Spring 1964

The relationship between the dominant eye and refractive error in anisometropia

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Abstract

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Degree Type

Thesis

Degree Name

Master of Science in Vision Science

Committee Chair

William Baldwin

Subject Categories

Optometry

OPTOMETRY PROJECT

Advisor: Dr. William Baldwin Spring 1964

Students: W. Donald Cota & Robert T. Lindley

THE RELATIONSHIP BETWEEN THE DOMINANT EYE AND REFRACTIVE ERROR IN ANISOMETROPIA

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Problem:

To see if in anisometropia there is a relationship between the dominant eye and the refractive error and, if so, if it is related to the eye of greatest refractive error or the eye of least refractive error.

Hypothesis:

The dominant eye is closer to emmetropia than the non-dominant eye.

Procedure:

Data was obtained from two hundred cases from the Pacific University College of Optometry clinic. The anisometropia of #4, R.G., 20/40 equalization, #14A, and #21 monocular was recorded. An average was taken to determine the eye with the greatest refractive error. Only cases having aniso of .25D or more were used. Cases without consistent anisometropia were rejected. There was no differentiation made between myopia and hyperopia, as the refractive error was evaluated with respect to the deviation from emmetropia. The dominant eye recorded was that recorded on the respective cases, where only one technique was employed. Therefore, the validity of the dominant eye was subjected to clinic error. Two statistical evaluations were made of the refractive error compared to the dominant eye. The first consisted of an evaluation of all two hundred observations, while the second evaluation consisted of only those observations with anisometropia of 1.00D or greater. The two variances compared were least refractive error associated

with dominant eye and least refractive error associated with non-dominant eye. The hypothesis was tested assuming the two samples consisted of independent and randomly drawn observations from identical populations.

Magnitude of Anisometropia and Eye of Greatest Error

Dominant Eye	#4	R.G.	20/40 equalization	#14A	#21 monocular	Eye least $\bar{c}$ R.E.
O.D.	0	0	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	.50 O.S.	0	.50 O.S.	.50 O.S.	------	O.D.
O.S.	.25 O.D.	.50 O.D.	0	.25 O.D.	------	O.S.
O.S.	.25 O.D.	.25 O.S.	1.00 O.S.	.50 O.S.	------	O.D.
O.D.	.25 O.D.	.50 O.S.	.25 O.S.	0	.25 O.S.	O.D.
O.S.	.75 O.D.	1.25 O.D.	1.25 O.D.	.25 O.D.	1.00 O.D.	O.S.
O.D.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	0	.25 O.S.	.50 O.D.	.50 O.D.	.25 O.D.	O.S.
O.D.	.25 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	.25 O.D.	O.S.
O.S.	.50 O.D.	.50 O.D.	.25 O.D.	.50 O.D.	.25 O.D.	O.S.
O.D.	.75 O.S.	.25 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	.25 O.S.	.50 O.D.	.50 O.D.	.50 O.D.	.25 O.D.	O.S.
O.S.	.25 O.S.	.25 O.D.	0	.25 O.D.	.25 O.D.	O.S.
O.D.	1.00 O.S.	.25 O.S.	1.00 O.S.	1.25 O.S.	1.25 O.S.	O.D.
O.S.	1.00 O.D.	1.00 O.D.	.75 O.D.	1.00 O.D.	1.00 O.D.	O.S.
O.S.	.75 O.D.	.75 O.D.	1.00 O.D.	.50 O.D.	1.25 O.D.	O.S.
O.D.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	0	O.D.
O.D.	5.50 O.S.	5.50 O.S.	5.50 O.S.	5.25 O.S.	------	O.D.
O.D.	1.50 O.S.	1.00 O.S.	1.25 O.S.	1.25 O.S.	1.00 O.S.	O.D.
O.D.	.25 O.D.	.25 O.S.	.75 O.S.	.75 O.S.	.50 O.S.	O.D.
O.D.	.25 O.S.	.25 O.D.	.75 O.D.	.25 O.D.	.25 O.D.	O.S.
O.S.	.25 O.D.	.75 O.D.	.50 O.D.	.25 O.D.	0	O.S.
O.D.	.50 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	.25 O.D.	0	.50 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	.25 O.D.	.50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D.	.50 O.D.	1.00 O.D.	.75 O.D.	.25 O.D.	.50 O.D.	O.S.
O.D.	.75 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	2.50 O.S.	3.00 O.S.	3.00 O.S.	2.75 O.S.	2.75 O.S.	O.D.
O.D.	.25 O.D.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	.75 O.D.	1.00 O.D.	1.00 O.D.	1.00 O.D.	.75 O.D.	O.S.
O.D.	.50 O.D.	.50 O.S.	.25 O.S.	.25 O.S.	0	O.D.
O.D.	.25 O.S.	.50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D.	1.00 O.S.	1.00 O.S.	1.00 O.S.	1.00 O.S.	.75 O.S.	O.D.
O.D.	2.00 O.D.	1.00 O.D.	1.00 O.D.	1.00 O.D.	1.00 O.D.	O.S.
O.D.	0	.25 O.D.	.50 O.D.	0	.25 O.D.	O.S.
O.S.	.25 O.S.	.25 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	O.D.
O.D.	.25 O.S.	.50 O.S.	.25 O.S.	.50 O.S.	.25 O.S.	O.D.
O.S.	.75 O.D.	.50 O.D.	.25 O.S.	.50 O.D.	.75 O.D.	O.S.
O.S.	0	.25 O.S.	.50 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D.	.50 O.S.	1.50 O.S.	.75 O.S.	1.25 O.S.	1.25 O.S.	O.D.
O.D.	.50 O.D.	.75 O.D.	.75 O.D.	.50 O.D.	.75 O.D.	O.S.
O.D.	.50 O.S.	.25 O.S.	.25 O.S.	.50 O.S.	.50 O.S.	O.D.
O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	2.00 O.S.	1.25 O.S.	1.25 O.S.	1.75 O.S.	------	O.D.
O.D.	.50 O.D.	.50 O.D.	.25 O.D.	.25 O.D.	------	O.S.
O.D.	.25 O.D.	.25 O.D.	.25 O.S.	.25 O.D.	.25 O.D.	O.S.
O.D.	0	.50 O.S.	.75 O.S.	.75 O.S.	1.25 O.S.	O.D.
O.D.	.25 O.S.	.25 O.S.	.50 O.S.	.50 O.S.	------	O.D.
O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	------	O.S.
O.D.	.50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	------	O.S.

O.D. 1.00 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S. .50 O.D.	———	.75 O.D.	.75 O.D.	———	O.S.
O.S. 2.00 O.D.	1.25 O.D.	1.00 O.D.	1.00 O.D.	1.00 O.D.	O.S.
O.S. 0	.25 O.D.	.25 O.D.	.25 O.S.	.25 O.D.	O.S.
O.D. .25 O.S.	.25 O.D.	.25 O.D.	.25 O.D.	0	O.S.
O.D. .25 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	.75 O.S.	O.D.
O.D. .75 O.S.	.25 O.D.	.75 O.S.	.50 O.S.	———	O.D.
O.S. .25 O.D.	0	.25 O.D.	.25 O.D.	———	O.D.
O.D. .25 O.S.	.25 O.S.	.50 O.S.	.50 O.S.	———	O.D.
O.D. .50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.S. .75 O.D.	.50 O.S.	.25 O.D.	.25 O.D.	———	O.S.
O.D. .25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. 0	.25 O.D.	.25 O.S.	.25 O.S.	.50 O.S.	O.D.
O.D. .25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	———	O.S.
O.D. .50 O.D.	.25 O.D.	.25 O.D.	0	.25 O.D.	O.S.
O.D. .75 O.S.	.25 O.D.	.25 O.D.	.25 O.D.	———	O.S.
O.D. .25 O.S.	.50 O.S.	.25 O.S.	.50 O.S.	.25 O.S.	O.D.
O.D. 1.50 O.S.	1.75 O.S.	1.75 O.S.	1.50 O.S.	———	O.D.
O.D. .75 O.D.	.25 O.D.	.50 O.D.	.50 O.D.	———	O.S.
O.D. .25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	0	O.S.
O.D. .75 O.S.	.50 O.S.	.75 O.S.	.50 O.S.	0	O.D.
O.D. .25 O.D.	0	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. .25 O.D.	.50 O.D.	.75 O.D.	.50 O.D.	.50 O.D.	O.S.
O.D. 1.75 O.S.	1.75 O.S.	1.50 O.S.	1.50 O.S.	1.50 O.S.	O.D.
O.D. 1.25 O.S.	1.50 O.S.	1.25 O.S.	1.75 O.S.	1.25 O.S.	O.D.
O.D. .75 O.S.	.75 O.S.	.75 O.S.	.75 O.S.	.75 O.S.	O.D.
O.D. .25 O.D.	.25 O.S.	.25 O.S.	.50 O.S.	0	O.D.
O.D. 0	.25 O.D.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S. .50 O.S.	.75 O.S.	.75 O.S.	1.00 O.S.	.75 O.S.	O.D.
O.D. ———	.50 O.S.	.50 O.S.	.50 O.S.	———	O.D.
O.S. .75 O.S.	.50 O.D.	.75 O.D.	.75 O.D.	.75 O.D.	O.S.
O.D. .50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	———	O.S.
O.D. .75 O.S.	.50 O.D.	.50 O.D.	.25 O.D.	———	O.S.
O.D. .25 O.D.	.50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D. 0	.50 O.D.	.25 O.D.	.50 O.D.	.25 O.D.	O.S.
O.D. .50 O.D.	1.00 O.D.	.50 O.D.	.50 O.D.	.75 O.D.	O.S.
O.D. 0	.50 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.S. 1.25 O.D.	.75 O.D.	.75 O.D.	.50 O.D.	.50 O.D.	O.S.
O.D. .50 O.S.	0	.50 O.S.	.50 O.S.	.25 O.S.	O.D.
O.S. 0	.50 O.S.	.25 O.S.	.75 O.S.	.50 O.S.	O.D.
O.D. 0	.25 O.S.	.25 O.S.	.50 O.D.	.25 O.S.	O.D.
O.D. .25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.S. 1.25 O.D.	.75 O.D.	.75 O.D.	.75 O.D.	.50 O.D.	O.S.
O.D. 0	.50 O.D.	.50 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D. .25 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	O.S.
O.D. .50 O.S.	.25 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. .25 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	O.D.
O.S. .50 O.D.	.25 O.D.	.25 O.D.	.50 O.D.	.50 O.D.	O.S.
O.S. 2.75 O.D.	1.25 O.D.	2.50 O.D.	2.50 O.D.	1.25 O.D.	O.S.
O.D. .25 O.D.	.25 O.D.	.50 O.S.	.25 O.S.	.50 O.S.	O.D.
O.D. .50 O.S.	1.00 O.D.	1.00 O.D.	.75 O.D.	1.00 O.D.	O.S.
O.D. 1.00 O.D.	1.25 O.D.	.25 O.D.	1.25 O.D.	.50 O.D.	O.S.
O.D. .50 O.D.	.50 O.D.	.25 O.D.	.50 O.D.	.75 O.D.	O.S.
O.D. .25 O.D.	.50 O.S.	.50 O.S.	.25 O.S.	.50 O.S.	O.D.
O.D. .25 O.D.	1.25 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	O.S.

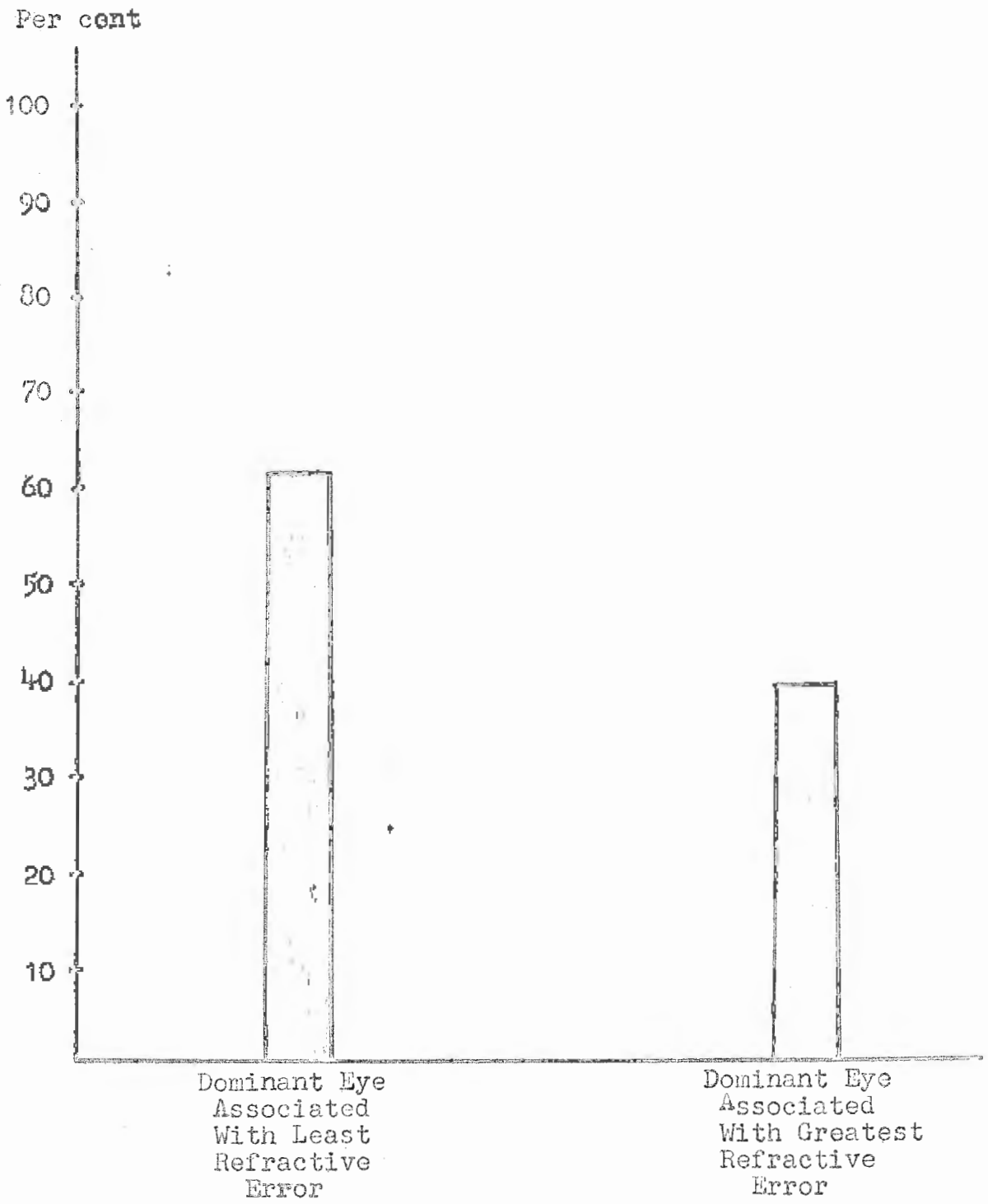
O.D. 0	.25 O.S.	.75 O.S.	1.00 O.S.	.50 O.S.	O.D.
O.S. .25 O.S.	.25 O.S.	0	.25 O.S.	.25 O.S.	O.D.
O.D. 1.50 O.D.	.75 O.D.	.75 O.D.	1.00 O.D.	1.00 O.D.	O.S.
O.D. .25 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	O.S.
O.S. .25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. .25 O.S.	2.00 O.S.	.75 O.S.	.75 O.S.	.50 O.D.	O.D.
O.D. .50 O.S.	0	.75 O.S.	.75 O.S.	----------	O.D.
O.D. .25 O.S.	.75 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. .75 O.D.	0	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D. .25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D. .75 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	----------	O.D.
O.D. 0	.50 O.S.	.50 O.S.	.25 O.S.	----------	O.D.
O.D. 1.00 O.S.	.75 O.S.	1.00 O.S.	.75 O.S.	.75 O.S.	O.D.
O.S. 2.00 O.D.	4.50 O.D.	3.75 O.D.	3.00 O.D.	3.50 O.D.	O.S.
O.D. .25 O.D.	.25 O.D.	.25 O.D.	.50 O.D.	----------	O.S.
O.D. .50 O.D.	0	.75 O.D.	.50 O.D.	.75 O.D.	O.S.
O.D. .50 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	.25 O.S.	O.D.
O.D. 0	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. 0	.50 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. .75 O.D.	0	.25 O.S.	.50 O.S.	.25 O S.	O.D.
O.S. .50 O.S.	1.25 O.S.	1.25 O.S.	1.75 O.S.	----------	O.D.
O.S. .50 O.D.	1.25 O.D.	1.25 O.D.	1.25 O.D.	1.00 O.D.	O.S.
O.S. 1.00 O.S.	1.50 O.S.	1.50 O.S.	1.00 O.S.	1.50 O.S.	O.D.
O.D. .25 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	O.S.
O.S. .50 O.D.	.75 O.D.	.50 O.D.	.75 O.D.	1.25 O D.	O.S.
O D. .25 O.S.	.25 O.S.	.25 O.S.	0	.25 O°S.	O.D.
O:D. .75 O.D.	.50 O.D.	.75 O.D.	.75 O.D.	.75 O:D.	O.S.
O.D. .25 O.S.	.50 O:S.	.50 O:S.	.25 O.S.	.75 O.S.	O.D.
O.D. .25 O.S.	.50 O.S.	.25 O.S.	0	.25 O.S.	O.D.
O.D. .25 O.D.	.75 O.D.	.75 O.D.	.75 O.D.	----------	O.S.
O.D. 1.25 O.D.	.50 O.D.	.75 O.D.	.50 O.D.	.75 O.D.	O.S.
O.D. .25 O.D.	.75 O.D.	.50 O.D.	.75 O.D.	.50 O.D.	O.S.
O.S. .50 O.S.	0	.50 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. 1.25 O.S.	1.00 O.S.	.75 O.S.	1.25 O.S.	1.25 O.S.	O.D.
O.D. .25 O.D.	.500.D.	.25 O.D.	.25 O.D.	.50 O.D.	O.S.
O.D. .25 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	.50 O.S.	O.D.
O.D. .25 O.D.	.25 O.S.	.25 O.S.	.25 O.S.	----------	O°D.
O.D. 3.00 O D.	2.50 O.D.	2.75 O.D.	2.50 O.D.	----------	O.S.
O.D. 1.00 O:S.	.75 O.S.	1.00 O.S.	1.00 O.S.	----------	O.D.
O.D. 0	.50 O.S.	.25 O.S.	.25 O.S.	.25 O:S.	O.D.
O.D. 0	.25 O.D.	.25 O°D.	.25 O.D.	0	O.S.
O.S. .25 O.D.	0	.50 O.S.	.50 O.D.	.50 O.S.	O.D.
O.S. .25 O.D.	1.00 O.D.	.75 O.D.	.75 O.D.	1.00 O.D.	O.S.
O.S. 1.00 O.S.	0	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S. .75 O.D.	1.00 O.D.	1.25 O.D.	.75 O.D.	.75 O.D.	O.S.
O.D. 0	.75 O.D.	.75 O.D.	.75 O.D.	.75 O.D.	O.S.
O.D. .50 O.S.	.75 O.S.	.75 O.S.	.75 O.S.	.75 O.S.	O.D.
O.S. .25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	0	O.S.
O.S. 1.00 O.D.	.50 O.D.	.50 O.D.	.75 O.D.	.50 O.D.	O.S.
O.S. 1.00 O.D.	1.00 O.D.	1.50 O.D.	.75 O.D.	1.25 O.D.	O.S.
O.S. 1.00 O.S.	.75 O.D.	.75 O.D.	.50 O.D.	1.25 O.D.	O.S.
O.D. .25 O.D.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D. .75 O.S.	1.00 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	O.D.
O.S. .25 O.D.	.50 O.D.	.25 O.D.	.25 O.S.	.25 O.D.	O.S.
O.D. .25 O.S.	.25 O.S.	.50 O.S.	.25 O.S.	----------	O.D.

O.D.	.75 O.S.	1.00 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	O.D.
O.D.	.25 O.S.	.25 O.S	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	.25 O.D.	.25 O.S.	.50 O.D.	.25 O.D.	.75 O.D.	O.S.
O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	0	.50 O.D.	.75 O.D.	.50 O.D.	.75 O.D.	O.S.
O.S.	.25 O.D.	.25 O.D.	.25 O.D.	0	.50 O.D.	O.S.
O.D.	.25 O.D.	0	.25 O.D.	.25 O.D.	.25 O.S.	O.S.
O.D.	0	.50 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	1.00 O.D.	.75 O.D.	.75 O.D.	.75 O.D.	.50 O.D.	O.S.
O.D.	0	.25 O.D.	.25 O.D.	.25 O.S.	.25 O.D.	O.S.
O.D.	.75 O.S.	.50 O.S.	.50 O.S.	.25 O.S.	0	O.D.
O.D.	0	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.S.	0	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	0	.25 O.S.	.25 O.S.	.25 O.S.	---------	O.D.
O.D.	.25 O.S.	.50 O.S.	.50 O.S.	1.25 O.S.	.75 O.S.	O.D.
O.D.	.50 O.S.	.50 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	0	0	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.S.	1.25 O.D.	.75 O.D.	.75 O.D.	.50 O.D.	.50 O.D.	O.S.
O.D.	.25 O.S.	.75 O S.	.25 O.S.	.25 O.S.	---------	O.D.
O.S.	1.75 O.D.	.75 O.D.	.75 O.D.	.75 O.D.	1.00 O.D.	O.S.
O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D.	.75 O.S.	0	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	.75 O.D.	.25 O.D.	.25 O.D.	.25 O.S.	.25 O.D.	O.S.
O.D.	.25 O.S.	0	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.S.	2.00 O.S.	2.50 O.S.	1.75 O.S.	1.00 O.S.	2.00 O.S.	O.D.
O.D.	.25 O.S.	.25 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	O.D.
O.D.	.25 O.S.	.75 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	O.D.
O.D.	0	.25 O.D.	.50 O.D.	.25 O.D.	.25 O.D.	O.S.
O.D.	1.00 O.S.	1.25 O.S.	.75 O.S.	.75 O.S.	1.00 O.S.	O.D.
O.S.	.50 O.S.	.50 O.S.	.25 O.S.	.50 O.S.	---------	O.D.
O.S.	0	.25 O.S.	.25 O.S.	.25 O.S.	.50 O.S.	O.D.
O.D.	.50 O.D.	0	.25 O.D.	.50 O.D.	.50 O.D.	O.S.
O.D.	0	.25 O.D.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	.25 O.D.	.50 O.S.	.25 O.S.	.25 O.S.	0	O.D.
O.D.	.50 O.S.	.50 O.S.	.50 O.S.	.50 O.S.	.25 O.S.	O.D.
O.S.	.50 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	.50 O.D.	O.S.
O.D.	.50 O.D.	.25 O.S.	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	.75 O.S.	1.00 O.S.	.50 O.S.	.50 O.S.	---------	O.D.
O.S.	.25 O.D.	.50 O.D.	.25 O.D.	.50 O.D.	.75 O.D.	O.S.
O.D.	.25 O.S.	0	.25 O.S.	.25 O.S.	.25 O.S.	O.D.
O.D.	.75 O.S.	.75 O.S.	1.50 O.S.	1.25 O.S.	1.25 O.S.	O.D.

Observations Based on Anisometropia of 0.25D or Greater

Dominant Eye Associated With Least Refractive Error··61.5%

Dominant Eye Associated With Greatest Refractive Error····38.5%



Of the 200 observations, 123 showed least refractive error associated with the dominant eye and 77 showed least refractive error associated with the non-dominant eye.

Mean of sample:

$$\bar{X}_1 = \frac{X_1}{n} = \frac{123}{200} = .615$$

$$\bar{X}_2 = \frac{X_2}{n} = \frac{77}{200} = .385$$

difference between samples:

$$D = X_1 - X_2 = 123 - 77 = 46$$

Average difference:

$$\bar{D} = \frac{D}{n} = \frac{123-77}{200} = \frac{46}{200} = .230$$

Comparison of two variances:

$$S_1^2 = \frac{\Sigma(x_1 - \bar{x}_1)^2}{n_1 - 1} = \frac{(123 - .615)^2}{123 - 1} = 114.50$$

$$S_2^2 = \frac{\Sigma(x_2 - \bar{x}_2)^2}{n_2 - 1} = \frac{(77 - .385)^2}{76} = 77.23$$

The hypothesis, as stated above, can be tested by calculating F

$$F = \frac{S_1^2}{S_2^2} = \frac{114.50}{77.23} = 1.48$$

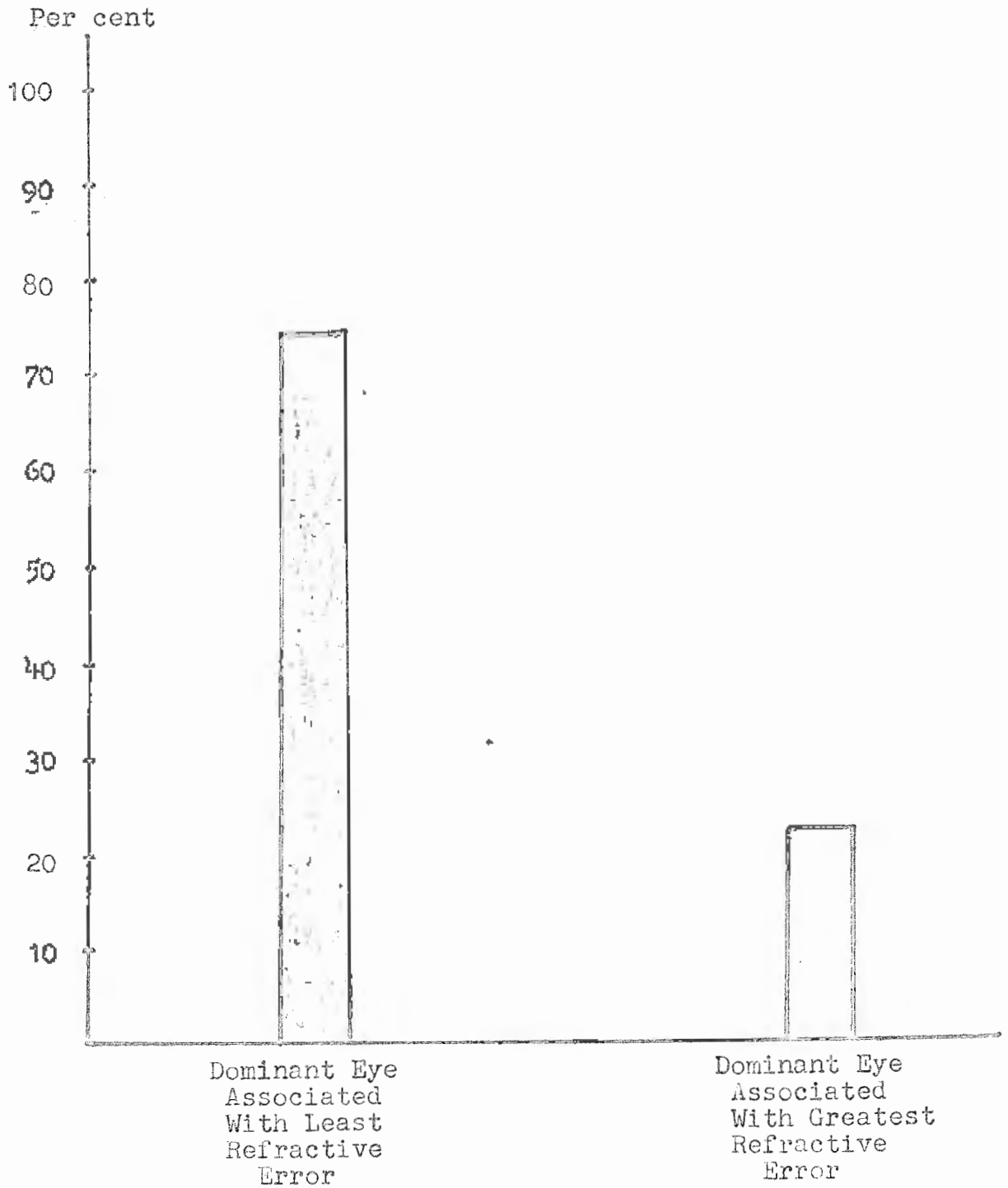
Table value = 1.42

Theoretical relative frequency used .10

Observations Based on Anisometropia of 1.00D or Greater

Dominant Eye Associated With Least Refractive Error··74.1%

Dominant Eye Associated With Greatest Refractive Error····25.9%



Of the observations with 1.00D anisometropia or more, 20 showed least refractive error associated with the dominant eye and 7 showed least refractive error associated with the non-dominant eye.

Mean of sample:

$$\bar{X}_1 = \frac{X_1}{n} = \frac{20}{27} = .7407$$

$$\bar{X}_2 = \frac{X_2}{n} = \frac{7}{27} = .2593$$

Difference between samples:

$$D = X_1 - X_2 = 20 - 7 = 13$$

Average difference:

$$\bar{D} = \frac{D}{n} = \frac{20-7}{27} = \frac{13}{27} = .1814$$

Comparison of two variances:

$$S_1^2 = \frac{\Sigma(X_1 - \bar{X}_1)^2}{n_1 - 1} = \frac{(20 - .7407)^2}{20-1} = 19.523$$

$$S_2^2 = \frac{\Sigma(X_2 - \bar{X}_2)^2}{n_2 - 1} = \frac{(7 - .2593)^2}{7-1} = 7.572$$

The hypothesis, as previously stated, can be tested by calculating F

$$F = \frac{S_1^2}{S_2^2} = \frac{19.523}{7.572} = 2.578$$

Table value = 3.14

Theoretical relative frequency used .10

	F	X	FX	FX^2
Dominant Eye Associated With Least Refractive Error	20	1	20	20
Dominant Eye Associated With Greatest Refractive Error	7	0	0	0
	Σ 27	1	20	20

Population mean:

$$M = \frac{\Sigma FX}{N} = \frac{20}{27} = .7407$$

$$\Sigma x^2 = \Sigma FX^2 - \frac{(\Sigma FX)^2}{N}$$

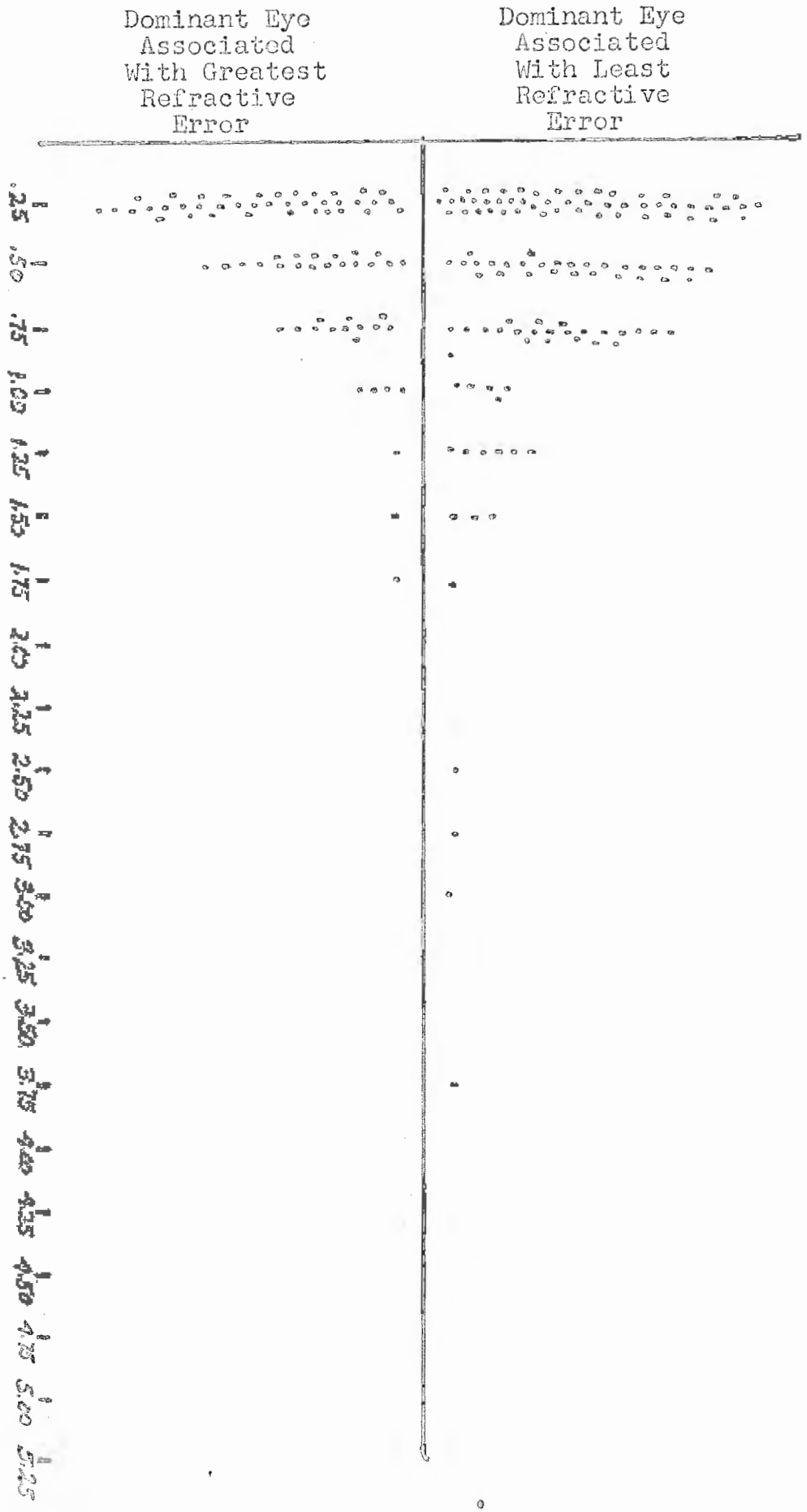
$$\Sigma x^2 = 20 - \frac{400}{27} = 14.81$$

Standard deviation:

$$\sigma^2 = \frac{\Sigma x^2}{N} = \frac{14.81}{27} = .5485$$

$$\sigma = \sqrt{.5485}$$

$$\sigma = .7401$$


Dominant Eye Associated With Greatest Refractive Error
Dominant Eye Associated With Least Refractive Error
.25
.50
.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25

Conclusion

The hypothesis, as previously stated, is the dominant eye is closer to emmetropia than the non-dominant eye. After an evaluation of all the two hundred clinical cases, it was found that 123 showed the dominant eye associated with least refractive error and 77 showed the non-dominant eye associated with the least refractive error. The population mean was .615 with a standard deviation of .486. The hypothesis was tested by calculating the F distribution for this binomial population to determine the acceptability of the hypothesis. The theoretical relative frequency chosen for the statistical evaluation was .10. The calculated F value was 1.48 and the table value was 1.42. Since the calculated F value was greater than the table value for the theoretical relative frequency chosen the hypothesis was rejected. A further investigation was made to determine whether the hypothesis would be accepted if only those cases showing an anisometropia of 1.00D or greater were used. Of this sample, there were 27 observations, 20 which showed the dominant eye associated with the least refractive error and 7 which showed the non-dominant eye associated with the least refractive error. The population mean for this group was .7407 with a standard deviation of .7401. The hypothesis was again tested using the F distribution with the chosen theoretical relative being .10. The calculated F value was 2.578 and the table value was 3.44. Since the table value of F was greater than the calculated F value, the hypothesis was accepted.

From this information we concluded the dominant eye is associated with least refractive error in cases where anisometropia is 1.00D or greater, but such a relationship is not predictable in cases showing less than 1.00D anisometropia. We can conclude from the above information that the scattering of the distribution of the 200 observations was loaded in the direction of the dominant eye associated with least refractive error due to the anisometropia of 1.00D or greater.