1-4-1959

To determine if there is a clinical significance in changing the sequence of the positive relative convergence and negative relative convergence findings in the standard optometric extension program routine

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Abstract
The purpose of this study was to determine if there was a significant difference in magnitude of the findings if the sequence of taking the positive relative convergence (16A) and negative relative convergence (17A) in the standard Optometric Extension Program routine were reversed.

Degree Type
Thesis

TO DETERMINE IF THERE IS A CLINICAL SIGNIFICANCE IN CHANGING THE SEQUENCE OF THE POSITIVE RELATIVE CONVERGENCE AND NEGATIVE RELATIVE CONVERGENCE FINDINGS IN THE STANDARD OPTOMETRIC EXTENSION PROGRAM ROUTINE.

CLINICAL YEAR THESIS

JANUARY 4, 1959

by

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ACKNOWLEDGEMENTS

We acknowledge the assistance of Dr. D. T. Jans of the Faculty of Pacific University College of Optometry for his advice and interest in the problems of this thesis.

We also wish to thank the persons who patiently cooperated with us by serving as subjects for this study.

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PURPOSE

The purpose of this study was to determine if there was a significant difference in magnitude of the findings if the sequence of taking the positive relative convergence (16A) and negative relative convergence (17A) in the standard Optometric Extension Program routine were reversed.

RELATED STUDIES

This research project is made as a parallel to a previous study conducted in the Pacific University College of Optometry and reported in a Clinical Year Thesis.[1] The purpose of this research project was to determine if there was a significant difference in magnitude of the findings if the sequence of taking the positive relative accommodation (Number 20 finding) and negative relative accommodation (Number 21 finding) in the standard Optometric Extension Program routine were reversed.

The conclusions from this study were: (1) There was no significant differences in terms of means or sigmas between the findings irrespective of the sequence used. (2) The number twenty, positive relative accommodation, showed a higher reliability on changing the sequence than the number twenty-one, negative relative accommodation finding. (3) The variance of the sequence could not be used with the same degree of confidence as the accepted sequence because of the individual variations. (4) Further work recommended in this field is to vary the sequence of number 16A, positive relative convergence, and the negative relative convergence, number 17A, of the standard Optometric Extension Program routine.

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[1] R. N. Rintell, R. V. Craig and J. P. McNally, Thesis, May 1958.

APPARATUS

Bausch and Lomb Green's refractor

Interpupillary distance ruler graduated in millimeters

Light meter

Reduced Snellen Chart with 20 / 20 acuity letters at the 16 inch testing distance

PROCEDURE

I. TECHNIQUE OF TESTING:

The illumination incident on the reduced Snellen card was maintained at 20 foot candles.

The phoropter was adjusted to the subjects near (16 inch) pupillary separation with the subjective finding (number 7), which had previously been determined by the examiners, in place.

The testing was done on two separate occasions, separated by a time interval of not less than 24 hours.

On the first occasion, the procedure was taken in the following manner;

The negative relative convergence at 16 inches on the reduced Snellen to blur out was taken. At this point, the subject was occluded and the prisms were reduced back to zero. The same procedure was used for the positive relative convergence to the blur out. This will be referred to as the first test or sequence.

On the second occasion, the procedure was taken in the following manner;

The positive relative convergence at 16 inches on the reduced Snellen to blur out was taken. At this point, the subject was occluded and the prisms were reduced back to zero. The same procedure was used for the negative relative convergence to the blur out. This will be referred to as the second test or sequence.

II. THE FOLLOWING PRE-REQUISITES WERE REQUIRED FOR THE VARIOUS TEST SEQUENCES:

Each patient must have had 20 / 20 binocular acuity at far and near through the subjective finding, (Number 7).

Each patient must have been in the age range of 18 to 38 years of age.

III. INSTRUCTIONS TO THE SUBJECTS:

The following instructions were given to each patient;

> "Read the group of letters on the bottom line and tell me when they become so blurred that you can not make out a single letter. Be sure and keep the line single."

This instruction was repeated at the start of each new test.

IV. A TOTAL OF 31 SUBJECTS WERE TESTED TWICE BY THE SAME EXAMINER.

TABLE 1

	16A 1st Seq.	16A 2nd Seq.	Diff.	17A 1st Seq.	17A 2nd Seq.	Diff.
1.	16Δ	12Δ	-4Δ	28Δ	24Δ	-4Δ
2.	19Δ	24Δ	+5Δ	10Δ	10Δ	0Δ
3.	14Δ	14Δ	0Δ	20Δ	20Δ	0Δ
4.	10Δ	13Δ	+3Δ	14Δ	9Δ	-5Δ
5.	26Δ	18Δ	-8Δ	16Δ	17Δ	+1Δ
6.	21Δ	28Δ	+7Δ	24Δ	17Δ	-7Δ
7.	24Δ	28Δ	+4Δ	18Δ	16Δ	-2Δ
8.	12Δ	23Δ	+11Δ	18Δ	26Δ	+8Δ
9.	26Δ	35Δ	+9Δ	16Δ	18Δ	+2Δ
10.	16Δ	14Δ	-2Δ	22Δ	20Δ	-2Δ
11.	14Δ	14Δ	0Δ	22Δ	16Δ	-6Δ
12.	19Δ	17Δ	-2Δ	16Δ	14Δ	-2Δ
13.	16Δ	16Δ	0Δ	22Δ	26Δ	+4Δ

TABLE 1

	16A 1st Seq.	16A 2nd Seq.	Diff.	17A 1st Seq.	17A 2nd Seq.	Diff.
14.	28Δ	18Δ	-10Δ	18Δ	12Δ	-6Δ
15.	16Δ	18Δ	+2Δ	16Δ	14Δ	-2Δ
16.	18Δ	16Δ	-2Δ	22Δ	20Δ	-2Δ
17.	26Δ	30Δ	+4Δ	28Δ	22Δ	-6Δ
18.	8Δ	10Δ	+2Δ	16Δ	9Δ	-7Δ
19.	8Δ	12Δ	+4Δ	18Δ	15Δ	-3Δ
20.	14Δ	19Δ	+5Δ	20Δ	22Δ	+2Δ
21.	12Δ	21Δ	+9Δ	16Δ	8Δ	-8Δ
22.	11Δ	14Δ	+3Δ	21Δ	9Δ	-11Δ
23.	23Δ	18Δ	-5Δ	19Δ	20Δ	+1Δ
24.	30Δ	36Δ	+6Δ	16Δ	22Δ	-2Δ
25.	21Δ	22Δ	+1Δ	16Δ	12Δ	-4Δ
26.	28Δ	28Δ	0Δ	24Δ	22Δ	-2Δ

TABLE 1

	16A 1st Seq.	16A 2nd Seq.	Diff.	17A 1st Seq.	17A 2nd Seq.	Diff.
27.	21Δ	23Δ	+2Δ	16Δ	17Δ	+1Δ
28.	28Δ	30Δ	+2Δ	9Δ	6Δ	-3Δ
29.	24Δ	26Δ	+2Δ	14Δ	14Δ	0Δ
30.	12Δ	1 1Δ	-1Δ	9Δ	16Δ	+7Δ
31.	26Δ	22Δ	-4Δ	22Δ	12Δ	-10Δ
		Mean Change	+1.4Δ		Mean Change	-2.0Δ
			σ = 4.73Δ			σ = 4.57Δ
			r = 0.96Δ			r = 0.74Δ

Significance = Z value

$$Z = \frac{MD}{\sigma_{MD}}$$

Number 16A:

$$Z = \frac{1.4}{4.73}$$

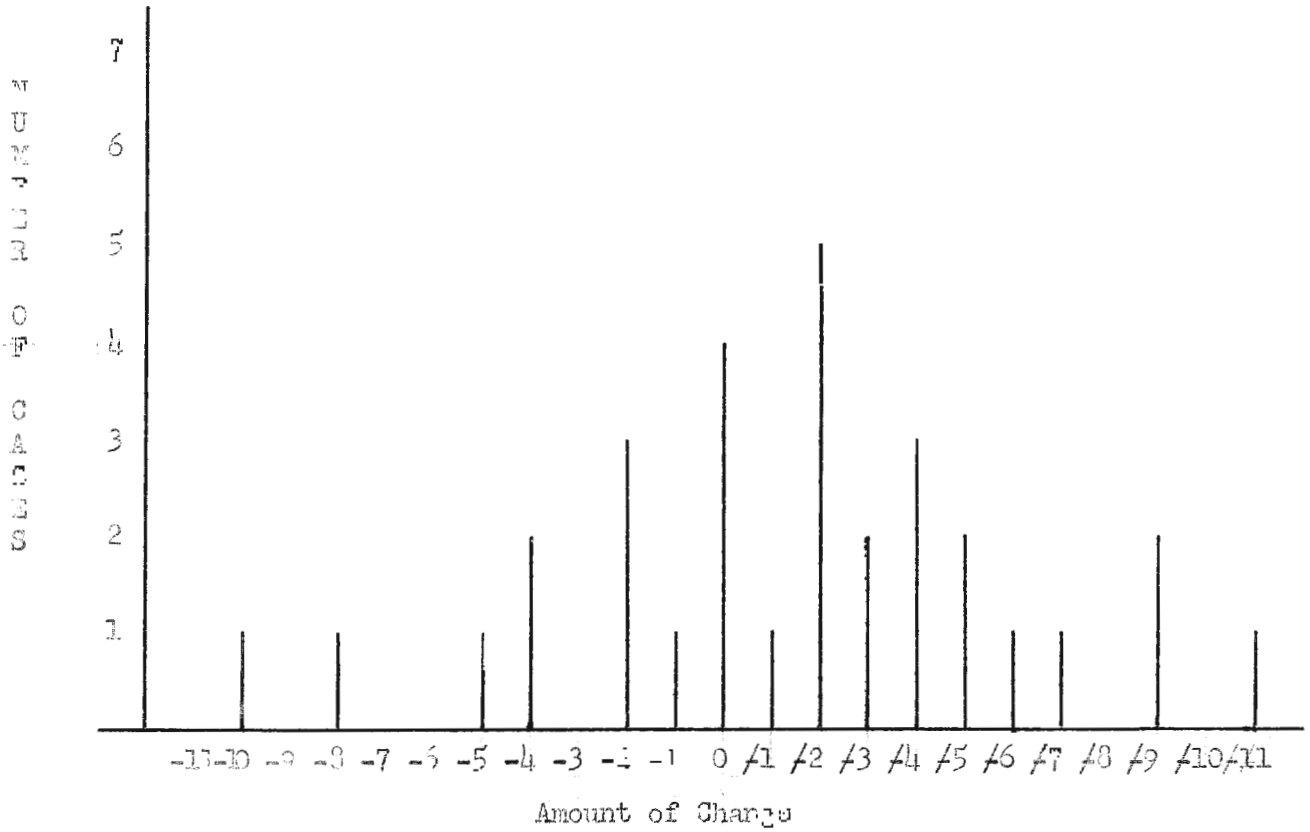
$$Z = .295$$

Number 17A

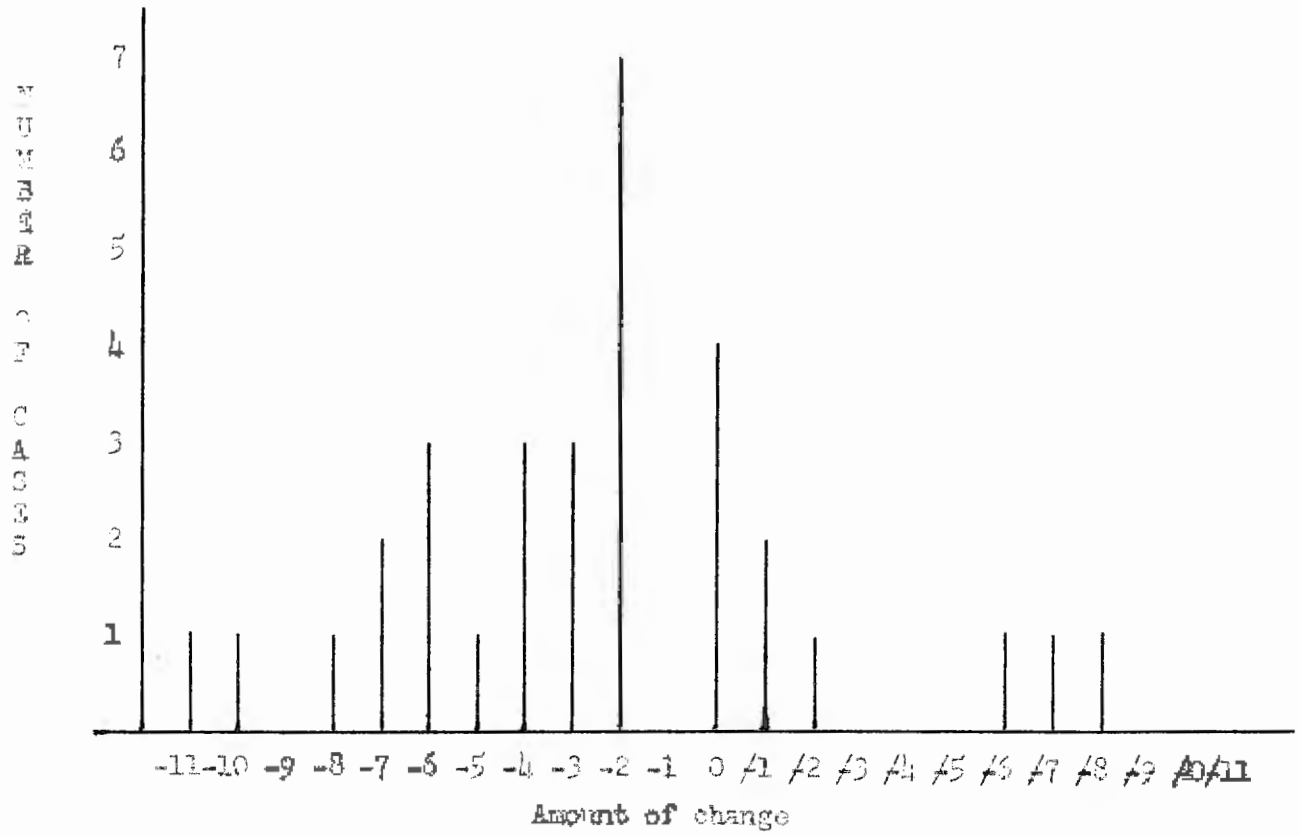
$$Z = \frac{-2.0}{4.57}$$

$$Z = .439$$

Change in values of 16A in reversing the sequence of taking 16A and 17A from the standard routine



Change in values of 17A in reversing the sequence of taking 16A and 17A from the standard routine



RESULTS

The mean change in the number 16A finding, positive relative convergence, by changing from the first sequence to the second sequence was an increase of 1.4Δ with a sigma of 4.73Δ, as shown by table 1. The correlation was .96.

The mean change in the number 17A finding, negative relative convergence, by changing from the first sequence to the second sequence was a decrease of 2.0Δ with a sigma of 4.57 as shown by table 1. The correlation was .74.

The findings indicate the results could be obtained by chance 49 times out of every 100. Therefore, the change is not held to be significant.

CONCLUSIONS

1. There was no significant differences in terms of norms or sigmas between the two findings irrespective of the sequence used.

2. The number 16A, positive relative convergence, showed a higher reliability on changing the sequence than the number 17A, negative relative convergence.

3. A test on retest of the 16A and 17A should be done to determine if the large variations in the findings are individual variations or a result of the change in sequence.

4. Further work recommended in this field is to vary the sequence of the number 16B, positive fusional reserve, and the negative fusional reserve, number 17B, or the standard Optometric Extension Program routine.