**CORRESPONDENCE BETWEEN VISUAL ACUITY,
REFRACTIVE ERROR, AND THE SPEED OF
VISUAL PERCEPTION***

BY

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CORRECTION of refraction is usually expected to improve not only visual acuity but also the speed of visual perception, at least to the physiologic maximum for the particular individual. A previous study (Eames, 1949) has shown a generally increasing frequency of cases exhibiting *increase* in visual perception speed at successively higher dioptric levels, after correction of both hypermetropic and myopic errors. It also showed a *decrease* in the speed of visual perception after correction in an appreciable percentage of cases, particularly among the myopic group. The present study is intended as a step toward further understanding of the relationship of visual acuity, refractive error, and the speed of visual perception.

The speed of visual perception was measured tachistoscopically with projected pictures of common objects shown at the reading distance, before and after correction of refraction in school children between the ages of 6 and 17. The results were correlated with visual acuity and with the amount of refractive error by means of the Spearman rank-difference-squared method (see Table).

TABLE

Coefficients of Correlation	Before Correction of Refraction		After Correction of Refraction		Emmetropic
	Hypermetropic	Myopic	Hypermetropic	Myopic	
Between speed of visual perception and visual acuity	0.89	0.92	0.90	0.85	0.93
Between speed of visual perception and refractive error	0.29	0.59	0.94	0.95	0.96
Number of Cases ...	28	12	28	12	10

A high positive correlation was found between the speed of visual perception and visual acuity, both before and after correction of refraction in both hypermetropic and myopic groups. It was noted that the coefficient of correlation in the myopic cases was somewhat lower after correction, probably

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because the tachistoscopic tests were made at the reading distance. This appears to parallel the previous finding that a rather larger frequency of myopic cases exhibited *decrease* in the speed of visual perception after glasses had been provided. It is not unusual to observe myopic pupils who prefer to do book and desk work without their glasses, probably because they find it easier to read at the myopic punctum proximum than to accommodate. No doubt this becomes habitual in many cases.

The correspondence between the speed of visual perception and refractive error was positive in all cases, but the hypermetropic group showed a lower coefficient of correlation than the myopic, which seems likely to result from the accommodative compensation which is common among hypermetropic children. It was possible to correlate refractive error with the speed of visual perception *after* correction of the error, by ranking the refractive values of corrected cases as the mean of the ranks which would have been assigned if the measurement values had been consecutive instead of the same. When handled in this way, both the hypermetropic and myopic groups presented high and almost equal positive correlative values. The same method was applied to a group with no refractive error (emmetropic pupils), with the result that a high positive correlation was found which was close to that obtained after correction of refractive error in the other groups. The emmetropic group was also studied as to the correspondence between visual acuity and the speed of visual perception, and a high positive relationship was disclosed. This value was closer to that of the hypermetropic group after correction than to that of the myopic group.

This study tends to confirm the assumption that there is a high degree of correspondence between visual acuity and the speed of visual perception in the hypermetropic, myopic, and emmetropic groups.

The following tendencies also appear:

(a) The correspondence, though still high, is less after correction of myopia, when the measurements of the speed of visual perception are made at the reading distance.

(b) The correspondence between the speed of visual perception and refractive error is positive but low among the hypermetropic, but positive and significant among the myopic before correction. Both appear to approximate to the relationship of the emmetropic after errors have been corrected, and this is also the case with the correspondence between speed of visual perception and visual acuity.

REFERENCE

EAMES, T. H. (1949). *J. educ. Res.*, **42**, 534.