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Isonymy analysis in the Spanish Central Pyrenees

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RESUMO

O presente trabalho mostra que a isonimia é um instrumento útil no estudo dos parametros demográficos de uma população. Apesar de na população estudada ter sido encontrada uma boa relação entre F e α, é mostrado que os resultados obtidos por outros autores (CROW & MANGE, 1965; FRIELD & ELLIS, 1974; ELLIS & STRAMER, 1978), podem não ser representativos das populações estudadas, poque F e os seus componentes variam grandemente com os parametros geográficos e demográficos das populações. Por outro lado, os autores acreditam que o uso das médias ponderadas dos quatro tipos intermediários de isonimia podem ultrapassar as flutuações devido ao tamanho da população e ao acaso, eliminando o problema da escolha de um dos quatro tipos, no cálculo do coeficiente de consanguinidade.

O uso de F e dos seus componentes no estudo dos parametros demográficos, pode conduzir a resultados claros e interessantes e, simultaneamente, ajudar-nos a compreender a dinâmica e estrutura das populações estudadas. No presente trabalho foram detectadas apenas heterogeneidades geográficas mas outras, como círculos de casamento, diferenças sociais ou condições económicas especiais, podem ser reveladas através do estudo da isonimia.

Palavras-chave: Coeficiente F; Variação Geográfica; Isonimia; Pirinéus Espanhóis.

ABSTRACT

Here is shown that isonymy is a useful tool in the study of the demographic parameters of a population. Although in our population we found a relative good matching between F and α, we show that the results found by other authors (CROW & MANGE, 1965; FRIELD & ELLIS, 1974; ELLIS & STRAMER, 1978) cannot be representative of the referred populations, because F and its components vary greatly upon geographic and demographic parameters of populations. In the other hand, we believe

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that the use of the weighted means of the four intermediate types of isonymy can solve fluctuations due to sample size and randomness, eliminating the problem of which of the four types we have to chose in the estimation of the consanguinity coefficient.

The use of F and its components in the study of demographic parameters can lead to interesting and clear results and, at the same time, it can help us greatly in the understanding of the dynamics and structure of the populations studied. Here we detect just geographic heterogeneties, but other ones, like closed marriage circles, social differences of special economic conditions can be revealed by the study of isonymy.

Key-words: F coefficient; Geographic variation; Isonymy; Spanish Pyrenees.

INTRODUCTION

It is well known the use of isonymy in the estimation of the consanguinity coefficient, and it is well known too which are the problems this method has, like the need of monophiletic origins for surnames, variation of surname distribution in space and time, etc.

Nonetheless, we think that the method has some advantages and that it can be used for studying other population parameters different from the consanguinity coefficient. As it will be seen here, geographic heterogeneities would be clearly shown through the study of the variation of F_r, F_n and F.

We have studied some populations of the Pirineo Aragonés Oriental, the Spanish eastern aragonese part of the Pyrenees, in order to define their biodemographic properties and characteristics.

This zone of the Pyrenees, which belongs to the province of Huesca, is limited in the East by Lérida, in the West by El Serrablo, in the North by France and in the South by the intrapyrenaic depression. It is characterized by its high altitudes and by the closeness of its valleys. For carrying on the study, the area (which can be seen in Fig. 1) was divided in three «comarcas», and each «comarca» was divided in «zones». The division was strictly geographical, the «zones» being natural valleys and the boundaries between zones being, almost always, the mountains that separate these valleys. The division and the names of the «comarcas» can be seen in Fig. 2. In there we can see that the three «comarcas» correspond to part of the natural «comarcas» of Ribagorza and Sobrarbe. The High Ribagorza is named «RIBAGORZA», the high sobrarbe is named «SOBRARBE» and the part of low Ribagorza and Sobrarbe that our study comprises is named here «PREPIRINEO», due mainly to the lowest mean altitude of its zones. The division in «zones» within each «comarca» was made, as it has been stated, based on geographical criteria, thinking, a priori, that the possible differences that we could find among different zones would have an underlying geographical causation.

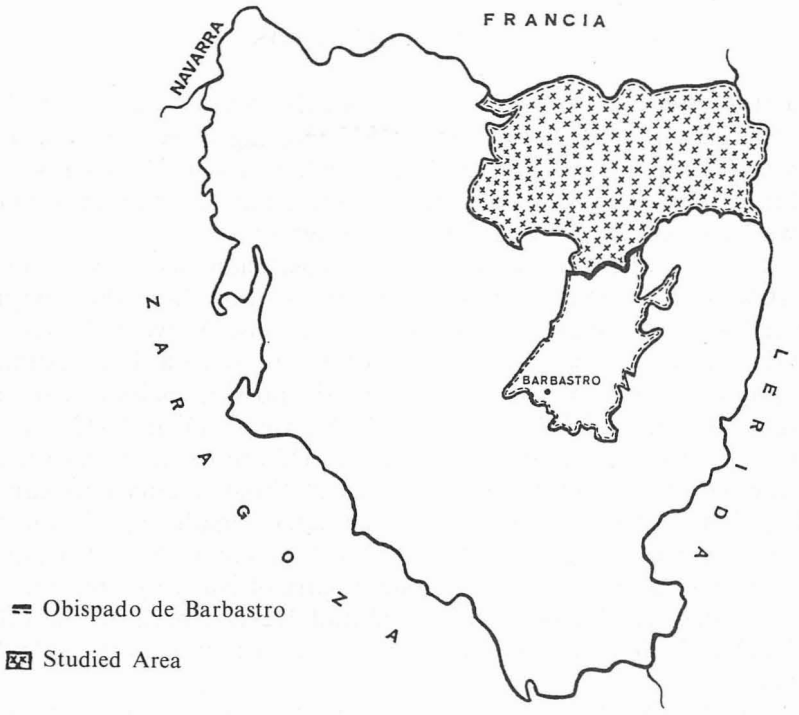

Fig. 1 — Province of Huesca.

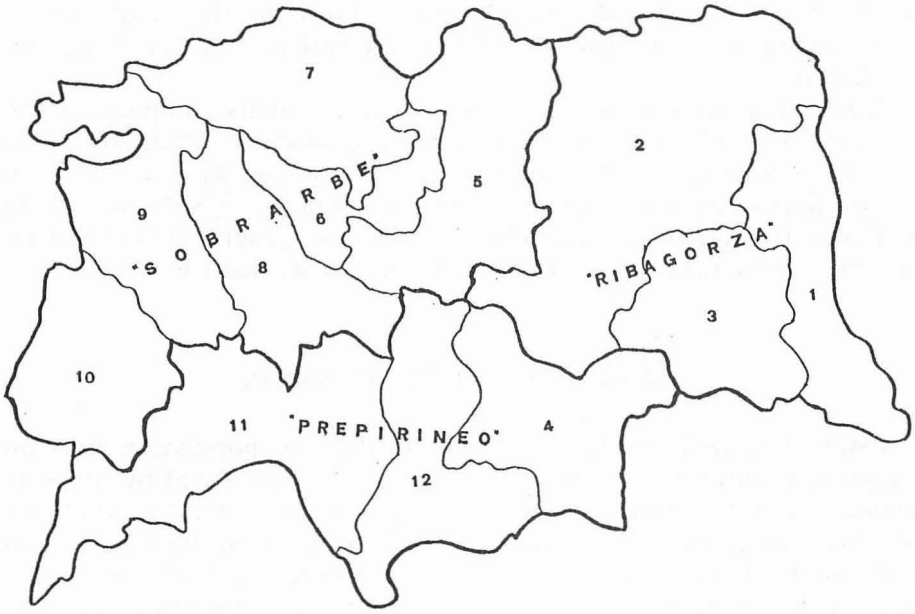

Fig. 2 — Studied «Comarcas».

MATERIAL AND METHODS

The data studied here was microfilmed from the Archives of the Barbastro Bishopric (Huesca, Spain). We recorded 4547 marriages, which took place between 1918 and 1981 in the 105 parishes included in our 12 «zones». The data were stored using the DBASE III program, and all the subsequent calculations were carried out through BASIC programs.

First of all we studied the consanguinity coefficient as it is usual in demography (CROW & MANGE, 1965), in order to know how the isonymy could reflect us the breeding aspects of our populations. As we had two surnames for both man an woman in each marriage, we were able to estimate the consanguinity coefficient by isonymy for the six possible pairs of isonymy (H1-H2, H1-D1, H1-D2, H2-D1, H2-D2, D1-D2, were H1 and H2 are the first and second surnames of the man and D1 and D2 are the first and second surnames of the woman). One of the examples of these calculations can be seen in the Fig. 3, where we can appreciate the calculi made: F_r, F_n and the total F have been calculated as CROW & MANGE stated in his 1965 paper. All of them were calculated for the six possible pairs of isonymy, but here we will just use the pairs H1-D1, H2-D1, H1-D2 and H2-D2, because the other two pairs (H1-D2 and H1-D2) just add redundant information to the calculus of the coefficient.

We think, as BERTRANPETIT stated in 1981, that the best estimate of F and its components is to make weighted mean of the four pairs considered for the number of cases of each one. These are the values that appear in bottom of Fig. 3, and are the ones that we will use all our calculations. As can be noted here, using this method we multiply the size of the sample by four, thus eliminating most of the random fluctuations that can change greatly the values of F.

Taking that into account, we calculated F and its components for the whole area for each one of its «comarcas» and «zones». After, we calculated those values for the area as a sum of «comarcas» and as a sum of «zones», and the values of each «comarca» as a sum of «zones». This showed us clearly how F and its components can detect, in this case, geographic heterogeneities found by other means. Temporal dimension was studied too.

RESULTS AND DISCUSSION

Estimating the F coefficient, we found that our population gives one of the highest values for F in relation to the α values calculated by ecclesiastical dispensations (PALACIOS, 1986). While CROW and MANGE, studying the Hutterites, found an α/F relation of O.46, and other authors have reported lower results (GARCÍA-MORO, 1982; BERTRANPETIT, 1981; etc), we have found an interesting 0.54 value for the total of the population, and a really high value, 0.70, for the «comarca» named Ribagorza.

Period: Prepirineo
Number of marriages: 1926

PAIRS	F. OBS.	PRED.	Fr	Fn	F
H1 — H2	56	10.81	1.403167E — 03	5.898892E — 03	7.293783E — 03
H1 — D1	49	14.86	1.928868E — 03	4.465921E — 03	6.386175E — 03
H1 — D2	37	13.18	.0017108	3.113204E — 03	4.818678E — 03
H2 — D1	53	13.21	1.714694E — 03	5.200519E — 03	6.906295E — 03
H2 — D2	60	12.79	1.660177E — 03	6.168952E — 03	7.818887E — 03
D1 — D2	73	16.56	2.149533E — 03	7.389601E — 03	9.52325E — 03
Mean values are:					
	328	81.41	1.753635E — 03	4.737149E — 03	6.482509E — 03

Contribution of F_n to F .7307586

Fig. 3 — Coefficients of consanguinity by isonymy.

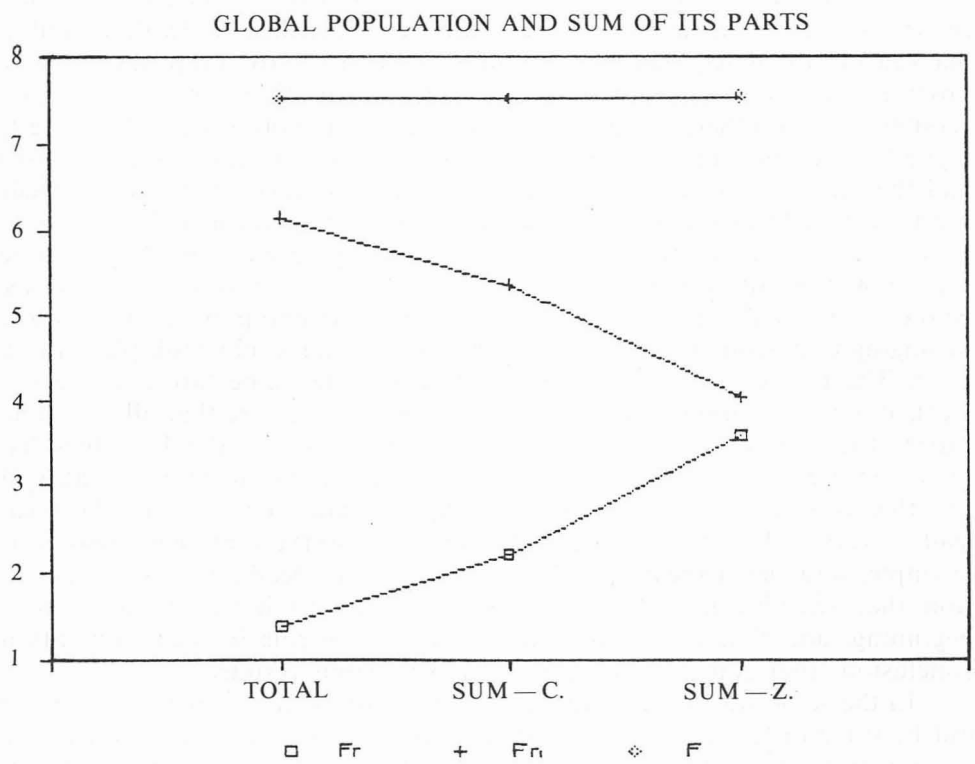

Fig. 4 — Variation of F and its components.

In that sense, we can conclude that our population are nearly of the assumptions required for estimating the consanguinity coefficient from isonymy.

After, we studied the values of F and its components for each zone following the method described earlier and we found (Table 1) that, the values greatly differ from one zone to another. In general, we see that F_n is really high, indicating thus there is a great number if isonymic marriages due (it seems that), to selective coupling for the surnames. In this table it has to be noted that zone 5 (Valle de Gistaín) presents, together with the highest endogamy, the lowest ratio F_n/F, and the highest component F_r, indicating, therefore, that F is much more influenced by the low number of individuals than by the selective marriages. In other zones, like number 11 (Aínsa-Boltaña), just the opposite happens, having very low F_r and very high F_n.

In general, we find that F_n values are very high and that we can establish no clear relation between endogamy and F_n/F ratio. However, a trend appears to exist toward a decrement of the ratio when the endogamy increases.

It is clear, then, that the «zones» studied here are very heterogeneous. For that reason, we tried to study the «comarcas» in order to see if this heterogeneity would disappear and we could see clear patterns in the populations studied. For that reason we calculated the values of F and its components for the «comarca» as a whole. The results are described in Table 2, and are marked «1» for Ribagorza, «2» for Sobrarbe and «3» for Prepirineo. We can observe, as in the study of zones, that all values differ greatly form one «comarca» to another, being the most endogamous Sobrarbe, and having the highest F_r component of all. We could conclude, due to the low values for F_r and the high values for F_n that in our «comarcas» there were strong predispositions to selective marriages based in surname coincidences. But we do not have to forget that we found a great heterogeneity among the different zones. That is why we decided to study the «comarcas» as sum of «zones», not as a whole. The calculus was made weighting F and its components of each zone belonging to a «comarca» for the number of marriages that took place in that zone. The results of such calculi are shown in the same table, in the rows marked with the number of the zone and a Z. We see here that all the values, except the ones of F, have suffered great changes. All the F_r values have increased greatly, while F_n values have decreased, the same as F_n/F ratio. We see, therefore, that, depending on the way we make the calculus, the results lead to very different conclusions. In here we observe that «comarca» 2, for example, now has a greater F_r than F_n component, leading us to the conclusion that selective mating was no so important as it was thought in the beginning, and that genetic drift has played some role in their populations, conclusions that could not be drawn from previous results.

In the same way, we calculated F and its components for the whole area, but by three different ways: the total area as a whole, the total area as a sum of «comarcas» and the total area as a sum of «zones». The results can be seen in Table 3. As it was expected, the value of F_r decreases greatly from one

TABLE 1. *Values of F_r, F_n and F for the different zones.*

ZONA	Fr	Fn	F	Fn/F	% END.	NUM. MAT
1	0.002598	0.003574	0.006161	0.5801	36.7	51
2	0.002166	0.002387	0.004549	0.5248	43.4	841
3	0.002773	0.005825	0.008582	0.6788	45.9	293
4	0.002914	0.005669	0.008566	0.6618	42.0	411
5	0.008604	0.003062	0.011640	0.2631	71.5	373
6	0.007086	0.010341	0.017356	0.5958	47.6	175
7	0.005185	0.003791	0.008955	0.4233	46.1	253
8	0.006052	0.006560	0.012572	0.5218	58.8	256
9	0.004842	0.002559	0.007390	0.3463	54.7	119
10	0.003084	0.002475	0.005551	0.4458	49.4	260
11	0.001876	0.003879	0.005747	0.6749	39.5	906
12	0.003006	0.003190	0.006186	0.5157	48.5	609

TABLE 2. *Values of F_r, F_n, and F for the different «comarcas».*

COMARCA	N. MAT	Fr	Fn	F	Fn/F	% END.
1	1185	0.001949	0.003671	0.005612	0.6540	52.2
1 — Z	1185	0.002335	0.003288	0.005605	0.5866	
2	1436	0.002963	0.007616	0.010557	0.7215	67.4
2 — Z	1436	0.006050	0.004553	0.010575	0.4305	
3	1926	0.001753	0.004737	0.006483	0.7308	52.9
3 — Z	1926	0.002455	0.004052	0.006497	0.6237	

TABLE 3. *Values of F_r, F_n and F for the studied area.*

REGION	N. MAT	Fr	Fn	F	Fn/F	% END.
TOTAL	4547	0.001387	0.006152	0.007531	0.8170	65.9
T — C	4547	0.002186	0.005368	0.007542	0.7117	
T — Z	4547	0.003559	0.004007	0.007552	0.5306	

TABLE 4. *Values of F_r, F_n and F for total period.*

PERIOD	N. MAT	Fr	Fn	F	Fn/F
1918-1975	4324	0.001421	0.006421	0.007832	0.8197
1918-1975-P	4324	0.001441	0.006401	0.007833	0.8172
1918-1975-Q	4324	0.001473	0.006370	0.007834	0.8132

type of study to the next, increasing when the unities used in its calculus are smaller. The values for F_r, F_n and F are shown in Fig. 4. We appreciate clearly how, although the F value remains constant, its components vary in function of the type of calculation made. These results confirmed us what we found in the usual ways: that the area studied was very heterogeneous, with many changes from one zone to another, and with no clear marriage patterns for the whole area.

In this way, we thought that the zone as we defined it had not to be the lowest unity of study. The zone is a relative great area of study, because it comprises generally a whole valley. One zone is divided in several parishes and litle villages. Knowing that, we took one of the zones, Valle de Gistaín, and we proceeded to analyze the zone as whole (we made this at the beginning of this discussion) and as sum of its parts (parishes and towns). The results found were very clear. The F_r component increased greatly, while the F_n became negative, thus disappearing the tendency to selective marriages and becoming very important the consanguinity due to small population size.

These results made us wonder about how this method of analysis could work in a temporal dimension. Knowing, through endogamy and isonymy studies, that the changes in time were very homogeneous and unidirectional, we made the same calculations than the one made with «zones», «comarcas» and the total area. In that case, we took the whole period from 1918 to 1975, and we divided it in three subperiods, from 1918 to 1925, from 1926 to 1950 and from 1951 to 1975. These periods were divided in twelve quiquenniums, so the situation was exactly the same as the one studied before. But the results did not. We found, as it was expected, no significative differences among the results of F or its components calcullating the total period as a whole, the total as a sum of subperiods or the total as a sum of quiquenniums Taable 4). This findings confirmed us that we were studying very homogeneous periods of time with respect to the variation of endogamy, isonymy, and so on, thus confirming the results found with other conventional methods.

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