A STATISTICAL NOTE ON RACIAL DIFFERENCES IN THE PROGRESSIVE MATRICES

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An article appearing in this Journal (Sperrazzo & Wilkins, 1958) presented an analysis of variance of scores on Raven's Progressive Matrices. The main variables in the analysis were age, sex, race, and socioeconomic (S-E) status (as judged from father's occupation). Variance estimates attributable to age, race, and S-E status were found to be significant beyond the .01 level. However, the fact that there was a significant first-order interaction between race and S-E status and a significant third-order interaction between race, sex, age, and S-E status led the authors to conclude the following:

It is apparent from the significant race by socioeconomic status interaction and the third-order interaction that a restriction on the interpretation of the race difference found is necessary. The measured differences in scores between races are related to the age, sex, and socioeconomic status of the Ss. The results cannot be interpreted, therefore, as showing differences in intelligence between the races tested here. The differences found seem to depend upon variations of the nonrace factors (Sperrazzo & Wilkins, 1958, p. 37).

This is an incorrect interpretation of the analysis and, therefore, from a statistical standpoint, an unwarranted conclusion. The most stringent test of the significance of the main effects is obtained in this case, not by using the residual (or within group) variance as the error term, but by including *all* the interactions (in addition to the within group variance) in the error term. This has been done in Table 1.

It may be concluded that in spite of the interactions between the variables (race, S-E status, age, sex), the race difference is highly significant statistically. The approximate percentage of the total variance in Matrices

scores in this study attributable to age is 23%; to race, 10%; to S-E status, 5%; and to sex, 0%.

It should also be pointed out that while the Matrices are regarded as a test of general intelligence, with a G saturation of about .80 (Raven, 1947), the term "intelligence" in the above quotation would seem to call for inverted commas in view of the unusually low correlations found in this study between the Matrices and three other tests of intelligence.

Table 1

Analysis of Variance of Progressive Matrices

Source of Variation	Sums of Squares	df	Mean Variance	F
Total	20,759.96	479		
Age	4,772.60	4	1,193.15	44.13*
Sex	80.03	1	80.03	2.96
Race	2,116.80	1	2,116.80	78.28*
Socioeconomic	1,056.52	2	528.26	19.54*
Residual (error)	12,734.01	471	27.04	

* $p < .001$.

Of course, the actual magnitude of the racial difference may be very small, even though the difference is highly significant statistically. An analysis of variance performed on the three socioeconomic groups separately, in addition to presenting the mean scores for each race within each S-E group, would give a more complete and meaningful picture.

REFERENCES

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SPERRAZZO, G., & WILKINS, W. L. Further normative data on the Progressive Matrices. *J. consult. Psychol.,* 1958, **22**, 35–37.

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