

## **Social Mobility in Colombia during the XIX Century. A Multifactorial Study for Small Populations.**

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Historical populations remain in our imaginary as static populations which had higher mortality and fertility patterns and where people devoted their lives to work, usually in a rural context. But, are really those the patterns of such populations? Peter Laslett (1965) proved us wrong in many ways, and after his work more historical data has shown that past societies behaved far different from what we imagined.

This study focuses on the patterns of social mobility in Colombia by using the 1870 census data. The census data allows us to study not only the differences across generations in occupation, but also to include a profile by age, sex and marital status, as demographic variables have been found as important determinants of social mobility for other historical societies (Hajnal, 1965, 1982; Ohlin 1961).

Historical data in Colombia, as in many other countries, is scarce. Despite the importance of Colombia as a main entrance port from Europe to South America, little is known on the socioeconomic characteristics of the Colombian population during the XIX century. The conjectures made by historians are mostly speculative, letting us with a vague idea of what would be the main social and family relations during that century. This lack of knowledge is mostly due to the lack of available data. At last, after years of searching, some volumes of the Colombian census for 1870 have been found in the National Archive (*Archivo General de la Nacion*). The present study has collected and digitalized some of the records from the 1870 national population census which includes: first and last names, marital status, ages and occupation. The last variable has been collected for all members in the household older than 8 years old. Most historical censuses did not inquired on occupation, and when they did it only asked such information to young males (mostly white). The fact that this particular census has it, allows us to use modern statistical techniques to study social mobility such as multifactorial methods (Lebart, 1995; Pardo, 2005).

Although our goal is to digitalize the entire census the process of finding, reading and digitalizing historical information has taken us, so far, years and will probably take us more before the full census is recorded. For that reason, we started exploring the question at hand in a small population, namely Guachavez district (at the Circle of Tuquerres in the Sovereign State of Cauca), which includes 770 records. The analysis is carried out crossing last names, which identifies family

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formations and occupations by creating age, sex and marital status profiles. The records are clean, meaning they have passed validation, verification and imputation processes.<sup>3</sup>

### **Social Mobility from the Multifactorial Point of View**

We propose analysis of correspondences as a tool to characterize social mobility, as it allows incorporating different angles to the question at hand. In particular, the profiles here presented are: (1) Last names and occupations, (2) ten-years-age-groups and occupations, (3) marital status and occupations and (4) sex and occupations.

The analysis of correspondences is basically the simultaneous representation of rows and columns from a counting table that crosses two variables. The table is built from row and column-profiles, as well as their relative frequencies. Then, it allows for the construction of n-points in the space of p-columns and, similarly, there are p-points in the n-rows space. Thus, both spaces are simultaneously represented in one plane by calculating the distances between rows and columns. To do that, one must calculate the distance across columns and rows from a counting table using  $\chi^2$ -distance, as it involves the weights from the row-categories under the influence of the column-categories. By calculating the  $\chi^2$ -distances there is a similarity across categories of the same variable, which can be represented in each of the spaces (rows and columns). But, it is the quasi-barycentric relationship what makes possible the simultaneous representation of both rows and columns. In summary, the analysis of correspondences allows the possibility of positioning and interpreting a specific point from a set of data points, relative to a space, with respect to another set of points defined in another space (Lebart 1995).

The results are summarized in two-dimensional graphs such Figure 1, which is interpreted with the help of Table 1 and is the result of crossing last names and occupations. The first axis (horizontal axis) is the contrast of 'servant', to the right, and 'farmer', to the left. This axis almost fully explains the category servant. The second axis (vertical axis) compares the categories 'children' and 'artisans', and the third axis contrasts the category 'farmer' with 'artisans', in this last axis the category 'servants' are not well represented. Following Table 1, 'servant' is very well represented in the first plane (99.8%), leaving the rest of occupations badly represented. In the second plane, axes 2 and 3, the other occupations are better represented.

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<sup>3</sup> For imputation of missing data, the 'hotdesck' method under STATA is used. To validate the consistency of the data, 5 levels of validation were developed, which are framed in a general procedure that determines a series of protocols.

To eliminate the effect created by 'servant' in the first axis of the first plane, a second plane is constructed and presented in Figure 2, which is constructed with axes two and three. In this Figure Cabrera, Vera, Ramirez, and Gaspar families are associated to farming, while Meneses, Charala, Rodriguez and Molina families are associated to artisans. One can also observe that Prado, Cuastarnal, Castellanos and Andrade families have large numbers of young children, below 8 years old.

Following these two planes (Figures 1 and 2), we can clearly see an association between last names and professions. Yet the interpretation is limited, as this is a descriptive technique which does not imply causality. The figures describe an association between last names and occupations and a large concentration for these particular data points, which depict low social mobility in the sense that families inherited professions from one generation to the next. In other words, the son of a farmer will become a farmer, perpetuating the current socio-economic conditions of his family. In fact, the best representations of last names in the first axis are: Benavides, Rodriguez, Gaspar, Molina, Batallas, Gonzales and Sandobal, all of them directly related to occupation 'servants'.

A similar analysis is carried out for profiles on occupation and age which show a life cycle pattern on occupation. Apparently, a person starts his productive life as farmer and later on life becomes an artisan to end up his last days as servant. When crossing marital status and occupation there is a clear and almost perfect relationship between being single and a farmer, being married and becoming an artisan and finally between being widowed and servant. This result reinforces the previous result, and apparently the life cycle hypothesis linked between occupations and stages in life seems stronger than the fact that being born in a certain family will define the occupation of a person. Finally, the analysis on occupation and sex describes a clear segregation on labor by gender. All men are devoted to agricultural shores while women are mostly artisans. However, very young women (ages 8 to 18) are also farmers, which again reinforce the fact that singles at very young ages, independently from the gender, are farmers.

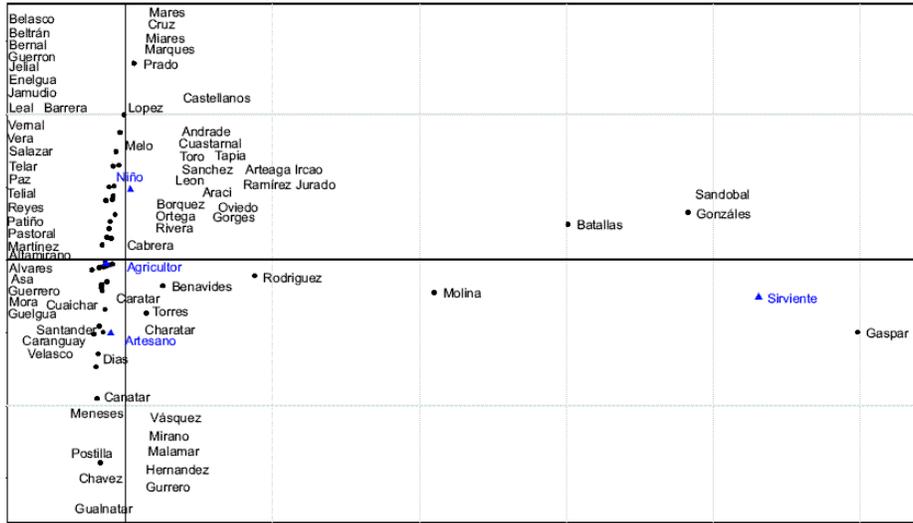
In summary, following the standard studies in the literature that link families or last names solely to occupations may lead to an incomplete picture on social mobility. The results here presented for the Guachavez district in Colombia for 1870 pose a tendency in the patterns of social mobility linked to the stages in life such as aging, which in turn is associated to marital status. The inhabitants of this population are born, both males and females, as agricultural farmers and when they grow older, over age 18, and marry women automatically become artisans while men continue to be farmers, until they reach older ages (over 58) when many are widowed and become servants. Finally, the methodology here proposed is very accessible and easy to interpret, as it is run under "R". Thus, it is feasible to carry out similar studies with other populations, even if they have much larger numbers and this will certainly help to reduce the limited scope of other descriptive techniques.

## References

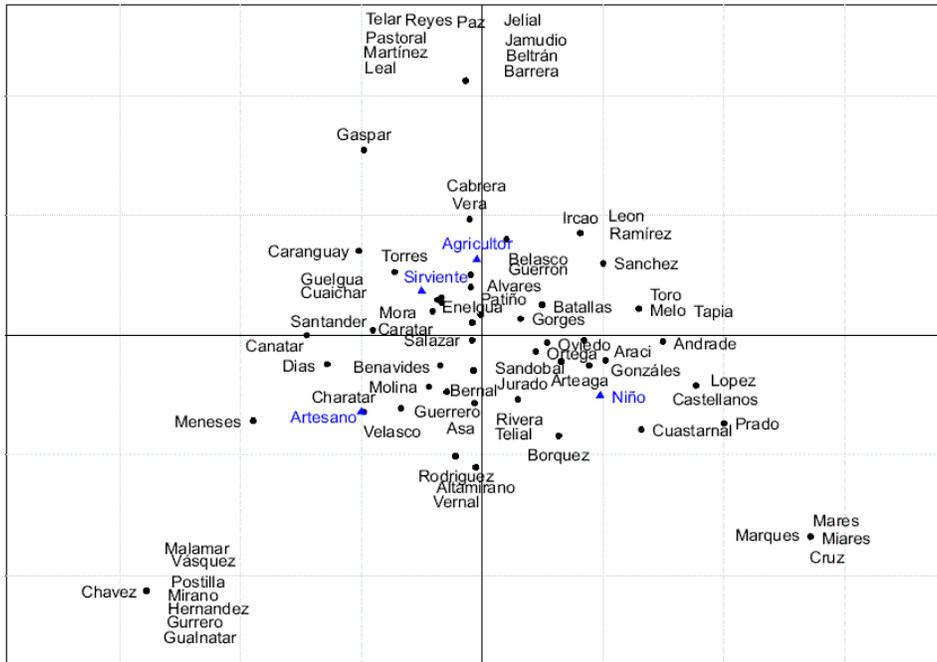
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## Figures and Tables

**Figure 1. Axis 1 and 2, Last names and Occupations.**



**Figure 2. Axis 2 and 3, Last names and Occupations.**

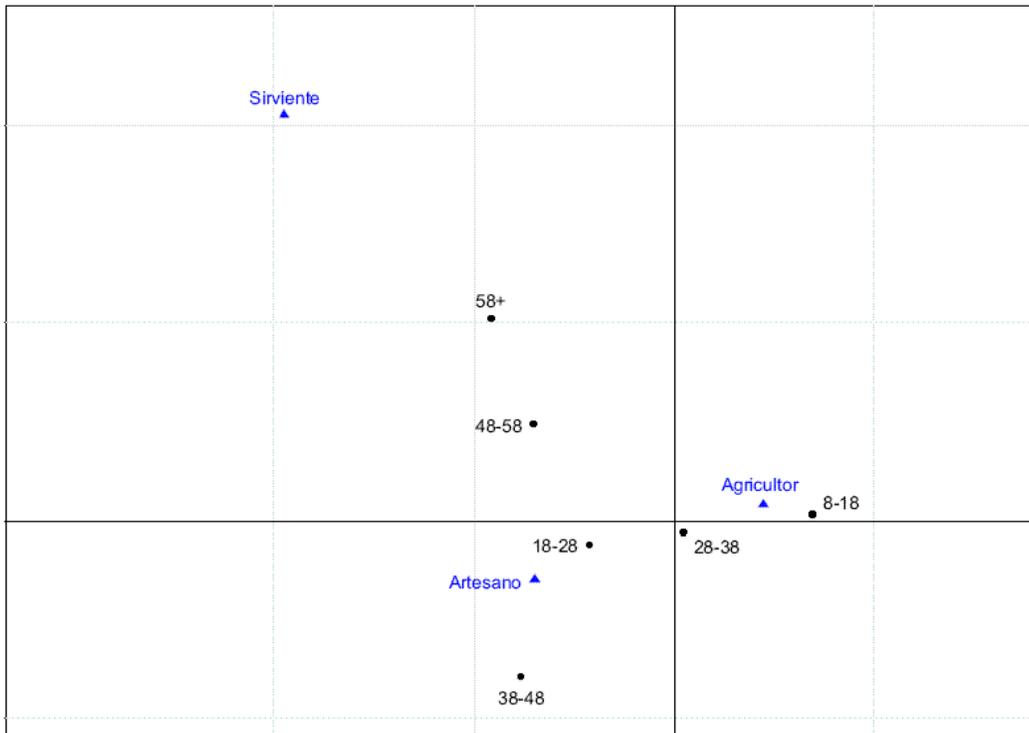


\*Agricultor=Farmer, Sirviente=Servant, Niño=Child, Artesano=Artisan

**Table 1. Coordinates for Last Names and Occupations corresponding to Figure 1 and 2**

	Coordinates			Contribution to axis		
	Comp1	Comp2	Comp3	Comp1	Comp2	Comp3
Children	0.04	0.49	-0.25	0.11	51.75	19.95
Farmer	-0.13	-0.02	0.32	2.34	0.21	51.74
Artisan	-0.1	-0.5	-0.32	0.73	47.21	27.66
Servant	4.31	-0.25	0.19	96.83	0.83	0.66

**Figure 3. Axis 1 and 2, Age and Occupations.**



\*Agricultor=Farmer, Sirviente=Servant, Artesano=Artisan

**Table 2. Coordinates for Age and Occupations corresponding to Figure 3**

	Coordinates		Contribution to axis	
	Comp1	Comp2	Comp1	Comp2
Farmer	0.22	0.04	33.06	3.27
Artisan	-0.35	-0.15	43.56	22.46
Servant	-0.97	1.03	23.39	74.27

**Figure 4. Axis 1 and 2, Marital status and Occupations.**

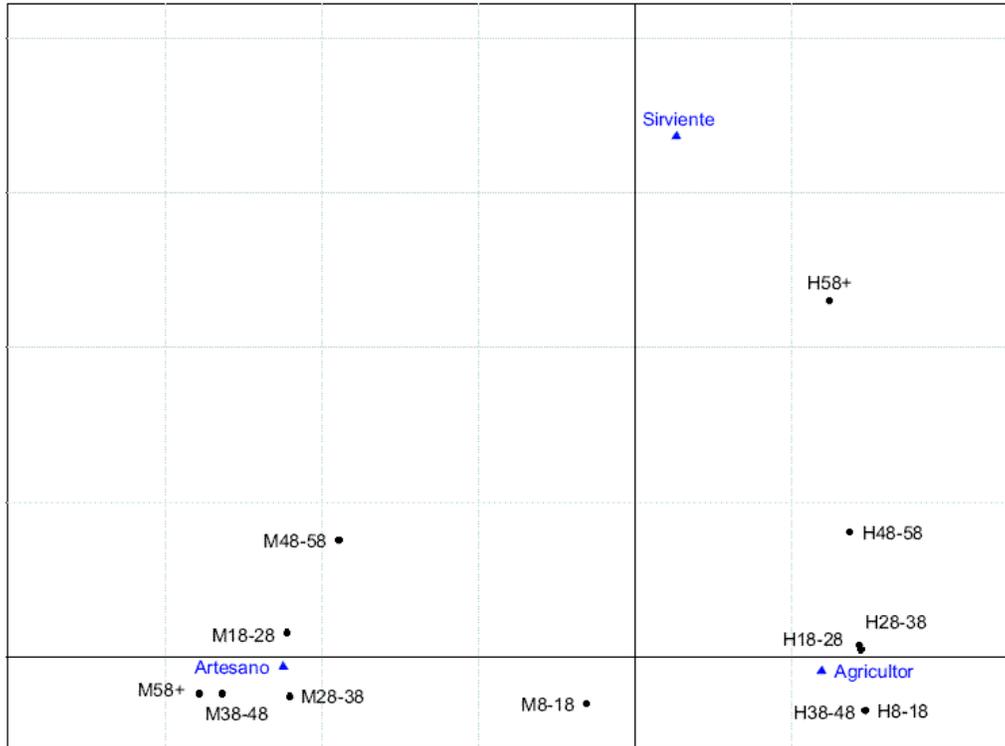


\*Agricultor=Farmer, Sirviente=Servant, Niño=Child, Artesano=Artisan

**Table 3. Coordinates for Marital Status and Occupations corresponding to Figure 4**

	Coordinates		Contribution to axis	
	Comp1	Comp2	Comp1	Comp2
Farmer	0.22	0	35.77	0.56
Artisan	-0.38	0	53.92	12.1
Servant	-0.63	0.02	10.31	87.34

Figure 5. Axis 1 and 2, Age, Gender and Occupations, (Women “M”, Men “H”)



\*Agricultor=Farmer, Sirviente=Servant, Niño=Child, Artesano=Artisan

Table 4. Coordinates for Age, Gender and Occupations corresponding to Figure 5

	Coordinates		Contribution to axis	
	Comp1	Comp2	Comp1	Comp2
Farmer	0.59	-0.05	34.41	1.92
Artisan	-1.12	-0.03	65.53	0.49
Servant	0.13	1.68	0.06	97.59