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# Estimating the Relationship between Reading in Primary Education, Educational Attainment and Social Welfare. The Case of Extremadura (Spain)\*

*Estimando la relación entre la lectura en Educación Primaria, el nivel educativo y el índice de bienestar social. El caso de Extremadura (España)*

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**Abstract:** The purpose of this paper is to analyse the relationship between the Social Welfare Index and the reading habits of primary school students in Extremadura (Spain). A study has been performed which consists of two parts. First, we conducted 4,288 surveys on reading habits in 87 municipalities. Second, we calculated the social welfare index. The statistical analysis reflects two conclusions: firstly, educational and socio-economic policies have resulted in equal opportunities that allow for similar social possibilities throughout the territory; secondly, Educational Attainment of parents is the most decisive factor in obtaining the best results in terms of students' reading habits.

**Keywords:** Reading habits, Primary Education, Educational attainment, Social welfare index.

**Resumen:** Este estudio tiene como objetivo analizar la relación entre el índice de bienestar social y los hábitos de lectura de los alumnos de Educación Primaria en Extremadura. Se ha llevado a cabo un análisis con dos partes. En primer lugar, se realizaron 4.288 encuestas sobre hábitos de lectura en 87 municipios. Paralelamente, se ha obtenido el índice de bienestar social de Extremadura. El análisis estadístico refleja dos conclusiones: la política educativa y socioeconómica ha motivado una equidad con posibilidades sociales similares en todo el territorio; en segundo lugar, el nivel educativo de los padres es el factor más decisivo en los hábitos de lectura de los estudiantes.

**Palabras clave:** Hábitos de lectura, Educación Primaria, Nivel educativo, Índice de bienestar social.

## INTRODUCTION

School authorities make economic investments, offer courses, facilitate exchange programmes, create library networks and design a range of programmes to encourage reading habits in their citizens, especially in schoolchildren. However, the effectiveness of implementing these measures is not usually known because, once investments are made and projects designed, no subsequent assessment studies are conducted to analyse what factors, conventional or other, affect reading rates.

To address this shortcoming, the present study was designed to determine the uniformity of reading habits of primary education students in the autonomous region of Extremadura (Spain), regardless of the welfare index of their geographical location. Indeed, in the field of education, it has always been held, as a kind of axiom, that the right social welfare policies have a direct impact on educational equality, on the one hand, and on the disappearance of extreme inequalities on the other hand. As such, they ultimately influence the general progress of a country's education. Of course, this is broadly the case over long periods of time, with the expected fluctuations, irregularities and differing conditions of certain parts of the region. Evidence of this is the tendency toward the completion of compulsory schooling and the practical disappearance of illiteracy rates in advanced countries over the last one hundred and fifty years. This has come about specifically since the nearly simultaneous implementation of educational laws in Western countries that provided full primary education throughout the territory, brought about in Spain

with the Moyano Law (1857). Another decisive step, this one related to reading habits, took place in Spain with the spread of public, municipal, school and state libraries, particularly in the last quarter of the 20th century (Bernal, 1991, p. 6; Camacho, 2004, p. 29).

However, in recent decades, despite evident progress and a plethora of statistics, some key fields in education have shown irregular results, major fluctuations and, in general, unsatisfactory outcomes at all levels that require monographic and profound consideration (IEA, 2012; Ministry of Education, Science and Sport [MECD], 2016). Among these, literacy habits stand out. Numerous surveys on literacy rates, which we will be mentioning, reveal unsettling sex differences, sharp declines for certain age groups, as well as territorial and social group differences. This is despite the above-mentioned equality policies. Therefore, we need to study the factors relating literacy to the complex concept of social welfare and its contributing variables, in order to try to specify which of these are the most influential with regard to reading habits. The objective is to assess the results of cross variables, with a view to providing possible recommendations in educational management and administration.

For this purpose, a two-way analysis process has been designed. First, we have conducted 4,288 surveys on reading habits in 87 municipalities and at 127 schools, grouped by town and geographical location. The sample base was the total population of primary school students in the 2016-2017 academic year, broken down by municipality of residence, age, gender and school. In light of the sample size, the maximum estimated error is estimated to be below 3% for a confidence level of 95%. Additionally, it must be noted that no results receiving a value of less than 25 responses were taken into account. We have calculated the social welfare index for Extremadura by considering aspects such as residence, family income or educational level according to quantitative data from the *Socio-economic Atlas of Extremadura* for 2017. Apart from other methodological details, which will be expounded upon later, our analysis is based on the geographical area of those surveyed, which has made it possible to map some of the variables. Additionally, we have disaggregated social welfare factors into various items: residence; youth index; family income; level of education; welfare (socio-economic component, health, employment, accessibility, social participation and natural environment).

We started from premises regarding the relationship between reading habits and socio-economic levels, which will be taken up again in the conclusions to note whether these have been confirmed or refuted by our research, or whether they require further study. Firstly, the data on reading habits in Extremadura are fairly homogeneous throughout the territory; secondly, educational policies

(reading promotion plans implemented by the regional authorities, the creation of school library networks and reading points, especially in municipalities with small populations) can improve educational indices, especially in the field of equity and, therefore narrow the margin of extreme territorial differences; thirdly, not all factors related to the social welfare indices affect students' reading habits to the same extent; fourthly, economic factors and location in large towns are not relevant; and fifthly, in the case of small differences, the most determining factor is the level of education in the area.

These premises underlie the following objectives: 1) Study the reading habits of students from Extremadura in the 6 to 12 age group to obtain their reading index, which here means the average books read in each municipality by primary students in one month; 2) Group municipalities according to their reading habits, and group them according to their welfare index and their level of education; 3) Analyse the relationship between these two variables in the region of Extremadura, for two purposes: 3.a) To compare populations based on their reading index and welfare index and 3.b) To compare populations based on their reading index and education level; 4) Assess the results and draw conclusions.

#### THEORETICAL FRAMEWORK

We shall begin this section by reviewing the scientific literature published to date on individual reading habit studies, as well as studies that relate economic variables to reading rates, both in small communities and large towns.

Interest in reading and the aspects that affect literacy have aroused intense interest in the scientific community in recent years. In the Spanish case we have moved from general indicators that focus on the quantitative study of the reading process (Colomer, 1993; Moret, 1999; Olizaregi, 2000) to other more local and specific studies that have tried to determine the situation in autonomous communities (Fundación Germán Sánchez Ruipérez, 2008, 2009; Gil, 2009; Serna, Rodríguez and Etxaniz, 2017; or Pérez-Parejo, Gutiérrez-Cabezas, Soto-Vázquez, Jaraíz-Cabanillas and Gutiérrez-Gallego, 2018a, 2018b, 2019). The same can be seen in the scientific literature from other latitudes (Brasseur, Hock, Kieffer, Biancearsaand Deshler, 2011; Logan and Johnston, 2009; Yusof, 2010). This is evidence of the scientific community's priority to understand the most decisive social aspects affecting achievement of better reading comprehension levels, which will undoubtedly lead to improved academic performance in students.

In this field, the scientific community has already confirmed the influence of socio-economic levels on acquiring reading skills and their subsequent develop-

ment (Bradley, 2002; Hackman and Farah, 2009; Moreno, 2001; Urquijo, García Coni and Fernandes, 2015).

Studies on reading, including the most current ones, have shown an interest in determining the reading habits of populations over 14 years of age (Federación de Gremios de Editores de España, 2018), which ignores younger groups and reveals a gap in the research. In this sense, we decided that it would be advisable to extend the age range limit from 2008 (14 to 24 years of age, Fundación Germán Sánchez Ruipérez, 2008), to younger groups (6 to 12 years of age), as well as to territorial disaggregation levels and the characterisation of individuals. It is noteworthy that the PISA report (MECD, 2016) and PIRLS (IEA, 2012) show levels of reading comprehension with room for improvement in the regions (both nationally and in relation to the OECD average) that require intervention.

Likewise, there are other studies that directly relate family socioeconomic status to reading habits or language skills in various parts of the world (Dolean, Melby, Tincas, Damsa and Lervag, 2019; Dudaité, 2016; Şahin, 2009; Sehar, 2018; Tarhan, 2016; Yalman, 2013; Yusof, 2010) that deal precisely with the core issue of our research. We shall refer to them in the discussion section with a view to comparing our results with theirs.

#### AREA OF STUDY

Firstly, we feel it is necessary to justify the choice of this particular region to conduct this study. The information that can currently be found in the various reports published by the *Observatorio de Lectura y el Libro* (Reading and Book Observatory) of the Ministry of Education, Culture and Sport, as well as the information collected by the National Statistics Institute, provide very general outlines on reading habits that need greater disaggregation to take into account the peculiarities of this region, its degree of rurality and the peculiarities of its demography, which decisively affect reading habits.

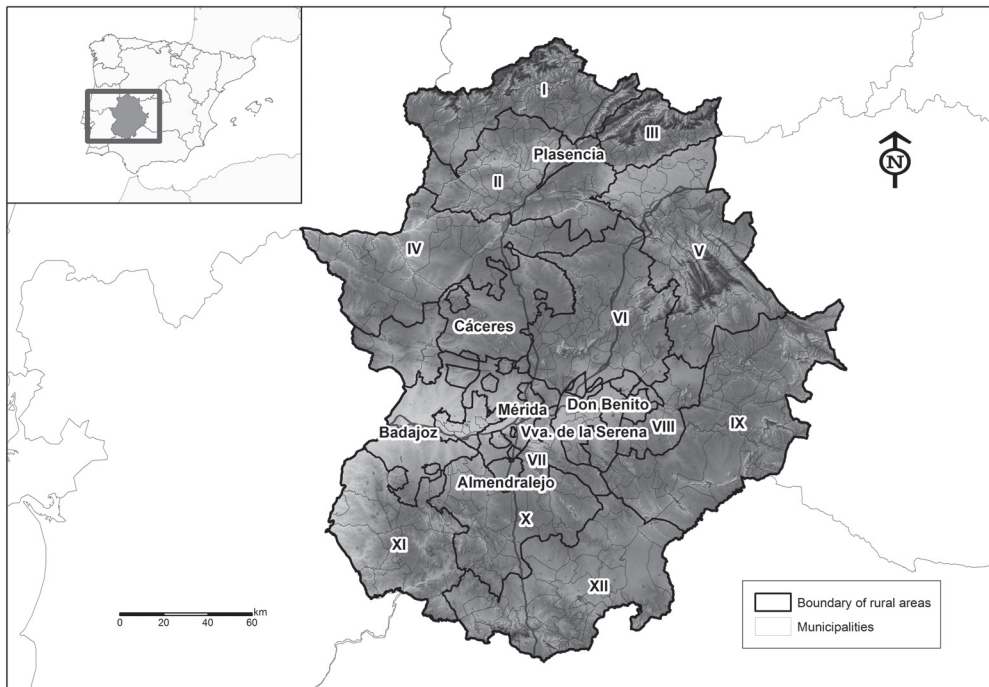
In this vein, the aforementioned PISA report (2016) called for improvement in reading of the regions educational centres, indicating a need for intervention. Perhaps relatedly, Extremadura is the only Spanish region that will continue to receive aid from European cohesion funds with room for improvement in regions in Spain (López and Faña, 2014; Nieto and Cárdenas, 2015), whose goals include investment in education and research (Bleotu and Doina, 2014; Furia, Castagna, Mattoscio and Scamuffa, 2010; Grecu, Titan and Druica, 2015; Grigorescu, 2012; Mate and Harris, 2014).

As Nieto and Gurría (2005) have stated, rural populations have been los-

ing population and services for years. Just as socio-economic variants have been studied to understand this problem (Junta de Extremadura, 2017), it is necessary to investigate cultural and educational aspects that affect such areas. Towns with fewer than 10,000 inhabitants account for more than 96% of the municipalities in Extremadura, which hold approximately 50% of the overall population distribution in the region.

To most authentically represent the results obtained and for greater statistical coherence, we have opted to show the 7 populations with more than 20,000 inhabitants in terms of their results, and the rest of the populations have been grouped in 12 larger areas that correspond to functional locations according to the map in Table 1. In these twelve rural areas, the municipalities were classified according to their population (< 1,000 inhabitants, from 1,000 to 2,000, from 2,000 to 5,000, from 5,000 to 10,000 and from 10,000 to 20,000) and we selected one or several within each interval to conduct the survey of primary education students.

**Map 1. Area of study**



**Table 1. Area of study**

RURAL AREAS	NATURAL AND/OR FUNCTIONAL AREAS COMPRISING
I	Las Hurdes, Sierra de Gata, Trasierra-Tierras de Granadilla and Valle de Ambroz
II	Valle del Alagón, Rivera de Fresnedosa and Riberos del Tajo
III	La Vera and Valle del Jerte
IV	Tajo Salor and Sierra de San Pedro
V	Las Villuercas-Ibores-Jara and Campo Arañuelo
VI	Comarca de Trujillo, Sierra de Montánchez and Zona Centro
VII	Lácara Sur and Municipios Centro
VIII	La Serena - Vegas Altas and Guadiana
IX	La Serena and Siberia
X	Río Bodión, Tierra de Barros-Matachel and Tierra de Barros
XI	Lácara-Los Baldíos, Comarca de Olivenza and Sierra Suroeste
XII	Waters and Services of the Region of Llerena and Tourist Area of Tentudí

## MATERIAL AND METHODS

### *Sources*

To conduct the study correctly, we used a large number of information sources ranging from censuses to stated preference surveys. Censuses have proven to be very useful in defining the size of the population and in performing the appropriate stratification of the survey collection process.

### *Survey of reading habits in Extremadura (2017)*

The Statistics Section of the Educational Evaluation and Quality Service of the General Secretariat of Education, under the organization of the Department of Education and Employment of the Regional Government of Extremadura, facilitated the interpretation of the spatial distribution of non-university students in the region of Extremadura. It was an essential source for the correct stratification of the surveys, as it has certain information that is not included in the official censuses published by the National Statistics Institute. As such, this was the main source of data used in determining the stratification and sample size.

The variables considered for the characterisation of the reading habits of those surveyed were: sex, age, school, course, reading frequency and medium, reading in



other languages, and literary preferences. Regarding the survey model used to obtain direct data on the primary education population, as well as the disaggregation of the information and the total volume of the surveys conducted by towns and sex, the work already published by Pérez-Parejo, Gutiérrez-Cabezas, Soto-Vázquez, Jaraíz-Cabanillas and Gutiérrez-Gallego can be referenced, (2018a, pp. 70-72), where the process is detailed.

The statistical unit observed in all designations of a variable was the individual primary school student.

The opinion survey was carried out on students over the age of 6 who were, at the time of the interview, in the schools (both public and subsidised) of the municipalities of the various rural areas into which the study area had been divided. The data were collected in a direct manner at the educational centres using a physical medium (paper). Data was also collected indirectly by means of a Google drive form; where students were appropriately led through the survey by their teachers or researchers. Four thousand, two-hundred and eighty-eight valid surveys were conducted on a population of 64,419 primary students (only 3,994 were usable, given the representation of the sample in the municipalities). Based on the sample size, the estimated maximum error is less than 3% for a 95% confidence level. We must point out that, when showing the data, no result with a value of fewer than 25 answers was taken into account. The survey was conducted between February and June of 2017. For a more representative result, we considered the existing population of the region according to the size of the municipalities. To date, the results published with the larger data set from which these are taken have referred to reading among immigrant students (Pérez-Parejo, Gutiérrez-Cabezas, Soto-Vázquez, Jaraíz-Cabanillas and Gutiérrez-Gallego, 2018a), genre preferences (Pérez-Parejo, Gutiérrez-Cabezas, Soto-Vázquez, Jaraíz-Cabanillas and Gutiérrez-Gallego, 2018b) or reading by university students (Pérez-Parejo, Gutiérrez-Cabezas, Soto-Vázquez, Jaraíz-Cabanillas and Gutiérrez-Gallego, 2019).

### *Socio-economic Atlas of Extremadura (2017)*

The Statute of Extremadura entrusts the Junta de Extremadura with the exclusive responsibility of undertaking statistical research for purposes of interest to the autonomous region. This is the context in which the *Socio-economic Atlas of Extremadura* was published in 2017. It comprises several clearly differentiated chapters: Economic, Demographic and Social Indicators; Commercial Areas; Entrepreneurship Indicators; Evolution of Statistical Indicators; Sociodemographic Characteri-



sation of the Most Important Municipalities; Basic Indicators of Groupings of Municipalities in Extremadura and an annex of thematic maps.

Although other research (such as Asadullah and Yalonetzky, 2012) was available, using the work prepared by the Statistical Institute of Extremadura, which includes among its variables educational level, was considered more appropriate to the territorial reality under study. Accurate knowledge of the region's current situation is the essential basis for all social and economic agents, public and private institutions, as well as the citizens of Extremadura in general, to have a quality, current and useful statistical corpus in accordance with the new demands for information required by society in the 21st century.

### *Description of the variables*

It is advisable to begin this section by explaining the variables considered for the proposed study, as well as the way in which they were obtained and the sources from which they originated quantitatively. The following have been considered for the purposes of this study:

1. Reading index: the average books read in each municipality by primary students in one month. This information was obtained by transforming the qualitative value from the survey (None, One, From 2-4, More Than 4) into a quantitative scale, assigning a numerical value to each one of the options of the question items.
2. Resident population: number of inhabitants of each municipality based on the Municipal Register of Inhabitants on 1 January 2016, extracted from the *Socio-economic Atlas of Extremadura* (2017).
3. The youth index of the *Atlas Socioeconómico de Extremadura* (population between 0-15 years for every 100 inhabitants, from January 1, 2016) the potential primary student population (6-12 years), to whom the survey is directed.
4. Household disposable income per inhabitant (/inhab.): total income from work plus capital income, social benefits and transfers, subtracting direct taxes and social security contributions. Taken from the *Socio-economic Atlas of Extremadura* (2017), which uses 2014 as the reference date.
5. Global or synthetic social welfare index (SWI) taken from the *Socio-economic Atlas of Extremadura* (2017) and broken down into the following partial indices or components (for more details on the key properties of this index, the weighting of the components and the key underlying axioms, see the *Socio-economic Atlas of Extremadura* [2017]):
  - a. "Socio-economic level" component: 1) disposable household income per

- inhabitant (reference date 2014); 2) educational attainment (reference date 2015).
- b. “Health” component: which includes: 1) mortality rate (reference date 2015), and 2) dependency ratio of children and adults (reference date 2016).
  - c. “Employment” component, which consists of the unemployment variable (reference date 2016).
  - d. “Facilities” component, which includes four variables: 1) the surface area of sports facilities relativised by municipal surface area (reference date 2014); 2) Primary schools relativised by population (reference date 2014); 3) health clinics and centres relativised by population (reference date 2016); and 4) banking entities relativised by population (reference date 2017).
  - e. “Accessibility” component, which consists of the variable related to the accessibility of the leading municipalities where services are provided (reference date 2017).
  - f. “Social participation” component, which consists of the abstention rate in the general elections variable (reference date 2016).
  - g. “Natural environment” component, which consists of two variables: 1) the surface area of rivers and lakes relativised by municipal surface areas (reference date 2009) and 2) irrigated areas relativised by total agricultural areas (reference date 2015).
6. “Educational attainment” component, which is the percentage of the population with secondary or university studies for the population aged 16 and over in 2015. This variable has been used in the analysis in an independent way, despite being part of the set of variables that make up the social welfare index.

### *Methodology*

We also need to mention that the data has been processed using the free computer software *R-Statistics*, which includes the algorithms used to calculate ranking analysis and several tools designed to build graphs.

Prior to the ranking analysis based on the selected variables, we used the “*na.omit*” function to find and eliminate the rows that did not contain any information and to determine that there were no omitted values within the data set. In order to establish differences among the variables, we used the Euclidean distance, which is sensitive to differences in the metrics of the variables. However, we did not find it necessary to standardise the variables before ranking, since the groups were made using each variable individually.

The classification method utilized was a hierarchical analysis using the “*hclust*” algorithm that results in the clustering of elements based on the set of distances by applying various methods. More specifically, in this case, we employed the “*ward.D2*” method, which consists of calculating the differences squared before updating the cluster.

In order to analyse the distribution of the clusters obtained, the classification dendrogram was graphically represented using the “*plot*” function. Then, the internal characteristics of each group were extracted using the “*summary*” function. Another noteworthy aspect of group distribution is the calculation of the class centroids obtained through the “*by(model.matrix)*” function.

All the information and the ranking carried out had to be added to the reference data (*Dataset*). This data clustering makes it possible to draw scatter diagrams and box diagrams that compare the classification performed and the variable considered in the study (reading index).

Once the variables were obtained, we prepared two classifications. In the first one, the welfare index was used, grouping the municipalities of Extremadura into 5 classes, with the intention of obtaining the average reading index value in each of the groups.

These five classes have been obtained from the results of the dendrogram where the order number does not imply any priority, but is only related to the appearance of the groups (to which the municipalities belong) in the aforementioned graphic representation.

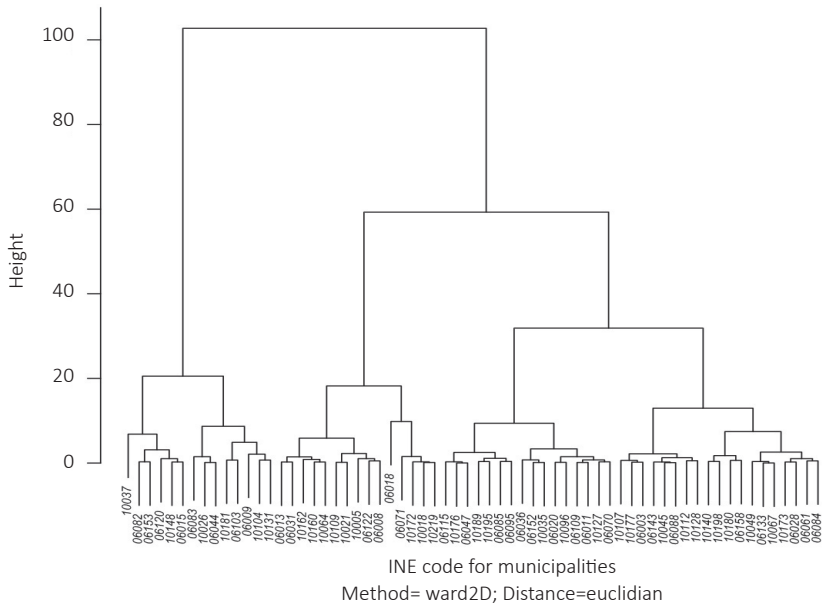
By way of clarification, the weight assigned to the calculation of the mean value of the reading index of each group is equal to the number of surveys carried out in the municipality divided by the population aged 6 to 12. It should be noted that, for the calculations, only those with at least 25 surveys or more, or representing more than 10% of the population aged 6 to 12, have been considered.

#### Analysis of the results

The analysis consisted of two distinct stages, which are the ones laid out in this section. Firstly, in the first part of the analysis, the welfare index was interrelated with the reading index, and then we determined which of the components of the welfare index was the most impactful.

The result of the classification of the municipalities surveyed based on the welfare index is shown below, so that we can subsequently analyse their relationship with the reading index. The dendrogram (Figure 1) represents the classification made using all the variables that determine the welfare index.

**Figure 1. Classification dendrogram based on the welfare index**



Source: Prepared by the authors

Table 2 shows the distribution of the number of elements in each group and the value of their centroids. The first aspect that should be highlighted is that the groups have a certain homogeneity in terms of the distribution of the number of elements, where the clusters Very Low SWI Group with 9 is the smallest, and High SWI Group with 24 would be the largest, to the point that the expected value of the elements of each group is 17. The distribution of the centroids can also be considered as uniform, the mean separation of the groups being 9 points.

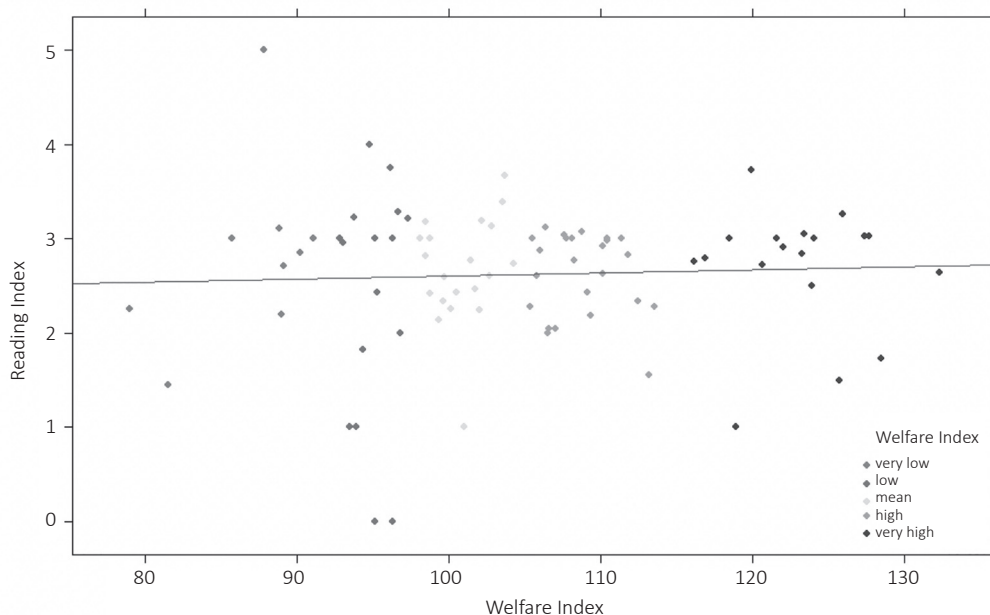
**Table 2. Elements and centroids by groups in the welfare index**

GROUPS	VERY LOW SWI	LOW SWI	MEAN SWI	HIGH SWI	VERY HIGH SWI
Number of elements	9	16	20	24	18
Centroids of the classes	86.8983	95.0548	100.8442	108.8165	123.1562

Source: Prepared by the authors

Figure 2 presents a scatter plot of the reading index (y) and the welfare index (x). At the same time, the elements are represented according to the group to which they have been assigned; each of them indicated by a different colour. The classification does not express a conclusive relationship with the reading index.

**Figure 2. A scatter plot of the welfare index and the reading index**

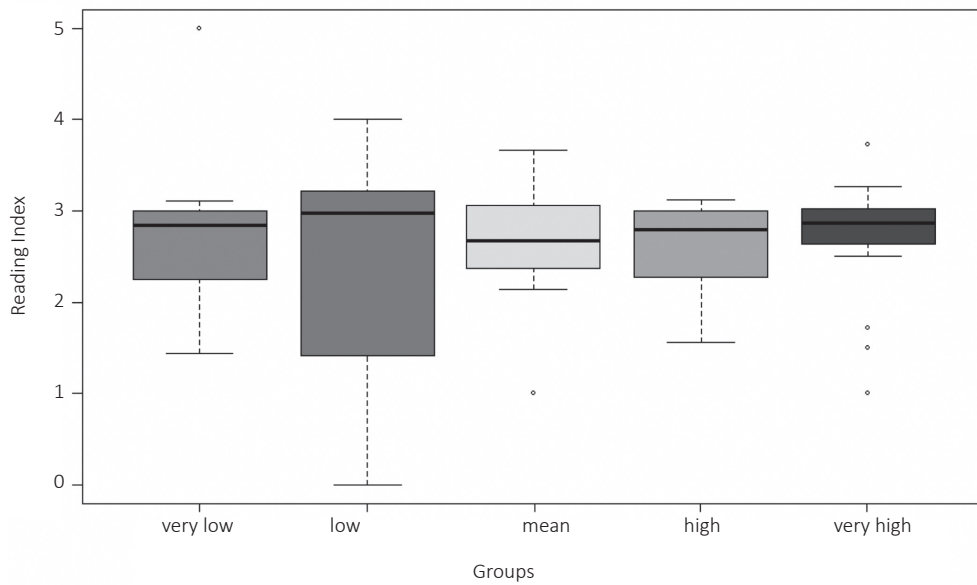


Source: Prepared by the authors

The box diagram (Figure 3) shows the dispersion of the reading index within each group. While the mean values of the groups are similar, the dispersions do reflect greater differences. Low SWI Group has the highest level of dispersion (coincidentally it is also the one with the highest average), while Very High SWI Group displays the lowest dispersion. Therefore, it cannot be said that there is any conclusive relationship between the groups and the reading index.

Figures 2 and 3 use the same colours for groups, but the groups do not follow the same order on the x axis. This is because in Figure 2 the groups are sorted by the value of the social welfare index, while in Figure 3 these are classified by the group number.

**Figure 3. Box diagram based on the groups defined from the welfare index over the reading index**



Source: Prepared by the authors

Table 3 shows, once again, that the welfare index is not proportional to the reading index. The maximum value of the reading index corresponds to the Low SWI Group; however, this group occupies the penultimate place in terms of the welfare index. The table also includes the number of surveys conducted in each group.

**Table 3. Table of comparison parameters between the groups obtained based on the welfare index and the reading index**

GROUPS	READING INDEX	SURVEYS	MUNICIPALITIES	WELFARE INDEX
Very low SWI	2.6090	133	9	8,689.83
Low SWI	2.9075	346	16	9,505.48
Mean SWI	2.6817	1310	20	10,084.42
High SWI	2.6303	1036	24	10,881.65
Very high SWI	2.8973	1169	18	12,315.62

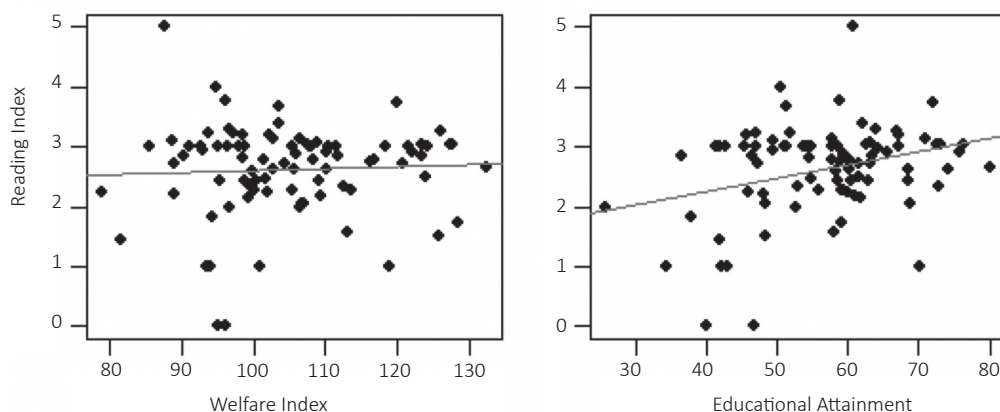
Source: Prepared by the authors

The reading index mean value of all the groups (2.745) is very similar to the overall value of the aforementioned index (2.748), its relative difference being just 0.13%. These results would corroborate the goodness of the data distribution in all the groups analysed.

It can be stated that there is no direct relationship between the welfare index and the reading index in the set of municipalities analysed, which allows us to conclude that the reading index is not conditioned by the social welfare index of the population.

In view of the results obtained so far, it is advisable to delve deeper into the variables that make up the welfare index. To do this, we calculated the correlation between reading index and welfare index, educational attainment, town and family income (Figure 4 and Table 4). Figure 4 shows that the reading index has a greater correlation with educational attainment. This is confirmed by the correlation values shown in Table 3, as well as by Pearson's correlation index between the reading index and educational attainment, which is 0.28, with the p-value being 0.0226. Since the p-value is less than 0.05, the correlation can be considered significant.

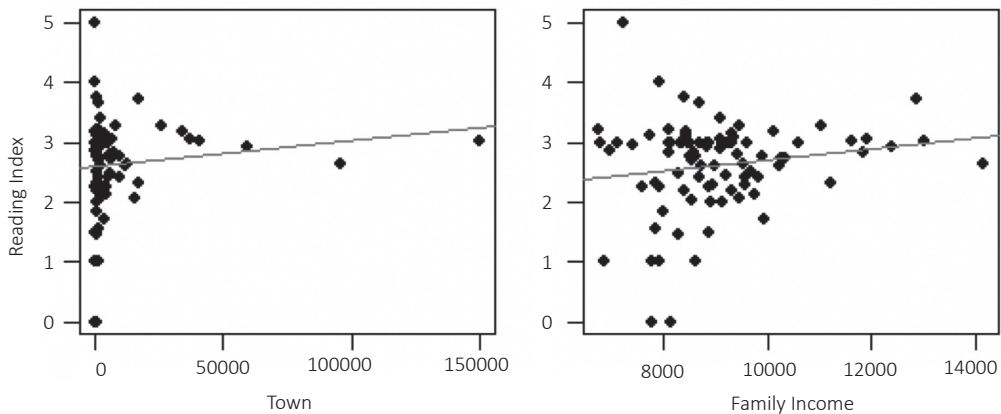
**Figure 4. Multiple scatter plots of the variables analysed**



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**Figure 4. Multiple scatter plots of the variables analysed**



Source: Prepared by the authors

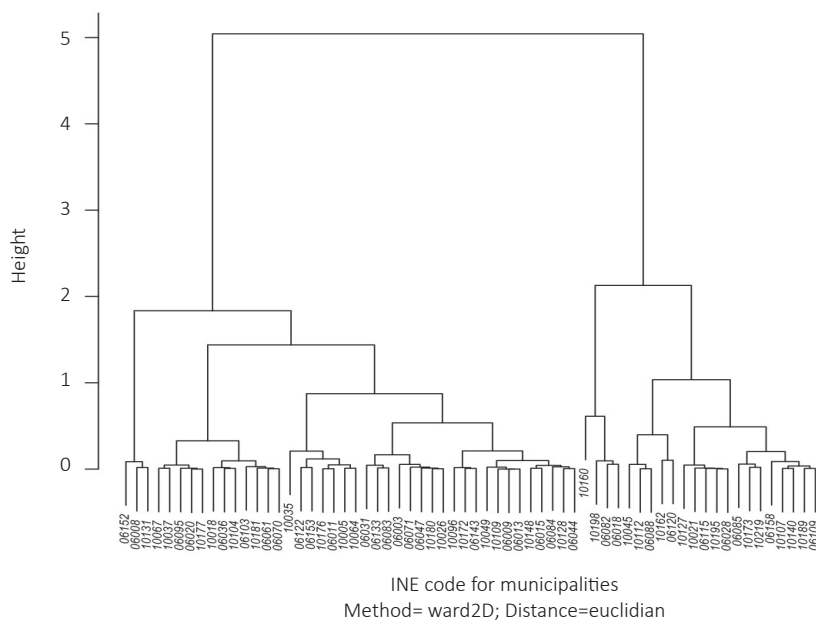
**Table 4. Correlation coefficients (Pearson)**

		WELFARE INDEX	EDUCATIONAL ATTAINMENT	TOWN	FAMILY INCOME
Reading index	Correlation	0.0640	0.2846	0.1540	0.1785
	Significance level	0.6154	0.0226	0.2243	0.1581

Source: Prepared by the authors

Once the variable with the highest level of connection to the reading index (denoted education index, understood as academic training) has been determined, we can then classify the municipalities based on that index. The second classification is made based on the municipality reading index where compared with the educational attainment of each group since this variable is more closely linked.

The dendrogram displayed below (Figure 5) represents the classification made based on the reading index of the municipalities surveyed. Unlike the information displayed in Figure 1, in this case, the distribution of the groups is extremely heterogeneous. There are groups with 3 (Very High RI group) or 4 municipalities (Very Low RI group) as opposed to others that congregate a greater number of elements, such as the 27 items in High RI group and the 18 in Low RI group.

**Figure 5. Classification dendrogram based on the reading index**

Source: Prepared by the authors

**Table 5. Parameters for comparison between the groups obtained and the reading index**

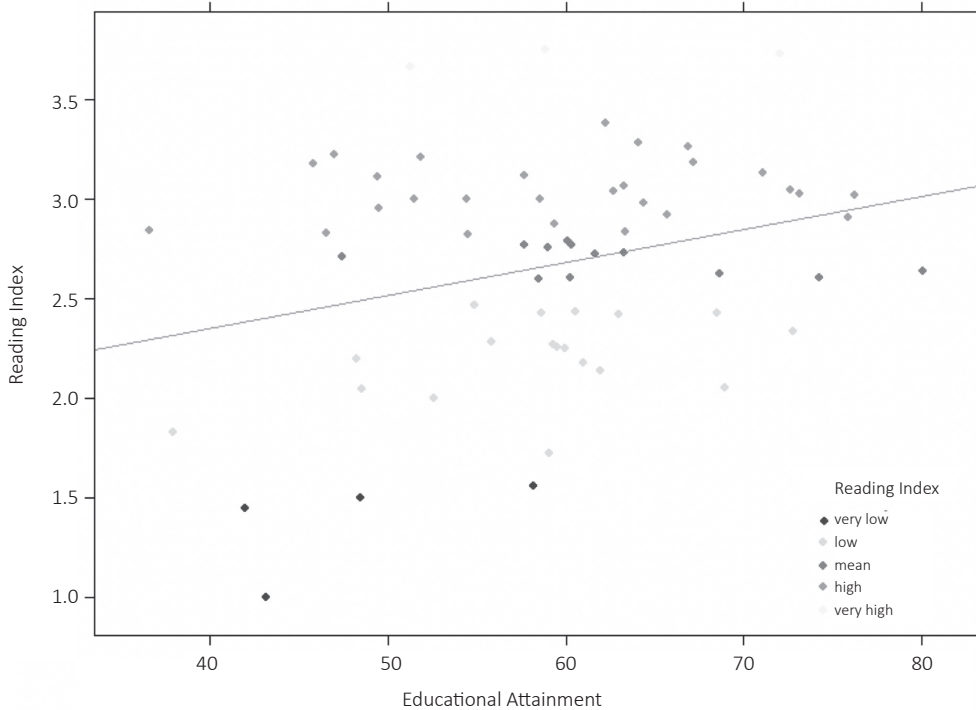
GROUPS	READING INDEX	SURVEYS	MUNICIPALITIES	EDUCATIONAL ATTAINMENT
Very low RI	1.3750	44	4	47.93
Low RI	2.2070	1135	18	58.39
Mean RI	2.6943	832	12	62.59
High RI	3.0473	1855	27	59.67
Very high RI	3.7161	84	3	60.71

Source: Prepared by the authors

Figure 6 presents a scatter plot of the reading index (y) and educational attainment (x). The elements are represented according to the group to which they have been assigned. Each of them is displayed in a different colour. While in the previous scatter diagram there was no conclusive relationship between the welfare index and the reading index, in this case, although not very pronounced, there is a direct relation-

ship between the reading index and educational attainment. This allows us to state that, as the educational levels of the population of Extremadura increases, the reading index significantly rises. We do not see much of a dependence on the other factors that make up the welfare index, such as income level, health, accessibility, town, etc.

**Figure 6. Scatter plot displaying educational attainment and the reading index**

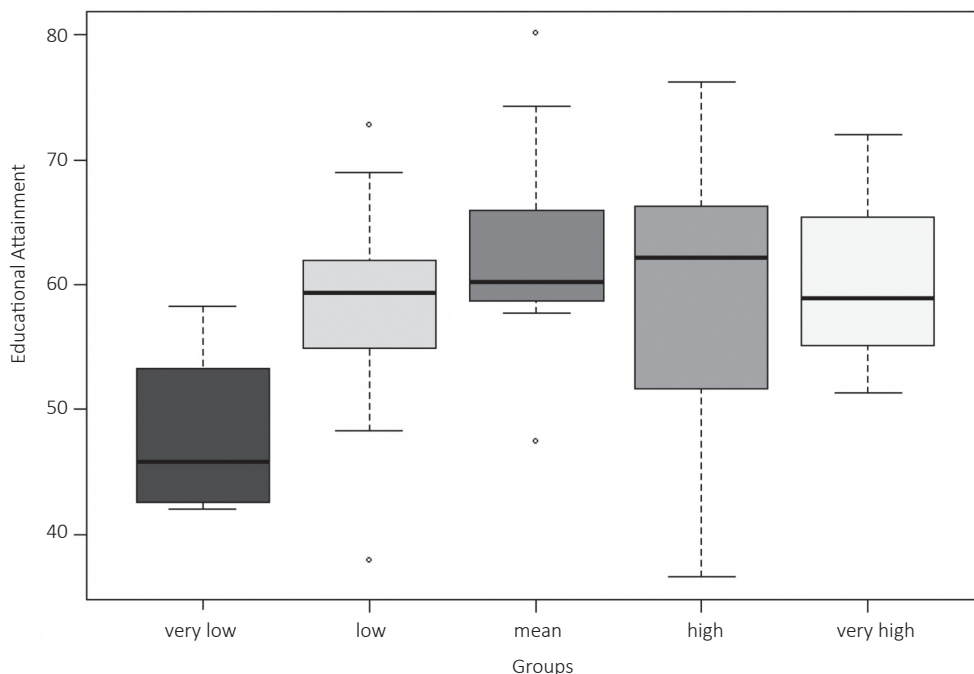


Source: Prepared by the authors

The box diagram (Figure 7) shows the dispersion of educational attainment within each group, according to the classification made based on the reading index. While the previous box diagram showed similar average values for the groups, albeit with the dispersions presenting greater differences, in this case, clear differences regarding the averages of each of the groups can be seen. On the other hand, the dispersion of the elements of each group is smaller, which indicates a closer link to educational attainment in the defined groups. Very Low RI group has the lowest average regarding educational attainment and Mean RI group shows the least dispersion.

In Figures 6 and 7 the groups are established according to the dependent variable, as was the case for Figures 2 and 3, in order to highlight the relationship between educational level and the reading index.

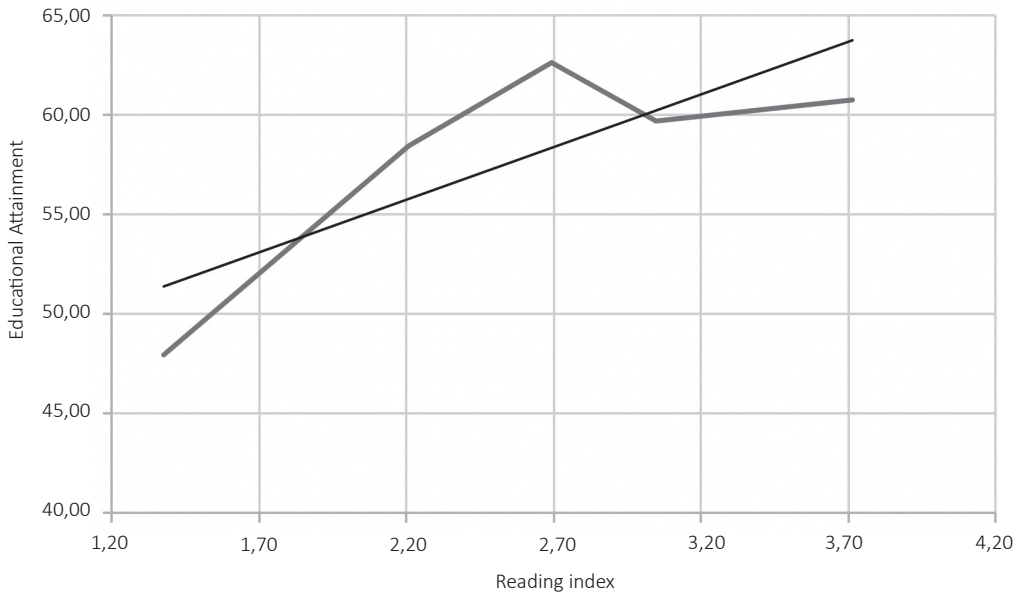
**Figure 7. Box diagram displaying educational attainment and the reading index**



Source: Prepared by the authors

Table 5 and Figure 8 show the relationship between reading index and educational attainment in each group. Similarly, the confluence and homogeneity of the results show the goodness of the stratification of the surveys carried out. The graph represents the confirmation of the alternative hypothesis (p-value and coefficient), i.e. reading index and educational attainment cannot be considered independent variables, as displayed by the regression line of the same.

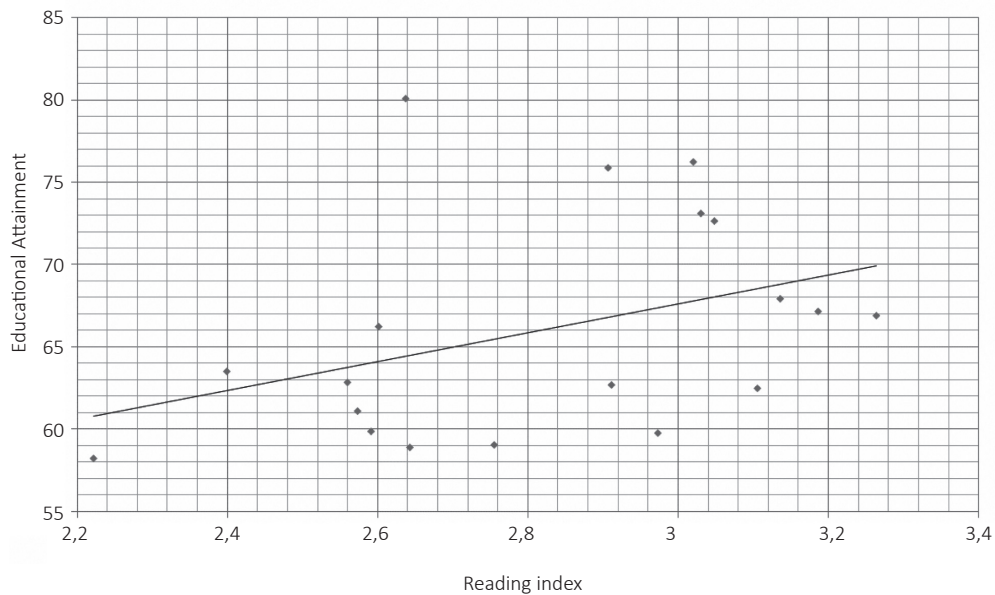
**Figure 8. Scatter plot of the mean values of reading index and educational attainment for each group**



Source: Prepared by the authors

To further examine the relationship between reading index and educational attainment here, a dispersion graph is shown with indices grouped by territories.

Figure 9 represents the correlation between educational attainment and reading index of the 12 areas defined in the territory of Extremadura and the seven cities with more than 20,000 inhabitants. Just as there was a direct relationship between these two variables in Figures 7 and 9, considering all the surveys and groups, respectively, this relationship is confirmed when taking into account the territorial divisions defined to contextualise the study spatially.

**Figure 9. Correlation graph displaying educational attainment and the reading index of the areas**

Source: Prepared by the authors

## DISCUSSION

Although it is unusual, we consider it appropriate to include a detailed description of some of the pertinent previous research in this section, which were also included in the theoretical framework beforehand. This is done with the objective of showing clear comparisons with said research and the present study.

In recent years, many sociological studies have focused on analysing the connection between family socioeconomic status and students' educational progress. One of the difficulties in such an analysis lies in selecting the factors to measure socioeconomic status and the factors for assessing educational success. Thus, for example, among the factors that determine the former, we can analyse family income, books expenditure, the qualifications of parents, employment or living conditions. Among the aspects we can choose from to measure the educational success of students, we can select school grades, pass rates, illiteracy rates, the rate of students going on to university, success on international tests (PISA or PIRLS), access to ICTs, language skills or reading habits. Furthermore, spatial-temporal contextual-

ization can have a significant effect on the results. Consequently, we need to discuss the preceding conclusions in relevant research in order to contrast the results obtained in this study, based on geographical areas.

Among the factors selected to measure educational success, much of the previous research focuses on communication skills and reading habits, because being an efficient reader is one of the main skills that children must learn in school and one that is very relevant to their development in modern society (Dolean *et al.*, 2019).

Regarding references to this issue in international literature, Taner and Basal (2005) were pioneers in this respect and concluded that there is a relationship between family socioeconomic factors and language skills. The overall conclusion is that as the economic level increases, so does the reading level. Later, other investigations have corroborated this at various educational levels and in several geographical areas, such as Asiegbu and Ezeugbor (2018), Cedeño, Martínez-Arias and Bueno (2016), Dolek (2018), Suleman, Hussain, Khan and Nisa (2012) or the aforementioned Dolean *et al.* (2019), the latter referring to conditions of severe poverty in Romania.

In general, all these cited papers show a moderate to high correlation between socioeconomic status and educational attainment, to the point that it can be said that children living in poverty have a lower literacy level than children with a higher socioeconomic status. Therefore, the welfare index is related to students' reading habits and motivation. Our study also follows this line of argument. However, as we have mentioned, these statements must be further nuanced when compared with other research.

Indeed, most surveys and quantitative studies show that student performance is affected by factors related to the household's economic conditions and the socioeconomic status of the students. Once this had been established, we had to try to determine which factors are more influential in students' performance within our geographical scope.

Thus, Deniz (2003), prior to Taner and Basal, states that there is a difference between rural and urban environments in favour of the latter, a conclusion confirmed by Dudaité (2016), McKenzie (2015) and Newman (2016). In this respect, we disagree with these authors because, in principle, in our data referring to present-day Extremadura, the differences between the two are not very large, probably because the differences between rural and urban environments are not as prominent as in other areas, and also most likely because of the political effort to promote equality over the last forty years. We should note that Extremadura is a region with low demographic density, with structural dearth and with few municipi-



palties of notable size. In this context, on a global scale, almost none of its cities would be given the classification of a “city,” strictly speaking. However, on a regional scale, looking to the aforementioned qualities, one can establish distinctions between rural and urban areas with more than 20,000 inhabitants.

It is of interest to mention the relevant results on the same subject by Dudaitė (2016) in Lithuania. According to the author, the socioeconomic background of households, as well as possession of books and works of art, have a strong positive effect on students’ results. There is no correlation, however, between the level of family income or having a personal study space. A comparison between the sexes in that study showed that socioeconomic factors had a stronger effect on boys’ achievements than on girls’ achievements. Finally, information technology had a greater impact on children’s and students’ learning achievements when they lived in cities. The study by Dolean *et al.* (2019) stresses the importance of the educational level of mothers. Finally, the contribution by Yusof (2010) in relation to Thailand is particularly detailed. We agree with him and with the two previous authors in that family income is not as decisive in promoting reading as the level of family education (Figure 4 and Table 4).

It should be pointed out that all the cited studies in this discussion show that a certain level of income and economic security is a *sine qua non* requirement for educational progress, but once this threshold has been reached, which corresponds to a large portion of the middle class, family income is by no means decisive, just as, in the case of Extremadura, geographical location, in terms of living in a more rural or urban environment, is not at all decisive. According to the papers cited and our data, the educational level of parents, who, within this group, tend to provide a robust stimulus to the early literacy of children (including at home before they enter school), as well as a boost to their academic achievements and reading levels, are more decisive. That this factor, among all those that make up the welfare index, is constant in several geographical areas that are extremely distant from each other and have their own peculiarities, makes it extremely relevant.

Our novelty with respect to previous papers lies in three aspects taken into consideration here: first, obviously, the geographic area studied; second, the description of variables and their cross reference in order to study those that are most influential in attaining educational success; third, the methodology utilized, which in this case is two-fold. Firstly, the methodology included a larger sample size than those of previous research, which reduces the margin of error of the results. Secondly in terms of methodology, the present study employed good geographic stratification, which allows for enhanced territorial disaggregation.

## CONCLUSIONS

Regarding the initial premises, we must say that the data on reading habits in Extremadura are quite homogeneous throughout the territory, as the range of results is not very broad. In this sense, and related to our second objective, although we cannot strictly state (since it has not constituted the main axis of our study) that only equity policies have improved all the indices related to education, it is true that the results shown throughout this work invite us to conclude that they can be an important factor. It is clear that the difference between extreme values has diminished considerably, all of which could be the subject of a future line of research. Thirdly, the welfare index as a whole does not significantly affect student' reading habits. As such, for example, neither income level nor location in large urban centres is decisive in improving reading indices; on the other hand, parents' academic training is a sufficiently decisive factor.

Therefore, as general conclusions, we can say that the equality policies implemented in the region have achieved their main goals, which are to implement public education throughout the territory, do away with illiteracy rates, and attenuate major irregularities, thus tending towards equality. This has probably been helped by the excellent coverage of the library network and reading points, together with the preservation of educational centres in almost unpopulated environments. If we connect reading habits to the set of factors involved in the welfare index, without disaggregating each one of them, it can be said that there is no significant correlation between this index and the reading index. However, educational attainment, which is one of the factors considered in the social welfare index, i.e. the academic training of students' parents, does display a sufficiently significant relationship with reading indices.

Regarding future lines of research that have originated from this study, especially in relation to the demographic-educational context, one of the most interesting is undoubtedly the analysis of how, in rural areas, populations with advanced studies are disappearing, as a percentage, or, at least, a gap is opening quantitatively with respect to urban areas, which attract this social group to a greater extent. In this sense, one of the specific future research projects could involve towns that have CRAs (Centros Rurales Agrupados-Rural Grouped Schools), as there are many of these centres in Extremadura, and compare the results with the more urban-based areas of the region.

Finally, we would like to highlight the novelty and suitability of the methodology used, which is technically germane to the aspects being studied and to analysing the variables, and which can be replicated in other similar fields of social research.

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