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USING DISSIMILARITY INDEX FOR ANALYZING GENDER EQUITY IN CHILDCARE ACTIVITIES IN SPAIN

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Abstract: This paper uses dissimilarity indexes to examine whether there is equity or not in the time dedicated by mothers and fathers to childcare activities, since according to the literature, it is recommended that both the mother and the father participate in them together. The study focuses on Spain, a country where currently there is a great debate on this topic. The data were provided by the Time-Use Survey, conducted by the Spanish Statistics Office in years 2009-2010 and the final database consists of 1,878 heterosexual households with children. Results indicate that male participation in childcare is still far from female participation, although the way both men and women distribute their childcare time among childcare activities is certainly similar.

Keywords: Time use, childcare, gender, dissimilarity index, Time-Use survey

INTRODUCTION

Time use is one of the topics that have generated the most interest among economists and social researchers since the middle of last century. A well know series of gender gap questions, including the need to know the distribution of roles within households and to value unpaid work to adapt social policies to the new reality, among others, led to the collection of time-use data [del Val García 2012].

However, the list of benefits that can be obtained from analyzing time-use data is very much longer, including social trends, ageing and life-cycle, educational differences, well-being and health, the estimation of household production outputs, etc.

According to the literature on time use, both mothers and fathers have increased the amount of time they devote to childcare ([Gauthier et al. 2004], [Bianchi et al. 2006], [Gray 2006], [Sullivan 2006], [Craig 2006], [Craig et al. 2010]). One of the main reasons for this might be the change in social expectations of what constitutes adequate parenting [Coltrane 2007]. As a consequence, the amount of time necessary to produce a "good" childhood has ratcheted up tremendously [Sayer et al. 2004]. However, this increase in the time that parents devote to childcare does not mean that the average distribution of care has become more gender-equal. As women entered the labor market, the number of families with parents sharing childcare could be expected to increase significantly. However, while men have increased their participation in childcare (and other domestic tasks), this rise does not match the extent to which women have taken up market work ([Sayer 2005], [Sullivan 2006], [Fisher et al. 2007]).

Here we study the distribution of roles in Spanish households for childcare activities. According to the Spanish Time Use Survey (STUS) 2009-2010, the childcare activities we consider are physical childcare and supervision, teaching the children, reading, playing and talking with the children, accompanying the children and other childcare, whether specified or not. More specifically, we focus on the distribution of that time among the childcare activities considered. That is, we pursue to check for parent specialization in those tasks.

In order to study parent specialization in childcare tasks, we will use the Dissimilarity Index (*DI*), a particular case of the Duncan and Duncan index (*DDI*) [Duncan and Duncan 1955]. Both the *DDI* and the *DI* have been widely used in the literature to study segregation, but could be interpreted as specialization indexes, especially the *DI*.

The article is structured as follows. In Section 2 is devoted to data and methods. In that section we introduce the main characteristics of the STUS 2009-2010 and point out its main drawbacks, and also define the dissimilarity index. In Section 3 we present the main results of this research. Finally, we highlight the most relevant conclusions reached through this research.

DATA AND METHODS

Data

As said above, the data we have used come from STUS 2009-2010, which is based on the preceding STUS 2002-2003 and the new guidelines of the Harmonized European Surveys on Time Use compiled by Eurostat.

The three basic units of observation and analysis that are considered in STUS 2009-2010 are (i) the individual members of the household aged 10 and above, (ii) private households residing in main family dwellings, (iii) the days of the week.

According to the STUS 2009-2010, a household is defined as the ensemble of people who occupy a main family dwelling, or part of it, in common and consume and/or share food and other goods charged to the same budget. Each household selected in the sample is allocated a day of the week (from Monday to Sunday) to complete the activity diary. All household members aged 10 years old and over should complete the diary for the selected day. The diary timesheet covers 24 consecutive hours (from 6 a.m. to 6 a.m. the following day) and is divided into 10-minute intervals, in which the respondent has to note the main activity, the secondary activity (simultaneous) that he or she performed at the same time (where applicable), whether he or she was with other known persons at that time, where he or she was or the means of transport used, as well as whether or not he or she was using a computer or the Internet when performing these activities. Nevertheless, even though STUS 2009-2010 collects information on both main and secondary activities, we only proceed with main activities because of the small number of households reporting that they perform secondary childcare activities (less than 800) and the inconsistency of their responses. This cannot be considered a problem if we do not conflate primary child care activities with the time that parents spend with children.

The size of the planned sample was around 11,538 dwellings, but after removing the empty dwellings and the dwellings that could not be sampled, the sample was reduced to 9,541. Since the households of interest for childcare research are those made up of at least one heterosexual couple with children, we initially selected households where the reference person was part of a heterosexual couple. However, surprisingly, we could not use the classification used in STUS 2009-2010 because of the discrepancy between the type of household and the kinship of household members (this is a serious drawback of STUS 2009-2010). Consequently, we set up our own classification and select 6,259 households of interest (including a heterosexual couple). Finally, only 1,878 of these households reported having devoted at least ten minutes to childcare activities the day they filled the one-day diary (we exclude Ceuta y Melilla from the database). Therefore, the final database of households with heterosexual parents and children contains

1,878 units (households). Table 1 shows the number of units by Spanish provinces. The Spanish provinces are shown in Figure 1.

Table 1. Number of households in the final database, by province

Province	Units	Province	Units	Province	Units	Province	Units
Álava	11	Castellón	21	Las Palmas	41	Segovia	7
Albacete	22	Ciudad Real	23	León	11	Sevilla	49
Alicante	52	Córdoba	15	Lérida	12	Soria	6
Almería	17	Cuenca	6	Lugo	7	Tarragona	12
Asturias	62	Gerona	23	Madrid	245	Teruel	16
Ávila	8	Granada	18	Málaga	47	Toledo	45
Badajoz	39	Guadalajara	18	Murcia	66	Valencia	73
Baleares	70	Guipúzcoa	33	Navarra	143	Valladolid	28
Barcelona	151	Huelva	18	Orense	9	Vizcaya	50
Burgos	15	Huesca	5	Palencia	8	Zamora	6
Cáceres	24	Jaén	12	Pontevedra	53	Zaragoza	58
Cádiz	35	La Coruña	43	Tenerife	23		
Cantabria	54	La Rioja	64	Salamanca	4		

Source: Own elaboration from STUS 2009-2010.

Figure 1. Map of Spanish provinces

We selected the childcare activities from the list that mirrors the list published in EUROSTAT's 2008 guidelines (see Table 2), so our final database is composed of nearly 20,000 observations corresponding to the time devoted by mothers and fathers to 5 childcare activities in 1,878 households.

Table 2. Childcare activities

	Definition	Example
CHILDCARE	Childcare by parents or older siblings of children, other household members	Grandparents who are members of the household...) of child household members
Physical childcare and supervision of children	Feeding them, dressing them, putting them to bed, rocking them, getting them up, washing them... Supervising them at home and outside.	Changing my baby's nappies
Teaching the children	Helping the children with their homework, teaching them to do specific things.	Checking their homework
Reading, playing and talking with the children	Reading, playing and talking to children	Reading them a story
Accompanying the children	Going to the doctor's with the children. Waiting for them at a sports center, music class... if no activity different from waiting is specified. Visiting school or the nursery. It includes parents' meetings with teachers	At school with my children
Other childcare, whether specified or not	Other childcare	Listen to my daughter playing the piano at home

Source: Own elaboration from the Spanish Statistics Office (INE).

Methods

As stated in the introductory section, *DI* is a particular case of the well-known *DDI* which have usually been used to indicate whether a population group is segregated or not. A population group is said not to be segregated if the percentage it represents over the total population of a region is replicated when considering the different parts in which that region can be, administratively or not, divided. By contrast, it is said to be segregated if that population group is confined to some parts of that region. The *DI* (Duncan and Duncan 1955) is the particular case of a *DDI* when the number of groups is only two. Thus, the *DI* compares the difference in percentages between the two groups across the area under study.

Here the population we consider is parents with children, the population groups being fathers and mothers, and the non-spatial region being the space of childcare activities (it could also be interesting to consider the space of households). Then, we use the *DI* (which in our case coincides with the *DDI* since there are two population groups) to compare the distribution of the time employed by fathers and mothers across the artificial space of childcare activities we have created.

The standard formula for the dissimilarity index is as follows:

$$DI = \frac{1}{2}\sum_{i=1}^{n}\left|\frac{x_i}{X} - \frac{y_i}{Y}\right|, \quad 0 \le DI \le 1$$

where x_i and y_i represent the size of the minority and majority population groups, respectively, (usually) in census tract *i*, and *X* and *Y* are the size of the minority and majority groups, respectively, in the area under study (usually a municipality).

In our research, x_i represents the time devoted by men to childcare activity *i*, *X* is the time men devote to childcare activities, y_i is the time devoted by women to childcare activity *i*, and *Y* the time women devote to all the childcare activities.

The *DI* is bounded between zero and one. Zero indicates minimum dissimilarity/segregation across activities; that is, the percentage of time that men and women spend on each of the activities considered is the same across the space of activities. By contrast, one indicates maximum dissimilarity/segregation. In other words, if we construct a bi-dimensional table of relative frequencies, the rows indicating the different childcare activities and columns containing the two genders: men and women (see Table 3), *DI*=0 when factors, childcare activities and gender are independent (both marginal distributions, expressed in relative frequencies, are the same). A value of *DI*=1 will be obtained in the case of functional dependence, that is, when one of the two cells in the marginal distributions of the activities contains a zero (full specialization).

Table 3. Theoretical frequency distribution of childcare

	Men	Women	Total
Activity 1	x_1	y_1	$x_1 + y_1$
Activity 2	x_2	y_2	$x_2 + y_2$
⋮	⋮	⋮	⋮
Activity *n*	x_n	y_n	$x_n + y_n$
Total	*X*	*Y*	*X*+*Y*

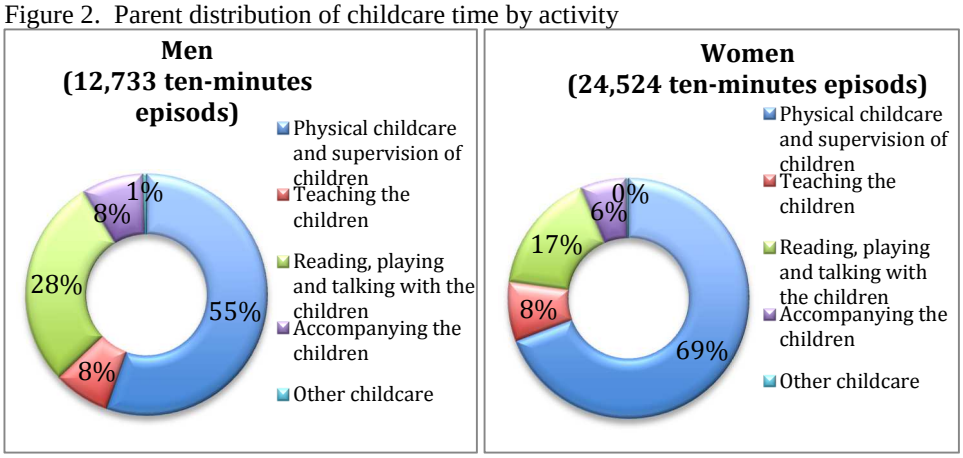
Source: own elaboration from Spanish Statistics Office (INE).

RESULTS

As said above, the main objective of this article is to analyze whether the distribution of the time that fathers (and consequently mothers) devote to childcare activities is the same across the artificial space of activities or, by contrast, whether they specialize in some activities. This information is provided by dissimilarity indexes. To better understand the results obtained, it is necessary to take into account that, according to STUS 2009-2010, in Spain one third of total childcare time corresponds to men and the remaining two thirds to women.

When considering the whole country, the distribution (by activity) of the time fathers spent on childcare does not differ significantly from how women distribute the time they devote to childcare among activities (Figure 2). The only relevant difference is that men participate more in playing, reading and talking with the children, while women are more involved in physical childcare and supervision (the most time-intensive activity). Thus, it is no surprise that the *DI* for Spain is low: 0.14. This means that while men participate in childcare only half as much as women, both men and women distribute their childcare time among the different activities in a similar manner.

Figure 2. Parent distribution of childcare time by activity



Source: own elaboration.

Table 4 lists the *DI* values for Spanish provinces when analyzing the discrepancy between the fathers' and mothers' vectors of the distribution of the time they spent on the five childcare activities considered. The *DI* ranges from 0.05 (Gerona) to 0.49 (Cuenca and Segovia). In general, the most important Spanish provinces are associated with a low *DI* (less than 0.20), whereas the highest *DI*'s correspond to depressed provinces.

One interesting result is that the *DI* is significantly and negatively correlated with fathers' degree of participation (Pearson's correlation coefficient = -0.30; Spearman's rank correlation coefficient = -0.38), which means that the higher fathers' participation in childcare activities, the more similar the male and female vectors of the percentage of time they devote to each activity.

CONCLUSIONS

From our analysis it can be firstly concluded fathers and mothers do not participate equally in childcare. In fact, mothers spend twice as much time as fathers on childcare activities. But, despite men participating much less than women in childcare activities, they distribute their time among the five activities

considered in a very similar manner to women, which results in a very low dissimilarity index (0.14). This result, which can be extended to the majority of Spanish provinces, constitutes the second conclusion. Finally the third conclusion is that the higher the level of father participation in childcare activities, the more similar the male and female vectors of the percentage of time they devote to each childcare activity.

Some interesting avenues for future research include comparing Spanish results to those stemming from the Time-Use Surveys of other countries, searching for the latent factors that explain the low level of male participation in childcare activities, analysis of the disparity in the amount of time devoted by mothers and fathers when analyzing the households that dwell in the areas of interest, etc.

Table 4. *DI* value for Spanish provinces

Province	***DI***	**Province**	***DI***	**Province**	***DI***	**Province**	***DI***
Álava	0.25	Castellón	0.13	Las Palmas	0.17	Segovia	0.49
Albacete	0.12	Ciudad Real	0.16	León	0.21	Sevilla	0.23
Alicante	0.24	Córdoba	0.19	Lérida	0.16	Soria	0.46
Almería	0.30	Cuenca	0.49	Lugo	0.22	Tarragona	0.24
Asturias	0.18	Gerona	0.05	Madrid	0.11	Teruel	0.18
Ávila	0.24	Granada	0.21	Málaga	0.11	Toledo	0.30
Badajoz	0.24	Guadalajara	0.28	Murcia	0.28	Valencia	0.18
Baleares	0.17	Guipúzcoa	0.20	Navarra	0.13	Valladolid	0.26
Barcelona	0.17	Huelva	0.21	Orense	0.09	Vizcaya	0.15
Burgos	0.35	Huesca	0.18	Palencia	0.15	Zamora	0.36
Cáceres	0.13	Jaén	0.24	Pontevedra	0.18	Zaragoza	0.18
Cádiz	0.17	La Coruña	0.12	Tenerife	0.30		
Cantabria	0.20	La Rioja	0.13	Salamanca	0.24		

Source: own elaboration.

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