

seen as approximately 25-30% smaller than expected from the dimensions of the inducing stimulus.

Under entoptic conditions S cannot make consistent estimates of apparent distance (Stanley, 1966), but the present adjustments of the projection plane to produce an equivalent-size projected after-image were relatively consistent. Although such distance adjustments do not fit the distance formerly predicted (Stanley, 1966), they support the notion that the sensory system processes information about size as if the eyes are fixated at a relatively close distance. Despite the subjective impression of boundless space, the visual system seems to function as if entoptic space had a distance boundary of approximately 8.44 ( $\pm 3.04$ ). In the present studies Ss were simply asked to close their eyes; it is possible that the "boundary" of entoptic space could be in-

fluenced by the state of tension in the eye (cf. Urist, 1959).

## References

- Emmert, E. Grössenverhältnisse der Nachbilder. *Klin. Monatsbl. Augenheilk.*, 1881, 19, 443-450.
- Gibson, J. J. *The perception of the visual world*. Boston: Houghton Mifflin, 1950.
- Price, G. R. On Emmert's law of apparent sizes. *Psychol. Rec.*, 1961, 11, 145-151.
- Stanley, G. The apparent size of entoptic after-images. *Psychon. Sci.*, 1966, 4, 289-290.
- Urist, M. J. Afterimages and ocular muscle proprioception. *A.M.A. Arch. Ophthal.*, 1959, 61, 230-232.
- Zehender, W. Nachträgliche Bemerkungen zu dem vorgehenden Artikel. *Klin. Monatsbl. Augenheilk.*, 1881, 19, 451-454.

## Note

1. The author is grateful to Lee Price for assistance in collecting these data.

## Comment on non-parametric tests in the one-sample case by Rogers Elliott

In a recent study I was faced with the question of establishing whether a set of correlation coefficients was reliably positive, as follows: -.55, .57, .18, .18, -.12, .12, .17, .76, .61, .74. The correlations represented the degree of intrasubject covariation in each of 10 adults between heart rate and muscle tension across occasions during an experimental session. The correlations were not homogeneous and therefore could not strictly be averaged to permit a parametric test of the significance (relative to the zero correlation assumed by the null hypothesis) of the average. I was using two-sided tests, because, although I expected mostly positive correlations, the expectation was empirical rather than theoretical.

Therefore, I sought an appropriate non-parametric test. Siegel (1956) lists four tests in the one-sample case. The runs test was inappropriate, order of observation not having been relevant; the Kolmogorov-Smirnov test was appropriate to the assumption that half the scores would be negative and half positive, but this reduced it to application to a very crudely specified theoretical distribution; the chi-square test was appro-

priate to the same distribution; and the binomial test was, of course, appropriate. None of the last three appropriate tests yielded significance at the .05 level, two-sided, and, since the binomial test had been the one uniformly adopted, no acceptable significance was reported.

Nevertheless, it seems reasonable to treat the set of scores just as one would treat them if they were difference scores, with essentially the same null hypothesis that the scores are not different from zero. So considered, the more powerful Wilcoxon test applies, and in the present case yields a T of 7.5,  $p < .05$ , two sided. The logic here is the same, in fact, as using the sign test (a binomial test) on the signs of difference scores, and the same binomial test in the one-sample case. In the same sense, the formula for the t-test on D scores is equivalent to that on scores of a single sample, when both sets of scores are assessed for the reliability of their mean difference from zero. In sum, these considerations would seem to justify the use of the Wilcoxon paired-replicates test in the one-sample case, when the expected average score is zero.

## Reference

- Siegel, S. *Nonparametric statistics*. New York: McGraw-Hill, 1956.