CHAPTER IV

PRESENTATION OF RESULTS AND INTERPRETATION

After the scores had been gathered by the process mentioned in Chapter III, basic data for calculation were then computed by desk calculator, and are presented in Table V.

Table V

Basic Data from which Further Calculations would be Made

Group	Subjects	Test	ΣX	ΣX^2	ΣXY	$\bar{X}$	s^2	s
I*	m = 66	MCm_1	2218	80440	64034(m)	33.60	90.79	9.52
	f = 34	MCf_1	1369	57774	45294(f)	40.26	80.35	8.96
	t = 100				109328(t)			
		$MCm{+}f_1$	3587	138214		35.87	96.44	9.82
		$CLm{+}f_1$	2773	108945		27.73	323.73	17.99
					X = MC			
		CLm_1	1701	60659	Y = CL	25.77	258.76	16.08
		CLf_1	1072	48286		31.52	348.65	18.65
II	m = 54	MCm_2	1722	59150	45102(m)	31.88	79.94	9.94
	f = 46	MCf_2	1562	56278	39957(f)	45.94	71.95	8.48
	t = 100				85059(t)			
		$MCm{+}f_2$	3284	115428		32.84	76.58	8.75
		$CLm{+}f_2$	2446	65794		24.46	60.26	7.76
					X = MC			
		CLm_2	1320	35126	Y = CL	20.00	53.94	7.34
		CLf_2	1126	30668		33.11	69.30	8.30
I+II	m =120	MC_t	6871	253642		34.35	88.38	9.40
	f = 80	CL_t	5219	174739		26.09	193.71	13.91
	t =200							

*Group I took the multiple-choice test <u>before</u> the cloze test, while Group II took the cloze tests first.

The author then analized the data in the following steps.

I. Calculating for Reliability Coefficients of the Tests

In order to determine the reliability coefficients of the multiple-choice structure test, and of the cloze test utilized in the main study, Kuder-Richardson Formula 21 was employed twice. The scores were calculated by Adler Desk Calculater.

Kuder-Richardson Formula 21[1] utilized in this calculation is:

$$r_{tt} = \frac{ns_t^2 - M_t(n - M_t)}{(n - 1)\, s_t^2}$$

Where :

r_{tt} = reliabiligy coefficient of the test

n = number of the items

M_t = average score of the test (mean)

s_t^2 = total variance

(For actual calculations refer to Appendix A)

The reliability coefficients of the 75-item multiple-choice sturtcure test, and of the 75-item cloze test were .80 and .92 respectively. The fact that the reliabilities of these tests are very high indicates that data obtained from these measure provide a reasonable basis for the following analyses.

II. Calculating for Correlation Coefficients Between the Tests

The two sets of scores obtained from Group I, and the other two

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[1]L. Saiyote, Educational Statistics, (Bangkok : Wattana Panitch, 1970), p. 150.

sets obtained from Group II, (from both administrations in the main study) were plotted on two scatter plots. Since they showed that the scores of each group were lineraly related, Pearson product-moment coefficients of correlation were then computed for each group.

The formula for Pearson Product-Moment Correlation Coefficient[2] untilized in this calculation is:

$$r_{xy} = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right] - \left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

Where :

N = Number of the subjects

ΣXY = sum of XY

ΣX = sum of X

ΣY = sum of Y

(For actual calculations, refer to Appendix B)

The correlation coefficients between the scores of the multiple-choice structure test and the cloze test in Group I, was .56 and the correlation coefficient between the scores of the cloze test and the multiple-choice structure test in Group II was .70. Both were significant at $p < .01$. The correlation coefficients of Group I and Group II were then entered into Fisher's Z transformation to determine the pooled correlation coefficient between the two tests. The result of this calculation is presented in Table II.

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[2] L. Saiyote, ibid., p. 168.

Fisher's Z transformation formula[3] utilized in this calculation is :

$$\bar{Z} = \frac{(n_1 - 3)\, z_1}{(n_i - 3)}$$

Where :

$\bar{Z}$ = average Fisher's Z score

z_1 = Fisher's Z score of Group i

n_i = number of the subjects of group i

(For actual calculations, refer to Appendix B)

Table VI

The Correlation Coefficients between MC and CL Tests and Their Pooled Correlation Coefficient

Group	Ordering	r	z
I (N = 100)	MC - CL	.564	.640
II (N = 100)	CL - MC	.704	.867
	Pooled r	= .640	

The pooled correlation coefficient is significant at $p < .01$ The result os this calculation shows that the scores of the

[3] L. Saiyote, *ibid.*, p. 228.

multiple-choice structure test correlate rather highly with the scores of the cloze test. This implies that the subjects who scored higher or lower than the mean score on the multiple-choice structure test,would also score higher or lower than average score on the cloze test, and vice versa. In other words, if the subjects could score highly on the multiple-choice structure test, they would score highly on the cloze test, and vice versa. Likewise, if the subjects scored lower than average score on the multiple-choice structure test, they would score lower than average score on the cloze test, too, and vice versa. However, there would be some subjects that did not perform the tests under this conditions.

As a whole, it can be concluded that the cloze test could be used to measure the proficiency of the subjects in grammatical points, (English structures) as well as could the multiple-choice structure test. And, it could be used alternatively to the multiple-choice test to measure such proficiency. Thus, the correlations in this calculation indicate that the first hypothesis is accepted, since the scores of the multiple-choice structure test correlate rather highly with the scores of the cloze test.

III. Calculating for Correlation Coefficient Differences.

In order to find out if the correlation coefficients of Group I and Group II differed significantly, the r's of the groups were entered into Fisher's Z function. The correlation coefficient differences were calculated by:[4]

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[4] L. Saiyote, <u>ibid.</u>, p. 227.

$$C.R.Z. = \quad Z = \frac{\bar{Z}r_1 \quad \bar{Z}r_2}{\sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}}$$

n_1 and n_2= number of the subjects in Group I and II

$\bar{Z}r_1$ and $\bar{Z}r_2$ = transferred r of Group I and II

(For actual calculations, refer to Appendix B)

It was found that C.R.Z. was 1.58 and not significant at $p < .01$, which indicates that there was no signigicant difference between the correlation coefficients of both groups. This shows that the correlation coefficient of the scores obtained by Group I, (MC - CL) was not significantly different from the correlation coefficient of the scores obtained by Group II. (CL - MC) This provides evidence to show that the order in administrations of the two kinds ot tests has no effect on the scores of the multiple-choice structure test or the cloze test. This calculation shows that the second hypothesis is accepted.

IV. Calculating for Mean Differences

However, there is another way to prove if the ordering of test administration affect the subjects' scores. That is to find out if the means of both groups differ significantly. So, to check the above finding, the differences of means of both groups were calculated by t-tests.

The t - test utilized in this calculation is:[5]

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[5]L. Saiyote, ibid., p. 175.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{s_{x_1}^2 + s_{x_2}^2 - 2r_{12}s_{x_1}s_{x_2}}}$$

Where: $\bar{X}_1$ and $\bar{X}_2$ = means of Group I, II

$s_{x_1}^2$ = the variance of the sample Group I

$s_{x_2}^2$ = the variance of the sample Group II

s_{x_I} and s_{x_2} = standard deviations of the two samples

r_{12} = the correlation coefficient of the tests.

(For actual calculations,refer to Appendix B)

The obtained critical ratio of the differences between the means of Group I was 3.44 (significant at $p < .01$) which indicates that there were significant differences between the means of the two sets of scores in Group I. In other words, this shows that the subjects could score higher on the multiple-choice structure test than on the cloze test when they took the former test first and the latter second.

In addition, the critercal ratio of the differences of the means of the cloze test and the multiple-choice structure test was 8.05 (significant at $p < .01$). This indicates that there were significant differences between the two sets of scores in Group II. In other words, it shows that the subjects could score higher on the multiple-choice structure test than on the cloze test, regardless of the order in which they took the tests.

The results of these calculations confirm clearly that the subjects in both groups could score higher on the multiple-choice structure test than could they on the cloze test, no matter what types of the tests were taken first. This evidence further supports the hypothesis that there was no order effect on the subjects' scores on taking the two tests in different orders. Thus, the second hypothesis is strongly and clearly accepted, when the results of the correlation differences and the means differences are considered.

Table VII

Mean Differences between the MC and CL Tests in Group I and Group II

Group	Statistic	MC	CL	Diff.	t
I(N = 100)	Means	35.87	27.73	5.47	2.58*
II(N=100)	Means	32.84	24.46	13.04	2.58*

*The differences were significant at $p < .01$.

V. Calculating for Sex Effect on the Test Scores.

The author then wanted to determine if sex differences effect the subjects' scores significantly on performing the multiple-choice structure test or the cloze test. Therefore t-tests were employed four times to determine the differences between the means of the scores performed by both sexes on each test.[6] The differences along with other basic data used for calculating are provided in TableVIII

[6] L. Saiyote, *ibid.*, p. 215.

The t-test utilized in this calculation is:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Where :

$\bar{X}_1$ = the mean of first group (female)

$\bar{X}_2$ = the mean of second group (male)

s_1^2 and s_2^2 = the variances of samples group 1 and 2

n_1 and n_2 = number of samples, femal and male.

(For actual calculations, refer to Appendix B)

Table VIII

Mean Differences between the Scores of Both Sexes on Performing MC and CL Tests in Both Groups

Group	Sex	Test	Statistic	MC	CL	Diff.	t
I (M=66)	M	MC	Means	33.60		3.44	2.58*
(F=34)	F		Means	40.26			
	M	CL	Mean		25.77	1.63	
	F		Mean		31.52		2.58**
II (M=54)	M	MC	Mean	31.88		8.05	2.58*
(F=46)	F		Mean	45.94			
	M	CL	Mean		20.00	8.28	2.58*
	F		Mean		33.11		

*Differences significant at $p < .01$
**Differences not significant at $p < .01$

It was therefore determined that, for Group I, there were significant differences between the means of the multiple-choice structure test performed by the male and the female subjects. (Significant at $p < .01$ and C.R. = 3.44) This indicates that the female subjects could score significantly higher on the multiple-choice structure test than could the male subjects, when both sexes took the multiple-choice structure test first.

However, in Group I, it was found that there was no significant (at $p < .01$ and C.R. = 1.63) difference between the means of the cloze test scores performed by the male and female subjects. This indicates that the male subjects could score as well as could the female subjects on performing the cloze test taken after the multiple-choice structure test. Psychologically, this finding seems reasonable, because the male subjects would perform the cloze test more carefully than they did on the multiple-choice structure test when they knew that they could not perform well. In other words, the reason might lie in the eagerness of the male subjects during the interval period to study harder because they were told on the first administration that there would be another test of structure in the following week. It also might be possible that the male subjects were told by more of their friends in Group II who took the cloze test first, what the cloze test was like. They, as a result, would study harder because their class teachers told them that the scores from both administrations would be counted as mid-term test scores.

For Group II, it was found that there were significant differences at $p < .01$ and C.R. = 8.05 between the means of the cloze tests scores performed by the male and female subjects. This indicates that the female subjects could score significantly higher than could the male subjects on the multiple-choice structure test taken after the cloze test.

In addition, it was also found that there were significant differences (at $p < .01$ and C.R. = 8.28) between the means of the cloze scores performed by the male and female subjects. This indicates that the female subjects could score significantly higher than could the male subjects on the cloze test taken first.

As a whole, it can be concluded that the female subjects could score significantly higher than could the male subjects on performing the multiple-choice structure test, both before or after the cloze test, and the female subjects could score significantly higher on the cloze test taken before the multiple-choice structure test than could the male subjects. The male subjects, however, could score as well as the female subjects only on the cloze test taken after the multiple-choice structure test. The main reason might lie in the eagerness of the male subject to perform better on the cloze test for the sake of good marks which would be counted as mid-term test scores. Thus, these results indicate that only a part of third hypothesis (The differences between sexes does not effect on the multiple-choice structure test or the cloze test scores) is accepted, and parts of it are rejected.

VI. Establising a Frame of Reference.

The multiple-choice structure test scores were then corrected for guessing. These calculations were based upon the assumption that a subject's raw score was made up of two components, the number of items on which he knew the correct answers, and the number of items on which he guessed correctly. It was also assumed that, because there were four alternatives in each item, he could have guessed correctly on one-fourth of the items for which he did not know the correct answer. So the multiple-choice scores were corrected by the following formula:[7]

$$X_c = R - \frac{W}{C - 1}$$

Where :

X_c = corrected score

R = number of correct answers

W = number of wrong answers

C = number of choices in each item

(For actual calculations, see Appendix B)

The corrected multiple-choice scores and the original multiple-choice scores were changed into percentage scores at five percent intervals from 30 percent through 100 percent. These sets of data were then entered into a regression equation to calculate the most probable multiple-choice scores in terms of cloze scores. These are presented in Table IX.

The regression equation utilized in this calculation is:[8]

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[7] F.B. Davis, Educational Measurements and Their Interpretation, (Calif:Wadsworth Co., 1966), p.79.

[8] L. Saiyote, ibid., p.225.

$$Y = r_{xy} \frac{s_y}{s_x} (X - \bar{X}) + \bar{Y}$$

Where : Y = predicted cloze score

$\bar{Y}$ = mean of the obtained cloze scores

X = raw score or corrected score on multiple-choice test

$\bar{X}$ = mean of the raw or corrected multiple-choice scores

r_{xy} = correlation coefficient

s_x and s_y = standard deviations of X and Y

(For actual calculations,refer to Appendix B)

Table IX

Equivalent Multiple - choice and Cloze Scores

Multiple-choice Structure Scores			Cloze Scores	
Percentage	Raw	Corrected	Percentage	Raw
30	22	4	21	14
35	26	10	27	18
40	30	15	32	22
45	34	20	36	26
50	37	24	40	29
55	41	30	46	32
60	45	35	51	36
65	49	40	55	39
70	52	44	60	42
75	56	50	65	46
80	60	55	70	50
85	64	60	74	54
90	67	64	79	57
95	71	70	85	61
100	75	75	89	65

*The standard error of regression coefficient is 10.68

This table shows that, if a subject obtained a 30 percent score on the multiple-choice structure test, he could obtain a 21 percent score on the cloze test, or a 22 raw score, or a 4 corrected score on the multiple-choice test, or a 14 raw score on the cloze test. In the same way, if a subject obtained a 32 percent score, or a 22 raw score on the cloze test, he could obtain a 40 percent score, or a 30 raw score, or a 15 corrected score on the multiple-choice test. In other words, it was found that the multiple-choice scores of 30, 40, 50 and 60 percents for examples, are comparable to 21, 32, 40 and 52 percents on the cloze test scores, and vice versa.

This frame of reference would be very useful for English teachers, especially those who are teaching in Nakornsawan Teachers' College at the Certification of Education Level, or those who are teaching at the same level and have their subjects under similar conditions.