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The social ecology of intelligence in France

Richard Lynn

Data are presented for the 90 Departements of France for mean population IQs, earnings, unemployment, intellectual achievement and infant mortality. Most of the variables are significantly associated. Mean population IQs are also significantly correlated with migration since 1801 and it is suggested that internal migration has been an important factor leading to contemporary differences in intelligence.

The social ecology of intelligence is concerned with the relationship between a population's mean IQ and a variety of social and economic phenomena. The first significant work in this field was carried out by Thorndike (1939) and Thorndike & Woodyard (1942) who demonstrated that the mean IQ in American cities was associated with per capita income, educational attainments, literacy and a number of other social indices. Thorndike's work has received relatively little attention. Recently, however, I have attempted to replicate and extend it in a study of the social ecology of intelligence in the British Isles (Lynn, 1977, 1979). In this study it was shown that mean IQs in different regions of the British Isles are significantly associated with per capita income, unemployment, measures of intellectual achievement and infant mortality. It was also shown that the mean population IQs are related to historical migration flows in such a way as to suggest that selective migration has been an important factor determining the mean IQs of the contemporary populations.

On the basis of this set of data a three-stage causal model was proposed in which selective migration leads to regional differences in mean population IQ, which are in turn responsible for significant proportions of regional variation in intellectual achievement, per capita income, unemployment and infant mortality. The object of the present paper is to endeavour to extend the generality of the model by examining how far data for France can be fitted to it. The population units taken for France were the 90 French Departements. Data are presented for mean IQs in the Departements, indices of intellectual achievement, mean earnings, unemployment and infant mortality, and inter-Departemental migration from 1801.

Data

The data are shown in Table 1 and are described below:

(1) Mean Population IQ. Data for mean population IQs for the French Departements were reported by Montmollin (1958) on the basis of an intelligence test administered to 257000 male conscripts into the French armed forces in the mid-1950s. The test consisted of six scales covering general information, spatial, mechanical, verbal, perceptual and number abilities. The test was standardized on a mean of 10·5.

(2) Intellectual achievement. The criterion of intellectual achievement used was membership of the Institut de France for the year 1975. The Institut de France consists of five academies, namely the Academie Française, Academie des Inscriptions et Belles Lettres, Academie des Sciences, Academie des Beaux Arts and Academie des Sciences Morales et Politiques. The Institut de France had 253 French members in 1975. For 250 of these place of birth was ascertained. The subjects were allocated to the Departement in which they were born and a Departement achievement quotient calculated by expressing the numbers of Institut members per million of the Departement's population in 1974.

(3) Mean earnings. These are for 1971 based on a French mean of 100. Source:

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Table 1. French Departements: Data for mean population IQ, intellectual achievement, mean earnings and other social and economic phenomena

Departement	Intelligence	Intellectual achievement	Earnings	Unemploy-ment	Infant mortality	Migration
Ain	10·1	5·46	90	3·20	16·8	0·03
Aisne	9·9	5·61	86	8·45	19·2	0·09
Allier	9·7	7·65	90	8·55	14·2	0·26
Alpes (Basses)	10·1	0·00	94	9·18	17·4	−0·70
Alpes (Hautes)	10·3	10·68	79	6·59	15·5	−0·18
Alpes-Maritime	11·7	1·28	94	15·88	18·1	1·05
Ardèche	8·4	0·00	82	4·91	18·4	−0·04
Ardennes	11·2	9·52	89	7·92	21·0	0·05
Ariège	10·0	7·35	77	6·00	17·2	−0·22
Aube	10·5	7·02	82	4·71	16·4	0·02
Aude	10·6	3·66	78	9·82	19·0	0·11
Aveyron	8·3	0·00	76	6·83	19·3	−0·05
Belfort (Territ. de)	12·3	0·00	93	6·45	19·8	0·68
Bouches-du-Rhone	11·3	5·65	100	12·82	19·7	0·85
Calvados	10·0	5·38	89	9·86	17·6	−0·01
Cantal	7·2	0·00	83	5·40	26·1	−0·14
Charente	10.0	3·01	84	4·33	20·1	0·03
Charente-Maritime	10·1	2·02	82	9·43	17·2	0·07
Cher	11·3	3·19	80	4·04	16·2	0·17
Corrèze	10·4	12·62	76	6·91	19·6	0·00
Corse	6·2	4·55	70	3·96	26·6	0·27
Côte-d'Or	11·0	4·44	91	4·22	18·0	0·03
Côtes-du-Nord	9·5	0·00	81	6·41	16·9	0·00
Creuse	9·7	0·00	69	6·18	17·4	−0·15
Dordogne	9·8	5·46	93	6·03	17·0	−0·05
Doubs	11·9	6·36	91	3·58	21·0	0·27
Drôme	10·0	2·70	91	5·09	16·2	0·10
Eure	9·6	2·46	90	4·84	14·7	−0·12
Eure-et-Loir	9·6	6·09	88	5·32	15·0	0·01
Finistère	11·6	2·54	84	7·37	14·6	0·33
Gard	10·8	12·10	83	11·32	17·1	0·18
Garonne (Haute)	10·9	3·97	91	8·41	14·9	0·29
Gers	9·1	5·74	71	4·99	14·1	−0·21
Gironde	10·9	3·80	94	12·06	18·8	0·38
Hérault	11·6	8·02	88	10·82	17·5	0·35
Ille-et-Vilaine	9·6	5·78	84	6·95	18·2	0·12
Indre	10·2	12·26	77	6·18	23·5	0·12
Indre-et-Loire	10·4	0·00	87	7·02	16·8	0·20
Isère	10·2	1·17	97	5·68	14·6	0·24
Jura	12·0	0·00	83	1·49	16·8	−0·17
Landes	9·3	0·00	79	6·93	17·3	0·07
Loir-et-Cher	9·7	0·00	80	6·61	16·1	0·09
Loire	10·5	2·68	88	7·88	17·7	0·53
Loire (Haute)	8·7	0·00	77	12·69	16·5	−0·04

Table 1. (*cont.*)

Departement	Intelligence	Intellectual achievement	Earnings	Unemployment	Infant mortality	Migration
Loire-Atlantique	11·5	2·19	93	11·99	16·0	0·45
Loiret	11·5	2·11	92	3·63	14·6	0·15
Lot	10·2	0·00	81	4·03	19·0	−0·37
Lot-et-Garonne	9·8	3·41	75	7·46	16·9	−0·08
Lozère	9·9	0·00	77	8·83	16·7	−0·28
Maine-et-Loire	10·7	0·00	79	4·76	13·1	0·21
Manche	9·2	2·21	76	6·98	15·7	−0·11
Marne	10·9	3·73	91	4·85	17·3	0·20
Marne (Haute)	10·1	4·59	82	4·78	17·9	−0·09
Mayenne	9·6	0·00	83	4·48	16·8	−0·13
Meurthe-et-Moselle	11·5	6·89	94	5·90	19·7	0·62
Meuse	10·9	9·78	80	5·70	18·8	−0·17
Morbihan	8·9	3·64	80	10·13	16·2	0·17
Moselle	10·4	0·97	97	3·48	20·6	0·55
Nièvre	10·3	8·03	81	7·39	18·3	0·02
Nord	11·4	4·72	93	7·08	22·2	0·66
Oise	10·1	5·01	95	3·90	14·7	0·14
Orne	9·7	3·36	77	5·32	19·6	−0·24
Pas-de-Calais	10·2	3·55	83	8·19	19·3	0·61
Puy-de-Dôme	10·0	3·41	91	10·17	20·3	−0·03
Pyrénées (Basses)	9·2	5·65	89	11·82	19·2	0·11
Pyrénées (Hautes)	10·5	4·36	79	9·52	19·1	0·10
Pyrénées-Orientales	10·8	0·00	77	13·10	17·9	0·48
Rhin (Bas)	9·4	5·66	92	2·50	16·9	0·20
Rhin (Haut)	10·3	6·52	93	2·50	19·4	0·13
Rhône	12·1	3·48	105	5·54	14·4	0·77
Saône (Haute)	10·7	0·00	84	4·13	20·2	−0·22
Saône-et-Loire	11·5	3·54	85	3·62	20·1	0·08
Sarthe	9·9	0·00	87	8·54	15·7	0·05
Savoie	10·1	3·26	97	5·45	17·4	−0·09
Savoie (Haute)	10·3	2·34	99	2·20	14·2	0·10
Seine	14·4	9·11	132	11·57	13·9	1·38
Seine-Maritime	10·4	5·05	101	7·05	17·4	0·28
Seine-et-Marne	11·5	8·68	112	8·66	17·0	0·27
Seine-et-Oise	13·1	9·11	132	11·57	13·9	0·92
Sèvres (Deux)	10·4	0·00	80	3·95	18·2	0·17
Somme	9·9	0·00	82	4·88	22·3	0·01
Tarn	9·7	5·99	79	6·53	18·6	0·08
Tarn-et-Garonne	10·0	5·49	76	4·60	23·2	−0·18

Table 1. (*cont.*)

Departement	Intelligence	Intellectual achievement	Earnings	Unemploy-ment	Infant mortality	Migration
Var	11·1	1·74	82	14·69	17·5	0·27
Vaucluse	10·3	5·25	89	8·48	16·0	0·22
Vendée	10.0	4·65	73	4·21	13·7	0·32
Vienne	9·7	0·00	82	6·37	18·1	0·18
Vienne (Haute)	10·6	5·67	82	7·77	14·3	0·18
Vosges	10·8	7·39	77	4·96	17·4	−0·06
Yonne	10·7	6·78	84	4·10	17·4	−0·12

Statistiques et Indicateurs des Régions Français, Institut National Statistiques et Etudes Economiques, Paris, 1975.

(4) Unemployment. Numbers registered unemployed at the end of January 1972 calculated per 1000 population. Source: Ministère du Travail, de l'Emploi et de la Population.

(5) Infant mortality. Infant deaths under 1 year per thousand live births. Average for 1970–72. Source: Statistiques et Indicateurs des Régions Français, Institut National Statistiques et Etudes Economiques, Paris, 1975

(6) Migration Flows, 1801–1954. These were estimated by calculation of the average annual increase in population from 1801 to 1954. It is assumed that rates of natural increase of population are approximately constant across the Departements, and hence that population increases largely reflect net migration flows. Population data were supplied by the Institut National Statistique et Etudes Economiques in Paris.

It will be noted that the IQ data were collected in the mid-1950s whereas the economic and social data were obtained for the early 1970s. The reason for this is that the economic and social data are generated by adults over the age range of approximately 20–70 years. The conscripts for whom the IQ data were obtained in the mid-1950s would be in their mid-30s in the early 1970s and should be reasonably representative of the total populations.

All data shown in Table 1 are given for the 90 Departements into which France was divided until 1964. Some of the data required adjustment because in 1964 the two Paris regions of Seine and Seine-et-Oise were divided into seven Departements. For all post-1964 data the figures for the new seven Departements were collapsed into the former two Departements.

Results and discussion

Product moment correlations were calculated between the variables and the correlation matrix is shown in Table 2. The proposed model indicating the causal relationship among the variables is shown in Fig. 1. The first variable in the proposed causal chain is migration 1801–1954. The correlation between historical net migration and contemporary IQ is $+0{\cdot}56$ ($P < 0{\cdot}001$) which can be compared with the correlation of $+0{\cdot}67$ ($P < 0{\cdot}05$) in the British data.

It is suggested that the explanation for the significant associations in both France and the British Isles between historical migration and contemporary mean population IQ lies in the presence of a selective element in migration. It will be noted that in France the highest mean IQs are found in the two Paris Departements of Seine and Seine-et-Oise, while it is lowest in Corsica. The pattern is similar to that in the British Isles, where the mean

Table 2. Product moment correlations between intelligence and the social and economic variables

	1	2	3	4	5	6
(1) Intelligence						
(2) Achievement	26*					
(3) Earnings	61**	20				
(4) Unemployment	20	08	20			
(5) Infant mortality	−30**	03	−25*	−08		
(6) Migration	56**	14	60**	40**	−09	

Significance levels: ** = 1 per cent; * = 5 per cent.

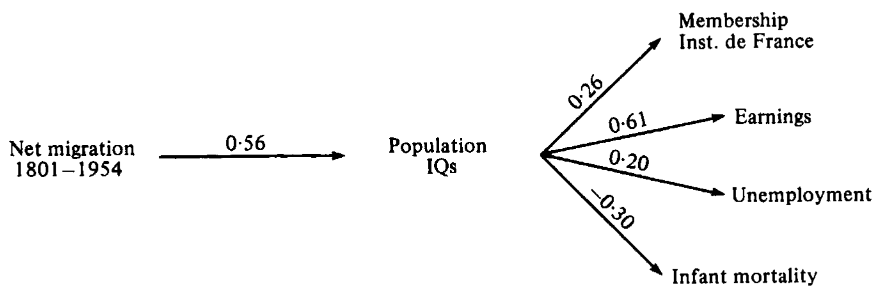

Figure 1. Path model showing hypothesized causal chain linking historical net migration to contemporary mean population IQs, to four economic and social output variables. (Significance levels: 0·21 < 5 per cent; 0·28 < 1 per cent.)

population IQ is highest in the London region and lowest in the peripheral regions of Scotland, Northern Ireland and Eire. It can hardly be coincidence that in both Britain and France the highest mean IQ is found in and around the capital city. The most reasonable explanation would seem to lie in a long history of selective migration of more intelligent individuals from the provinces to the capital cities. Both London and Paris have been centres of wealth, power, privilege and culture for many centuries and have almost certainly attracted a disproportionate share of gifted persons who have settled and reared families in the capital cities. The selective emigration thesis and its effect on mean population IQ has been worked out in detail in the case of Scotland (Lynn, 1977). This explanation receives general support from a number of studies which have shown that migrants tend to be more intelligent than non-migrants (e.g. Douglas, 1964; Maxwell, 1969). There are, however, possible alternative explanations for the relationship between historical migration and contemporary mean population IQ. One of these is that hybrid vigour is responsible for the high IQ in the Departements and regions which have gained most population and inbreeding depression for the low IQ in those which have lost most. There is some evidence for a negative relationship between Departemental IQ and inbreeding coefficients in France (Schreider, 1969), but the relationship does not appear to hold in the British Isles (Imaizumi, 1974). Even in France the relationship may not necessarily be causal. Nevertheless, the hybrid vigour/inbreeding depression hypothesis might repay further consideration.

A second possible line of explanation is that urbanization is a factor raising mean population IQs in metropolitan areas. This could be because urbanization acts as an environmental influence raising phenotypic intelligence, or alternatively that the tests have a content bias favouring urban subjects. There are several objections to an explanation of this kind. First, although higher IQs in urban as compared with rural areas have often been reported, it does not appear that a direct causal effect has ever been demonstrated and there does not seem to be any prima facie plausible reason why an urban environment as such should raise intelligence. Furthermore, in the British data the regional IQ differences emerge clearly in non-verbal tests like the Progressive Matrices, which would seem to count against content bias as an explanation. It is suggested, therefore, that selective migration remains the most reasonable explanation for the association in both France and the British Isles between historical migration and contemporary mean population IQ. In both countries the magnitude of the relationships suggest that around a third of the variance in population IQs can be explained in these terms.

We turn now from the causes of the mean population IQ differences to the effects. The first of these shown in Fig. 1 is intellectual achievement as measured by membership of the Institut de France. It will be evident that intelligence is a necessary ingredient in intellectual achievement and hence a positive association between mean population IQ and intellectual achievement would be expected. The actual correlation is $+0{\cdot}26$ ($P < 0{\cdot}05$) and can be compared with the correlation of $+0{\cdot}94$ found in the British Isles between mean population IQ and Fellowships of the Royal Society. The French correlation is clearly much lower than the corresponding correlation in the British Isles. Probably the chief explanation for this lies in the relatively low reliability of the French data for intellectual achievement. There are only 250 members of the Institut de France distributed over 90 Departements which makes the numbers per Departement very low and considerably subject to chance. Nevertheless in both France and the British Isles there are statistically significant associations between mean population IQs and the respective indices of intellectual achievement.

The next two proposed effects of mean population IQ are the economic variables of mean earnings and unemployment. There is considerable evidence that IQ is one determinant of earnings (e.g. Cattell, 1971; Jencks, 1972) and hence it can be predicted that populations with high mean IQs would have high earnings. The French data confirm that this is the case, the correlation between the two being $+0{\cdot}61$ ($P < 0{\cdot}01$). In the British data the correlation was $+0{\cdot}73$. Thus in both countries there are highly significant and substantial associations between regional mean IQs and regional mean earnings. Since the positive effect of IQ on earnings among individuals is well established this seems a straightforward causal sequence among populations.

The second economic variable is unemployment. It seemed reasonable to suppose that mean population IQ would be one determinant of unemployment, with a high population IQ tending to produce a low level of unemployment. One reason for this expectation is that a significant proportion of the chronically unemployed is characterized by low intelligence (e.g. Cattell, 1971) and there would be proportionately more of these in a population with a low mean IQ. In addition, there would be fewer individuals with the fairly high IQs which are probably necessary to run a successful business and hence create employment. In the British data we found a significant correlation between mean regional IQ and unemployment of $-0{\cdot}82$ ($P < 0{\cdot}01$) which clearly confirmed these expectations. However, in the French data it will be observed that the correlation is $+0{\cdot}20$. The correlation is in the opposite of the predicted direction but does not reach statistical significance. The explanation for this failure of prediction in France is not entirely clear, but it may lie in the large numbers of small agricultural holdings in the poorer rural areas. These are subsidized under EEC agricultural support policies and can thus be regarded as a form of hidden unemployment.

The final output variable is infant mortality. A negative relation between the rate of infant mortality and mean population IQ could be expected because a significant proportion of infant deaths are due to accidents in the home which more intelligent parents should be better able to prevent. At the individual level is has been found that infant mortality is high among low IQ parents (e.g. Savage, 1946). In the French Departement data, there is a statistically significant correlation of $-0{\cdot}30$ between mean population IQ and infant mortality. The result confirms the finding in the British Isles, where the correlation between the two variables was $-0{\cdot}78$.

In conclusion and taking the evidence as a whole, it would appear that the data from France confirm reasonably well the model proposed in the introduction to the effect that migration has brought about regional differences in mean population IQ, which are in turn responsible for some of the regional variation in intellectual achievement, earnings and infant mortality.

References

CATTELL, R. B. (1971). *Abilities: Their Structure, Growth and Action*. New York: Houghton Mifflin.

DOUGLAS, J. W. B. (1964). *The Home and the School*. London: MacGibbon & Kee.

IMAIZUMI, Y. (1974). Genetic structure in the United Kingdom. *Human Heredity*, **24**, 151–159.

JENCKS, C. (1972). *Inequality*. New York: Basic Books.

LYNN, R. (1977). Selective emigration and the decline of intelligence in Scotland. *Social Biology*, **24**, 173–182.

LYNN, R. (1979). The social ecology of intelligence in the British Isles. *British Journal of Social and Clinical Psychology*, **18**, 1–12.

MAXWELL, J. (1969). *The Level and Trend of National Intelligence*. London: University of London Press.

MONTMOLLIN, M. (1958). Le niveau intellectuel des recrues du contingent. *Population*, **13**, 259–268.

SAVAGE, S. W. (1946). Intelligence and infant mortality in problem families. *British Medical Journal*, 86–87, 19 Jan.

SCHREIDER, E. (1969). Inbreeding, biological and mental variations in France. *American Journal of Physical Anthropology*, **26**, 1–4.

THORNDIKE, E. L. (1939). *Your City*. New York: Harcourt Brace.

THORNDIKE, E. L. & WOODYARD, E. (1942). Differences within and between communities in the intelligence of the children. *Journal of Educational Psychology*, **33**, 641–656.

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Requests for reprints should be addressed to Richard Lynn, Department of Psychology, The University of Ulster, Coleraine, Co. Londonderry, Northern Ireland.