random.

The recommendation to carry out the survey over the natural period of a year cannot be taken into consideration, since it simply did not exist when the survey was put into effect in 1992, and the possibility of changing the methodology, so as not to distort the information available, was never considered. Seasonal representivity is guaranteed by carrying out the sample in two survey periods: autumn 2002 (September-October-November) and spring 2003 (April-May-June). Basically, the cost of gathering the information justified the aforementioned decision. Later we will see how the season influences in the different use of time.

TABLE 1 METHODOLOGY (EPT-Eustat 2002-03)	
1 Area of survey:	Autonomous Community of the Basque Country.
2 Population range:	Families (749,911) and Population aged 10 or over (1,906,989 ) resident in family households.
3 Frequency:	FIVE-YEARLY 1992-3, 1997-8, 2002-3.
4 Commencement date:	1992.
5 Type of operation:	Sampled.
6 Sampling design:	Three-stage: 1- Selection of sections by proportional stratified system. 2- Selection of household by systematic sampling with equal probability. 3- Selection of a person to complete the journal in the household random/with KISH table.
7 Sampling field:	Population register.
8 Size of sample:	5,016 households -- 5,016 people.
9 Substitution:	Yes.
10 Weekly distribution:	Working days, Fridays, Saturdays and Sundays.
11 Selection of day:	random by section, 3 journals for working days, 3 for Friday, 3 for Saturday and 3 for Sunday.
12 Period of survey:	Autumn 2002 - Spring 2003.
13 Means of collection:	mixed (journal completed by participant, rest of questionnaires and journal checked by surveyor).
14 Participants:	one person of 18 or over responsible for household information. one person of 10 or over responsible for completing the journal. (*)
(*) In 1992-3 and 1997-8 people of 16 or over.	

Finally, family information is supplied by a competent person over 18 and the journals are filled in by the interviewees themselves, although they may undergo some revision – in presence of the journal keeper - by the interviewer.

## 1.2 Questionnaires and their content.

The information is gathered basically by means of four questionnaires: two auxiliary – Route Map and Coding Book B2 – and two basic – family questionnaire and journal -<sup>3</sup>.

With the Route Map we can identify, follow and record any incident of each one of the units of the sample and the agents and inspectors of the survey.

<sup>3</sup> <http://www.eustat.es/document/datos/eptfamili.pdf>  
<http://www.eustat.es/document/datos/eptb1.pdf>  
<http://www.eustat.es/document/datos/eptb2.pdf>

TABLE 2. QUESTIONNAIRES AND CONTENT (EPT-Eustat 2002-03)	
<b>A FAMILY QUESTIONNAIRE (*)</b>	
<b>Identification:</b>	Address, housing and questionnaire key, survey period, household telephone no., principal or substitute, identification of researcher, date of survey.
<b>Others:</b>	Kish Table (Order of the household in the round X n° of individuals in the family, order n°, name and age of subject, instructions.
<b>Family characteristics:</b>	Order of individual and of family group, type of nuclear family, referee and relationship with this person, family representative.
<b>Personal characteristics:</b>	Name, surnames, sex, marital status, place and date of birth, studies in progress/qualifications, relation to activity, profession, physical or mental disorders, situation of residence.
<b>B1 JOURNAL</b>	
<b>Identification:</b>	Address, housing and questionnaire key, survey period, principal or substitute, name and surnames of subject, reference day and month to complete the journal.
<b>Others:</b>	Day and time of revision/collection of journal, identification of researcher, contact telephone n°. Explanations and examples of completion.
<b>Time record:</b>	Grid of times (from 0:00 to 24:00), at 5 minute intervals, place, text of main and secondary activities and company.
<b>B2 CODING BOOK</b>	
<b>Identification:</b>	Address, housing and questionnaire key, survey period, principal or substitute, date of journal, day of the week, state of journal (complete, with doubts, etc.).
<b>Content:</b>	order n° of the activity, time interval, place, main activity (text), secondary activity (text), company, purpose, coding fields
<b>Characteristics of day:</b>	type of working day and timetable for employed, weather, exceptional characteristics of day.
<b>X ROUTE MAP</b>	
<b>Identification:</b>	Address, housing and questionnaire key, survey period, principal or substitute.
<b>Situation and following of the sample:</b>	Location, situation and use of the dwelling, result of first interview, n° of family questionnaires, day of questionnaire, date of collection and result of completion of questionnaire B, justification for interview not carried out, contacts and visits by the interviewer, identification of interviewee, relationship to referee, household telephone number, agents' identification, situation and result of inspection.
(*) In the first survey an individual questionnaire was added with questions about activity, and use of time by waged, farm workers, domestic activity, leisure, etc. It was eliminated in following surveys	

The coding book B2, as well as allowing the inclusion of all activity codes, the company, the place and the purpose, also allows the inclusion of auxiliary information such as the type of working day or timetable for those in employment, special characteristics of the day, weather, etc.

The family questionnaire, as well as all the necessary identification, gives the family structure (type of nuclear family and relationships) and the fundamental characteristics of the individuals, outlined in table 2.

Although the first two surveys included a supplementary questionnaire for gathering information on time use by specific sectors (the unwaged, farm workers, housewives, etc.), by the time the second survey was collected the information was not used statistically and in the latest one, it was simply not collected.

In our opinion, both the family questionnaire and the individual one as recommended by Eurostat, in many cases miss the real aim of a survey on time use and move over into

the areas of other surveys or statistics that produce social indicators (domestic appliances, income, etc.). It is true, however, that the proposed family questionnaire includes an important section that records financial assistance to others (in the last 4 weeks) and, in the case of the individual one, covers voluntary social work and again, family aid.

Although they are undoubtedly of great interest with regard to certain activities that might not be reflected in the journals and provide a greater number of explanatory variables, they do present two major disadvantages. On one hand, we all know that the refusal to respond, whether totally or partially, or the poor quality of the information gathered, is directly proportional to the burden of the response. On the other, as well as substantially increasing subsequent processing, they give rise to an endless source of contradictions between the basic information –collected in the journal- and the supplementary information of these questionnaires.

The need for a much broader sample in order to possess more representative data, in the case of some fairly unusual activities, was also taken into account.

These reasons have led us to eliminate the individual questionnaire and simplify the other questionnaires as much as possible with the aim of concentrating our efforts, both in collection and statistical processing, on the information obtained from the journal.

The central questionnaire in the operation is, as we have stated, the activity journal. There is a single journal for all the participants in the survey (there is no specific model for minors). If we leave aside auxiliary information (identification, examples, contact numbers, etc.) it consists of a grid showing times of 5 minute intervals (from 0:00 hours to 24:00), in which is entered the place where the activity took place (additional information to that recommended by Eurostat), a main activity and a secondary one, and in whose company the activity or activities were carried out (see table 2). All this information is put down as text and, once checked and completed in the field, taken to the office and transferred to questionnaire B2 where it is encoded.

### **1.3. Quality Indicators.**

The first indicator that Eustat usually gathers comes from the results of the collection itself. Table 3 (section 1) shows how, in 10 years, almost nine points of the coverage rate (proportion of incident-free replies of the total sample) has been lost. From just under a quarter, the number of substitutions has risen to a third, largely due to an increase in the number of refusals to answer – 4.9 more percentage points - , this despite the programming, in anticipation of this situation, of awarding incentives to participants.

In the first two surveys no type of incentive was given, while in the latest one, as well as receiving a ballpoint pen, the participant could choose between an umbrella and an alarm clock.

Shortcoming in the of households directory at the outset and the greater mobility of the population in recent years (seasonal and weekend movement or changes of residence within or outside of the municipality) have caused the total coverage to fall by 3.9 points.

TABLE 3 QUALITY INDICATORS (EPT-Eustat 2002-03)			
1 Collection:	1992-1993	2002-2003	
Coverage Rate	73%	64,2%	
Refusals	15%	19,9%	
2 Duration of interview			
Family questionnaire	10'	10'	
Revision journal+Individual quest.(*):	35'	30'	
3 Minimum activities accepted per person: 5 (Cases of 10 or less are systematically checked)			
4 Sampling Errors(**)			
(Coefficient of Variation -%):	AVERAGE SOCIAL TIME	AVERAGE PARTICIPANT TIME	
$CV = \frac{\sqrt{\text{Var } \hat{\theta}}}{\hat{\theta}}$	Physiological Needs	0.366	0.366
	Work and Training	2.523	2.23
	Housework	2.263	2.126
	Care of People in Home	7.649	6.873
	Social Life	2.625	3.278
	Active Leisure and Sports	2.309	2.835
	Passive Leisure	1.442	1.48
	Travel	1.795	1.693
5 List of activities: 236 of activity (3 digits) 40 (2 digits). Compatible Eurostat - INE 19 of place and 10 of purpose.			
(*) Waived in 1997-8			
(**) 1997-1998			

The average duration of the first interview (10 minutes) and the second, in which the journal is checked and completed (30 minutes), as well as not varying, limits the survey to a reasonable time, from the point of view of the burden of response.

Another indirect quality indicator comes from the minimum number of activities accepted. Eustat does not accept 5 or fewer activities per day and per person and in the case of there being 10 or fewer, a revision is needed, which in many cases means a new collection of information.

The list of activities and codes used by Eustat covers 236 different activities, updated and adapted to the list put together by Eurostat and the adaptation made by the Spanish National Institute of Statistics, so that, apart from allowing Eustat to maintain their series of information, it is possible to make comparisons with other classifications. Activities associated with the use of Information and Communication Technology have been added, so that we have an auxiliary method of measuring, among other things, time dedicated to the Internet, use of the PC, etc. On one hand, these activities are included among those already defined (work, play, making friends, etc.), and on the other we are able to measure their importance in relation to the medium (working from home, computer games, chats, etc.). 9 place codes and 10 purpose codes (which in many cases define the activities themselves), complete the list of codes for the Time Estimation Survey.

The other basic quality indicator derives from the sampling errors, which Eustat calculates for the main tables that it publishes. Between the two error estimation

methods of 'Linealisation' or 'Replication', the latter was chosen, following the procedure known as Jackknife <sup>4</sup>.

The software employed is called 'WesVar' <sup>5</sup>.

Table 3 shows the information corresponding to 1997-8, two reduced lists of the Coefficients of Variation (quotient of the standard deviation from the parameter to be estimated and the parameter itself) for the principal groups of activities, both by average social time and the average time per participant. In none of the cases did it reach 10% of C.V., the level at which it would cause concern. Logically, it is the least frequent activities (care of people in the home) that cause the broadest errors –around 7%.

If we cross, by average time per participant, activity (8 basic types), sex and type of day (working, Friday, Saturday and Sunday), of the 64 resulting squares, 4 exceed 10% of C.V. (care of people in the home-women-working day -13.4%-, care of people in the home-women-Sunday -10,9%-, care of people in the home-men-Fridays -14,1%- and care of people in the home-men-Saturdays -11,2%-). It can be seen that very detailed analysis of specific sub-groups of the population must necessarily lead to a revision of sampling errors.

The very evaluation of Time Use Development also presents the need to analyse it in light of the margins of error, both of the information alone, and also of the development, a possibility offered by the software used by Eustat (see note 5).

## **II. Seasonal Effect on Time Use**

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A summary of the main meteorological variables obtained in the three principal meteorological observatories of the provincial capitals can be seen in Table 4.

If we take into account the average temperatures and the rainfall the changes in the three observatories – except in the case of Vitoria-Gasteiz in which they are lower – are around 10%. The number of hours of sunshine reveal a greater variation: in Bilbao there are 53 hours more in autumn than in spring and as much as 66.5 hours more in the case of San Sebastián. In Vitoria-Gasteiz there are 35 hours fewer hours of sunshine. Nevertheless, it is also necessary to bear in mind the number of hours of daylight.

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<sup>4</sup> Morganstein, D. (1998). "The replication method for estimating sampling errors". Seminario de Estadística en Euskadi, v. 37, EUSTAT, Vitoria-Gasteiz.

<sup>5</sup> WesVar Complex Samples, v. 4.1. (2001). Rockville, M.D: Westat, Inc.

Westat, Inc. (1998) WesVar Complex Samples 3.0 user's guide. Chicago, IL: SPSS, Inc.

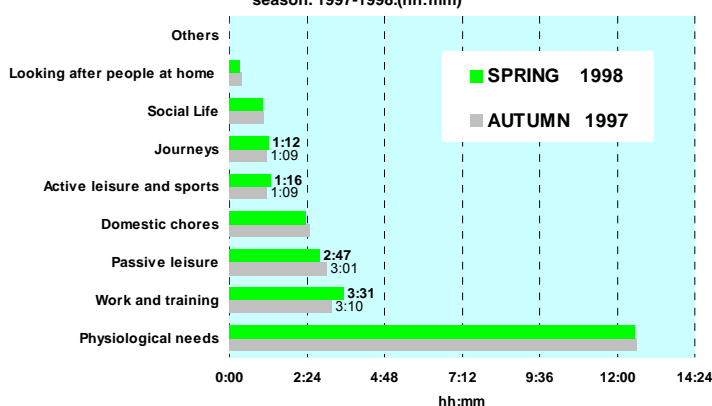
Figure 4 Principal meteorological variables by months and years.1997-1998

	Total 1997	Total 1998	1997				1998				DIF spring- autumn
			Sept.	Oct.	Nov.	Autumn	Apr.	May.	Jun.	Spring	
Average temp											
- Bilbao Airport	15,5	14,7	19,9	18,5	13,4	17,3	12,4	15,7	18,5	15,5	1,7
-Igeldo (San Sebastián)	14,6	13,7	19,2	17,5	12,4	16,4	11	14,6	17	14,2	2,2
Vitoria-Gasteiz Airport	12,8	11,7	17,8	14,7	9,1	13,9	9	13	16,5	12,8	1,0
Total rainfall in mm											
- Bilbao Airport	1023,1	1212,3	46,4	39	185,6	90,3	177,4	90,5	38,2	102,0	-11,7
-Igeldo (San Sebastián)	1733,5	1537,3	108,6	67,4	276,4	150,8	229,4	93,2	85	135,9	14,9
Vitoria-Gasteiz Airport	818,3	707,5	18,7	37,2	134,1	63,3	95	51,9	47,4	64,8	-1,4
Nº hours sunshine											
- Bilbao Airport	1855	1783,6	197,7	147	84,1	214,4	124,8	173,3	187	161,7	52,7
-Igeldo (San Sebastián)		1914	204,6	161,8	88,7	227,6	132,8	156,8	193,5	161,0	66,5
Vitoria-Gasteiz Airport	2040,3	1998,1	197,6	169,8	92,6	153,3	159	192,6	213,3	188,3	-35,0

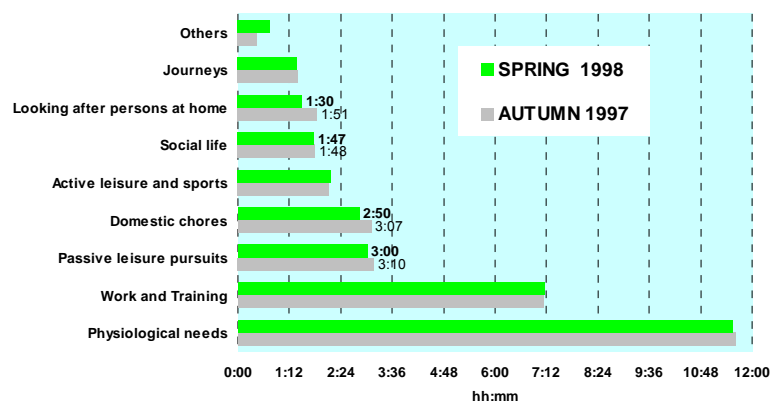
Source: National Meteorological Institute / Territorial Meteorological Centre of the Basque Country.

There are three types of indicators usually used in time analysis: the average social time - the average time devoted by the population to a particular activity -, the average time by participant – the average time spent on a particular activity by the population who carry out this activity – and the rate of participation –the percentage of people who carry out a particular activity.

GRAPH 1. Average social time according to the type of activity and the season. 1997-1998.(hh:mm)



GRAPH 2. Average time per participant according to the type of activity and the season. 1997-1998. (hh:mm)



Fuente: Eustat, EPT1997-98

In Figure 1 it can be seen that, generally speaking, if we take into account the popular activity groups, the seasons in which the sample was taken has not had much effect on the structure of time use.

An increase of 21 minutes - 11% - can be seen in work and study time in spring with respect to autumn, partly explained by the delay in the start of the academic course – basically in the universities – and by the extension of the holiday period in the month of September.

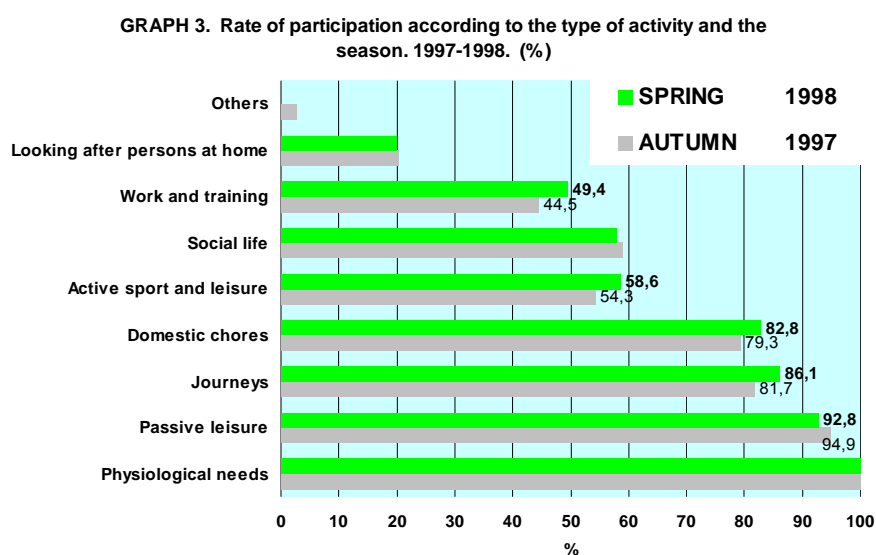
In spring there would appear to be a move from time spent on passive leisure pursuits (reading, TV, etc.) - -14 minutes-, towards active pursuits (sports, excursions, walks,



etc.) - +7 minutes-. Housework or time spent on it, as well as time spent on looking after people in the household also fall as does the time on journeys (5%). Except for the changes in work, study and in leisure, there do not appear to be significant differences.

If we take the average number of hours per participant as a point of reference, further still small differences can be seen, a situation which can be explained by the different percentage of participation in the various activities.

According to Figure 2, only the average time spent by participant on care of people at home appears to vary considerably with 21 minutes less (from autumn to spring) and in household chores - -17 minutes-, representing a fall of 19% and 9% respectively. Changes in other activities are lower than 6%.



Source: Eustat, EPT1997-98

From Figure 3 it can be seen how an increase in the level of participation in some activities (work and training, leisure and sports activities and domestic chores) explains the different results between average social time and average participant time .

If the activities are disaggregated and most importantly focussed on the average time indicator per participant, several notable changes can be seen: time devoted to looking after adults falls by almost one hour (55 minutes), statutory training increases by 35 minutes, passive leisure without activity falls by half an hour, the time spent on secondary work increases (+24 minutes) etc. As the average social times do not vary substantially, modifications can be appreciated in the proportion of users.

It may be concluded that there are no large differences due to seasonality in the structure of time use –basing this concept on the large activity types – at least when taking autumn and spring as points of reference.

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