Optimum Emphasis on the Individual and on Its Group

Estimating an individual's future performance (P) from a criterion (V) will usually be more accurate if some attention is paid to the average (Z) of the V's of the n other members of its group. Statistically, the problem is what multiple regression equation will predict P most accurately from V and Z. The gain in accuracy is zero only when r_{PZ} equals $(r_{PV})(r_{VZ})$ exactly. The optimum emphasis on Z depends mainly on the sign and size of $(r - t)$ where r is the intraclass correlation between the individual performances (the P's) of members of the same group and t is the intraclass correlation between the V's of the group. The optimum emphasis on Z is positive when $r > t$. Then an individual gets extra credit for being in a group with high Z but is penalized if it is in a group with low Z. This is the usual (although not universal) situation in problems of plant and animal breeding. The emphasis on Z is negative when $r < t$, as is usual (although not universal) in the choices which must be made among human beings. Negative emphasis on Z is equivalent to making a limited use of a quota system. It corrects for some things, extraneous to the P's, which affect the V's of a group alike but vary from one group to another. Whether r/t is more or less than unity depends largely on the basis of the grouping.

Jay L. Lush

Iowa State University
Ames, Iowa 50010

Hardy-Weinberg Law Generalized to Estimate Hybrid Variance for Negro Populations and Reduce Racial Aspects of the Environment-Heredity Uncertainty

The variance $V(M)$ of M ($M \equiv$ Caucasian fraction of ancestry of Oakland, California Negro population; see T. E. Reed, *Science*, 22 Aug 69) is determined from Reed's reported Caucasian phenotypes that vary essentially as M^2 for Gm and as M for the Duffy Fy gene systems. Expectation values for the averages $\langle M \rangle = 0.23 \pm 0.01$ and $\langle M^2 \rangle = 0.10 \pm 0.03$ predict a good fit for Reed's eleven observed phenotypes for the ABO, Fy, and Gm systems [$\chi^2 = 6.3$; $P(6\text{ df}) > 0.3$]. The small number, 21, of M^2-Gm phenotypes produces the standard error in $\langle M^2 \rangle$. The hybrid-variance generalization of the Hardy-Weinberg Law with $V(M) = \langle M^2 \rangle - \langle M \rangle^2 = 0.047 \pm 0.03$ thus eliminates the discordance of Reed's three M-values: ABO 0.20 ± 0.04; Fy 0.22 ± 0.01; Gm 0.273 ± 0.037. A $V(M)$ of 0.047 would result if about one Negro baby in twenty had one Caucasian parent (i.e., M increases 0.02 per generation) and assortative mating was correlated 0.6 for M. The standard deviation expected for M is comparable to but larger than Reed's North-South difference of 0.11, so that the more and the less Caucasian halves of Oakland's Negro population probably differ by more than 0.2 in average M, thus supporting the proposal of W. Shockley (abstract in *Proc. Nat. Acad. Sci. USA*, Dec 70) that significant, measurable difference in M may exist between the upper and lower academic halves of Negro student bodies. The majority response to a recent questionnaire by 23 presidents of predominantly Negro colleges is that black students there are academically advantaged by attitudes towards racial differences; consequently, comparing racial mix differences with achievement differences might refine or reject the preliminary estimate that a one-point increase in average "genetic" IQ occurs for each 1% of Caucasian ancestry, with diminishing returns as 100 IQ is reached.

W. Shockley

Stanford University
Stanford, California 94305