



## University of Canberra

This thesis is available in print format from the University of Canberra Library.

**If you are the author** of this thesis and wish to have the whole thesis loaded here, please contact the University of Canberra Library at *e-theses@canberra.edu.au* Your thesis will then be available on the www providing greater access.

SIMULTANEOUS AND SUCCESSIVE SYNTHESIS IN YOUNG CHILDREN :  
THEIR RELATIONSHIPS WITH SOME EARLY SCHOOL PERFORMANCES

by

KATHY GRABHAM

A Field Study Report Submitted  
in Partial Fulfilment of the  
Requirements for the Degree of  
Master of Education in the  
Canberra College of Advanced  
Education.

November 1980

## ACKNOWLEDGEMENT

*I would like to acknowledge the help received from the Centre for Behavioural Studies at the University of New England in allocating computer time. I would also like to offer thanks to my Supervisor, Wayne Ransley, for his patience, guidance and advice.*

## ABSTRACT

Modes of information processing were examined for 91 subjects aged between 5 years 7 months and 6 years 3 months, using A.R. Luria's model of brain function as the theoretical basis of the study. A factor analysis of the results of six psychometric tests administered to all subjects indicated the presence of two distinct factors. These were hypothesised to represent the separate contributions of simultaneous and successive synthesis. Further separate factor analyses, of the six psychometric tests and tests of M-Space (derived from the work of R. Case) and tests of standard school assessment tasks (that were also administered to the subjects), were performed. The results indicated that although both modes of synthesis are available to children of this age, simultaneous synthesis is not a potent factor in school learning.

A further exploratory study was carried out using the same 91 subjects. Subjects were given a series of verbal subtraction problems requiring understanding of mathematical relationships, and randomly assigned to two presentation groups. One group received pictorial information in addition to the verbal presentation. The other group received concrete materials. A multiple regression analysis was performed on the whole group using factor scores for simultaneous and successive syntheses (derived from the factor analysis of the six psychometric tests) as independent variables and criterion test scores for the verbal subtraction problems as the dependent variable. The analysis indicated that although neither aptitude for successive synthesis nor aptitude for simultaneous synthesis had predictive value for this kind of problem solving, simultaneous synthesis was possibly the predominant mode of information processing. Further multiple regression analyses performed on each of the presentation groups indicated an interaction between successive synthesis and the modes of presentation of information. Due to the small numbers of subjects in each presentation group this result was inconclusive.

## CONTENTS

	Page
Abstract	<i>iii</i>
Acknowledgement	<i>iv</i>
 <u>CHAPTERS</u>	
1. INTRODUCTION : DESCRIPTION OF TERMS : CHAPTER SEQUENCE	1
. Description of Terms	3
. Chapter Sequence	4
 2. THEORETICAL BACKGROUND TO THE STUDY	 6
 3. A.R. LURIA'S MODEL OF BRAIN FUNCTION	 16
. Description	16
. The Second Unit	17
. Language Development and Luria's Model	22
. Research Based on Luria's Model of Brain Functioning	25
 4. AN EMPIRICAL INVESTIGATION OF THE MODEL	 31
. Experimental Design	31
. Psychometric Tests	32
. Statistical Analysis	33
. Tests of M-Space	35
. Tests Involving Standard School Tasks	39
. Conclusion	42

LIST OF TABLES

	Page
TABLE 1	
. Factor Analysis 1	35
TABLE 2	
. Factor Analysis 2	38
TABLE 3	
. Factor Analysis 3	40
TABLE 4	
. Factor Analysis 4	41
TABLE 5	
. T-test	52
TABLE 6	
. Multiple Regression Analysis 1	53
TABLE 6	
. Multiple Regression Analyses 2 & 3	55

LIST OF FIGURES

	Page
FIGURE 1	
. Interaction Between Units of Brain Function	17
FIGURE 2	
. Relationships between And Functions of the Zones of the Second Unit	21
FIGURE 3	
. Mr Potato Man	36

<u>Contents</u>	Page
5. AN EXAMINATION OF COMPREHENSION IN MATHEMATICAL RELATIONSHIPS	44
. Verbal Subtraction Problems : Variables in Information Processing	44
. Reasons for the Exploratory Study	48
. Testing Procedure	49
. Test Score Results : Statistical Analyses	52
. Summary of Results	58
6. SUMMARY AND IMPLICATIONS OF THE STUDY	59
. Some Aspects of the Theoretical Basis of this Study	59
. A Summary of Results and Further Discussion	60
. A Discussion of the Education Implications of the Study and Suggestions for Further Research	63
APPENDIX A	67
. Examiner's Instruction Sheet : Order of Test Presentation	68
APPENDIX B	69
. Examiner's Instructions	70 & 71
. Sample Matrix Booklet	72 & 73
. Score Sheet	74
APPENDIX C	75
. Examiner's Instructions	76 & 77
. Scoring Procedure	78
. Score Sheets	79 & 80
APPENDIX D	81
. Fact Test	82 & 83
. Numbers and Numerals	84 & 85
. Subtraction Problems	86 - 94
BIBLIOGRAPHY	95 - 102