

## Food intake study at Cerdanya Valley (Pyrénées)

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### THE CERDANYA VALLEY

The Franco-Spanish frontier runs from the Mediterranean to the Atlantic. For most of its length it runs along high mountain peaks where it coincides with a physical boundary. In one valley, the Cerdanya Valley, in the eastern Pyrénées, it meanders across fields with few visible boundary markers. It divides this valley between two nation states. Yet an ethnic unity is often claimed by local people either as Catalans or as Cerdans. Catalan nationalists even refer to "Alta Cerdanya" and "Baixa Cerdanya" as though the divisor were not one between nation states. The valley is more or less surrounded by mountain ranges with few passes (now road and rail tunnels). Yet the frontier is easy to cross; even during the many periods when soldiers have attempted to guard the border local people have always crossed it and there are marriage records and family relationships to prove it. It is this international division of a valley with a physical and claimed ethnic unity that allows special circumstances for research.

SAHLINS wrote a socio-political history of the whole valley and its division. RUFÍÉ collected some blood samples of "locals" on the French side, as did Aluja on the Spanish side, to provide information on genetic markers. Our team (BERTRANPÉTT, MACBETH *et al.*) studied parish records on both sides for an understanding of marital movement: marriage partners have frequently crossed the frontier. SUBIRATS *et al.* on the Spanish side considered the statistics on cardiovascular mortality; these were high compared to the rest of Catalunya. FURBURY analysed insurance company data on the area to suggest relatively high cardiovascular ill-health on the French side too.

The simplified map (see further) identifies the outline of Cerdanya, an indication of the surrounding mountain ranges, four towns and the frontier. The frontier has the anomaly of the Spanish enclave of Llívia within France.

### INTRODUCING THE FOOD INTAKE STUDY

The samples of the valley population studied were approached through schools in the main town, Puigcerdà, and a large neighbouring French village, Bourg-Madame. The fringes of

these two towns touch at the one official customs/police post in the valley. The schools only lie some 5 km apart, but they are in different "countries". As in schools in all rural areas, the students come from the towns and from smaller villages and farms around. This means that some children live closer to other children across the border than to their respective schools.

After a study of the teenagers' food preferences, the schoolchildren between 11 and 15 (inclusive) were asked to take home to their families food intake questionnaires, either in French, Castilian Spanish or Catalan. These covered all meals and snacks for 7 consecutive days in mid-March. Some 2 800 questionnaires were handed out for the categories "self" (the teenager), "mother", "father" and "a grandparent". Some 1 500 questionnaires were returned, of which 648 were deemed complete.

**Table 1**  
Samples

	<i>Puigcerdà</i>	<i>Bourg-Madame</i>
Teenagers	118	123
Mothers	94	92
Fathers	87	78
Grandfathers	34	22
Totals	333	315

The questionnaire had columns for meal and snack times, subdivided by day of week. It had rows for food items. Respondents were asked only to make single stroke marks for each time a food item was eaten in the column of time of day under day of week. These allowed simple frequency calculations. Methods of statistical analysis to compare intake frequencies of the French and Spanish samples were various. In the table shown here, columns 1 and 4 show arithmetic means, but the distributions are very skewed; so, columns 2 and 5 show mean rank order, and the significance of their difference using Mann-Whitney (m-w) analysis is shown in column 8. Another helpful method of analysis is to compare the proportions of each population who ate each food at all; these are shown in columns 3 and 6, and the significance  $\chi^2$  in column 7.

Table 2

Food item	SPAIN			FRANCE			X <sup>2</sup> sig	m-w sig
	arith. mean	rank order	% ate	arith. mean	rank order	% ate		
Beef, veal	1.52	299.61	71.5	1.94	350.82	80.0	**	***
Hamburgers	0.76	350.97	41.4	0.39	296.52	26.3	***	***
Lamb	1.17	372.17	62.8	0.52	274.10	36.8	***	***
Pork	1.15	312.38	57.1	1.27	337.31	63.8		
Ham, bacon...	1.5	309.75	52.6	1.41	340.1	64.8	**	*
Sausages...	0.91	295.9	42.2	1.5	354.74	59.7	***	***
Salami...	1.38	363.38	43.8	0.4	283.4	22.9	***	***
Pâté...	0.26	301.29	15.0	0.54	349.03	30.2	***	***
Oth. charcuteries	0.14	320.47	9.0	0.20	328.76	11.4		
Game	0.27	314.65	16.5	0.37	334.91	22.9	*	*
Chicken	1.56	357.94	76.9	1.03	289.15	68.6	*	***
Poultry, turkey, etc.	0.35	305.17	24.0	0.50	344.94	36.2	***	***
Other meats	0.67	332.18	34.2	0.59	316.38	2.5		
Total red meat*	3.44	347.94	91.6	2.84	299.72	88.9		***
Total pork meat*	4.94	325.73	89.8	4.57	323.2	94.6	*	
Total charcut.*	2.43	328.51	67.9	2.10	320.26	71.4		
Total poultry*	1.91	341.49	83.2	1.54	306.54	81.0		**
Total meat*	11.63	337.75	99.1	10.67	310.5	99.0		

\* Total red meat + beef + hamburgers + lamb; Total pork meat = pork + ham/bacon + sausages, etc. + salami, etc.; Total charcuterie = ham/bacon + sausages + salami + pâté + other charcuterie; Total poultry = chicken + turkey and other poultry; Total meat = total red meat + total charcuterie + total poultry + pork + game.

## MEAT AND FISH

The choice of categories of food items had to be comprehensible to the respondents and useful for analysis. Some knowledge of local foods was necessary and the row titles used for meat are shown in Table 2. A quick glance at columns 7 and 8 show how often significant differences in consumption were shown between these two sample populations, living 5 km apart and claiming to share a common ethnicity. The French consumed beef, sausages, ham, pâté and turkey significantly more often, while the Spanish chose lamb, hamburgers, salami and chicken with greater frequency. Yet the scores for total meat did not differ significantly. The Spanish choice of lamb concurs with many Mediterranean countries, while the beef consumption on the French side is typical of most of France. Local doctors on both sides mentioned high consumption of pork and pork products, but this was not shown. Significant differences between national samples are shown in some pork products. In general, explanation of the differences in meat choices can be found by considering national food habits; valley unity is not shown.

The results of analysis of fish consumption deserve discussion. Four categories were listed (see Table 3). In each zone, 32% had registered 'other fish' at least once, which shows the other three categories were insufficient, but no further infor-

mation is available on what the 'other fish' were. No significant difference is found for shellfish, eaten by at least a quarter of each sample at some point during the week. However, very significant differences are shown by each method of analysis for oily fish and by Mann Whitney for white fish. In each case the Spanish ate fish more frequently. This again reflects national Spanish food culture, rather than some ethnic unity of all residents in the Cerdanya.

The balance of saturated, poly-unsaturated or mono-unsaturated fatty acids in beasts varies to some extent with husbandry, but taking generalised figures of that balance, Table I suggests fatty acid differences.

## THE FATS AND OILS

Table 4 shows in a more abbreviated form the very significant differences in choice of oils and fats for cooking and for including in sauces and dressings. Only the significance of difference is shown and which country used the fat or oil more frequently. The Spanish use olive oil much frequently in frying their food, while there was no difference in frequency of its use for dressings. The French used other vegetable oils more frequently, but no further information is available on which oils. Considerable fatty acid differences exist in the different vegetable oils. In conversation with housewives on

Table 3

Food item	SPAIN			FRANCE			X <sup>2</sup> sig	m-w sig
	arith. mean	rank order	% ate	arith. mean	rank order	% ate		
White fish	1.63	352.99	72.4	1.11	294.38	65.4	***	***
Oily fish	0.61	353.3	42.0	0.37	294.06	23.2		***
Shellfish	0.39	326.4	28.2	0.38	322.49	26.7		
Other fish	0.49	321.02	29.4	0.5	328.18	32.4		
Total fish*	3.12	360.91	91.9	2.36	286.01	89.5		***

\* Total fish = white fish + oily fish + shellfish + other fish

both sides of the border attention was regularly drawn to the French use of butter for cooking; they also use butter more often on bread, crackers, etc. The Spanish Catalan tradition is to rub the inside of tomatoes on bread and not to use butter or margarine. The local Cerdan tradition for bread and for cooking is to use the dripping from meat, especially pork or poultry fat. The frequency of use of 'other meat fat' does not differ significantly between the two zones.

## DISCUSSION AND CONCLUSION

These figures suggest that despite the physical unity of the valley of the Cerdanya and the claimed unity of ethnic identity, significant differences exist in the frequencies of consuming some foods. Many statistically significant differences were found in other foods.

The selection of foods shown here provide a sufficient indication of differences that could have important effects on the consumption of saturated, poly-unsaturated and mono-unsaturated fatty acids. The relationship of these fatty acids to risks of cardiovascular diseases is well supported in the medical literature. The irony lies in the attention that recent anglophone medical literature has given to the claimed cardiovascular benefits of a 'Mediterranean' diet. In the North many would assume that the Eastern Pyrénées were 'Mediterranean'. Yet, regional variation is shown in this study of populations living only 5 km apart. Gonzales and Romero's new book on the Mediterranean Diet shows many examples of regional variation.

So, whereas we also have information from housewives on typically Catalan, even Cerdan, recipes from our study we can identify consumptions more typical of the Eastern Pyrénées than of the Mediterranean coastal areas, nevertheless the influences of national cultures are demonstrated in our results.

The link between cultures and health is clear in food choices and diet. In this case, the choices highlighted above can be reviewed in relation to their typical fatty acid content and cardiovascular risks.

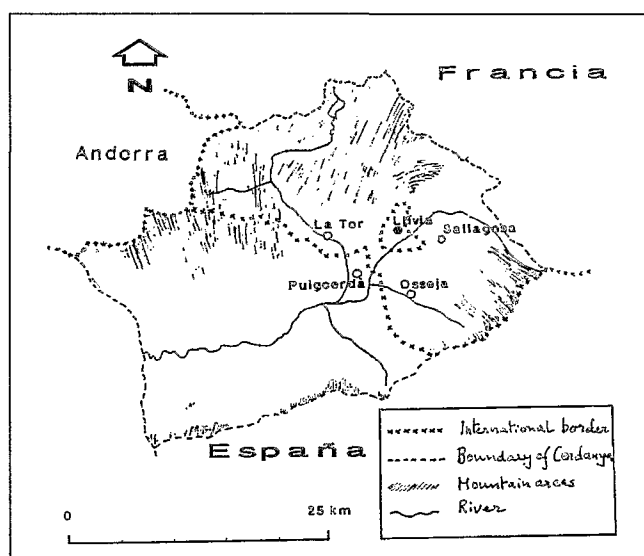


Table 4  
Fats and oils

Proteins fried in		
olive oil	***	Esp.
other veg. oils	***	Fr.
butter	***	Fr.
other animal fat	—	
Vegetables fried in		
olive-oil	***	Esp.
other veg. oils	***	Fr.
butter	***	Fr.
other animal fat	—	
Sauces and dressings		
olive oil	—	
other veg. oils	***	Fr.
butter or animal fat	**	Fr.
With bread, crackers, etc.		
butter	***	Fr.
margarine	—	