A FURTHER NOTE ON PREDICTING MANPOWER RESOURCES FROM HEALTH AND EDUCATIONAL DATA

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An earlier study[1] reported a substantial relation (multiple co-efficient of correlation 0.889) between predictor variables available in 1940 and the relative rejection (disqualification) rates for military service by states in the period 1950 to 1952. It was suggested that on the basis of data available in 1950, similar predictions might be made for the future, provided continuance of the statistical relationships for the 1940–1950 period was assumed.

The purpose of this paper is to observe whether these relationships were durable and to try to account for any changes that might appear.

The variables employed at this time are essentially the same as those used previously. They are:

X_C: rejection (disqualification) rate in 1950–1952 and 1960,[2] respectively.

X_1: age-adjusted mortality index in 1940 and 1950,[3] respectively.

X_2: per capita expenditure for education[4] in 1939–1940 and in 1949–1950, respectively.

Although the correlation between the two predictor variables remained essentially unchanged in the decade since the original study, the correlations of both predictors with the respective criterion rates were reduced by similar amounts (see Table 1). In the

case of mortality index, the Pearson r changed from + 0.727 to + 0.574; in the case of expenditures per pupil, from − 0.682 to − 0.557. The resultant multiple R changed from 0.889 to 0.715. This coefficient is smaller than that for the 1940–1950 data, but it is still substantial.

The change in the relations among the variables from the first to the second set of observations could be a function either of fluctuations in the predictor variables or in the criterion. It is also possible that selective migration could blur relations that would appear in a relatively static population. That is, if increased population movement caused examination for induction to occur more often in a state different from the one in which the registrant received his education, the relations found in the earlier study would probably be altered.

Disqualification rates by states are more predictable from 1950 disqualification rates than from the social predictors: correlation between the 1950–1952 and 1960 disqualification rates for 48 states was + 0.794, whereas the health and educational predictors were + 0.574 and − 0.557, respectively. Nevertheless, the relations between the antecedent social variables and later disqualification for military service are remarkably durable. The changes appear to be the result of the selective impact of modifications in acceptance standards. Mean disqualification rate (by states) in 1950–1952 was 34.61 per cent. An upward revision in mental standards occurred in 1958, and mean disqualification rate (by states) in 1960

TABLE I. CORRELATIONS AMONG HEALTH, EDUCATION AND REJECTION VARIABLES

	(C) 1950–1952 Rejection Rate	(1)		(C) 1960 Rejection Rate	(1)
(1) 1940 Age-adjusted mortality index	0.727		1950 Age-adjusted mortality index	0.574	
(2) 1939–1940 Per capita expenditure for education	−0.682	−0.256	1949–1950 Per capita expenditure for education	−0.557	−0.252

$R_{C.12} = 0.889$

$R_{C.12} = 0.715$

The prediction formulas are respectively:

$X_C = 5.11X_1 - 0.19X_2 - 3.61$

$X_C = 7.48X_1 - 0.09X_2 - 2.91$

308

TABLE 2. STATES WITH LARGEST AND SMALLEST RELATIVE CHANGES
IN DISQUALIFICATION RATES

	1950–1952	1960	Ratio 1960/1950–1952
Mean*	34.61	44.24	1.32
Vermont	30.80	50.50	1.64
Rhode Island	31.60	54.10	1.71
Connecticut	30.20	53.20	1.76
New Jersey	28.30	45.20	1.60
Minnesota	20.30	37.70	1.86
Iowa	22.20	36.20	1.63
Nebraska	25.30	45.60	1.80
Montana	23.30	40.30	1.73
South Carolina	63.30	66.90	1.06
Georgia	51.40	51.10	.99
Alabama	54.60	56.70	1.04
Arkansas	56.80	59.00	1.04
Louisiana	55.90	59.30	1.06
Oklahoma	35.60	32.40	.91
New Mexico	39.30	35.80	.91
Oregon	31.90	23.10	.72

* Mean of rates in 48 states.

was 44.24 per cent. Table 2 shows the states with the largest and smallest relative changes in disqualification rates between 1950–1952 and 1960.

With higher standards, the greatest relative change in disqualification rates appeared in Northeast and North Central States; Southeast and South Central States, with high disqualification rates at the time of the earlier study, were affected relatively little.

REFERENCES

[1] Ullmann, C. A., A Note on Predicting Manpower Resources from Health and Educational Data, *Milbank Memorial Fund Quarterly*, 32, 65–68, January, 1954.

[2] Surgeon General, Department of the Army, HEALTH OF THE ARMY, DATA FROM PREINDUCTION AND INDUCTION EXAMINATION RESULTS 1960, Volume 15, No. 12, December, 1960.

[3] Public Health Service, National Center for Health Statistics, Age-Adjusted Death Rates in the United States, unpublished.

[4] Federal Security Agency, Office of Education, *Statistics of State School Systems, 1949–1950,* Data from Table XIV, Column 10. Current expenditure (excluding interest) per pupil in average daily attendance in full-time public elementary and secondary day schools, by state, for specified years.