http://researchspace.auckland.ac.nz

ResearchSpace@Auckland

Copyright Statement

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

This thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- Any use you make of these documents or images must be for research or private study purposes only, and you may not make them available to any other person.
- Authors control the copyright of their thesis. You will recognise the author's right to be identified as the author of this thesis, and due acknowledgement will be made to the author where appropriate.
- You will obtain the author's permission before publishing any material from their thesis.

To request permissions please use the Feedback form on our webpage. http://researchspace.auckland.ac.nz/feedback

General copyright and disclaimer

In addition to the above conditions, authors give their consent for the digital copy of their work to be used subject to the conditions specified on the Library Thesis Consent Form.

Growth and Development of Intellectually Handicapped Children

by
Margaret R Sims

October 1982

A thesis presented to the Department of Anthropology, Auckland University for the degree of Doctor of Philosophy

UNIVERSITY OF AUCKLAND LIBRARY
THESIS
83-122
cop. 2.

FORRESTERS LAW: In a complex social system, the obvious, commonsence solution to a problem will turn out to be wrong most of the time.

ACKNOWLEDGEMENTS

I owe many people thanks for their help with this research. First I would like to thank the New Zealand Society for the Intellectually Handicapped for their permission to work in several of their Preschool/Special Care Centres. The staff at these Centres were always obliging and prepared to spend time to assist me. I would like to thank them all. To the parents of all the children I also present my thanks. They all expressed keen interest in the study and were prepared to spend time with me every assessment when I needed them. To the children themselves I give a big vote of thanks. They welcomed me back each time with a smile.

I would like to thank my supervisors, Dr G Bridgman and Dr G Tunnell. They both worked very hard to help get this thesis into its final form. To Geoff especially I want to say thanks for all the over-time put in.

The statistical analyses in this thesis were only possible because of clear and patient advise from Mr Steve Black. I want to thank you Steve, for all the time you spent advising and teaching me the correct way to approach statistics. I also owe thanks to the staff of the Computer Centre. Without their help I would never have been able to cope with all the computing in this thesis. I would specially like to thank Mr Russell Fulton for his patient help with my computing problems.

I thank Mr Marc Rackley who wrote the programme to convert the raw nutrition data into nutrient intakes per day. Thank you Marc. You did a job for me that I could never have done myself and I appreciate that.

I would also like to thank Mr Reg Croawell who kindly donated the paper for this thesis. Your support was greatly appreciated Reg.

ABSTRACT

There have been no studies in New Zealand designed to investigate the effectiveness of the major "systems-based" intervention programme available for intellectually handicapped children; the service offered by the New Zealand Society for the Intellectually Handicapped. The Society does not have a standardised programme running in all its Preschool/Special Care Centres throughout the country. However, the Auckland branch developed a formalised approach to programming and teaching in 1979. This study attempted to determine the effectiveness of this new approach in terms of the children it was designed to benefit. It was found that children attending Auckland Preschool/Special Care Centres did show greater rates of progress than children attending Preschool/Special Care Centres outside Auckland for a variety of different skills. For Downs Syndrome children these were self-help, cognitive and language skills. For motor-delayed multihandicapped children the skills were selp-help and language. These differences persisted when differences between the social and environmental backgrounds of the children from Auckland and outside Auckland were controlled for.

It was also found that Downs Syndrome, motor-delayed multihandicapped and normal children showed different rates of progress for motor, socialisation, cognitive/academic and language skills. Rates of progress were not different for self-help skills although the absolute level of achievement was significantly different for the three poulations.

The three groups of children showed different rates of growth in a variety of physical measurements, and different absolute sizes in several others. Downs Syndrome children have shorter limbs than either of the other two groups of children. They also have the narrowest jaws and a small thorax. Motor-delayed multihandicapped children have the smallest limb diameters but have the longest faces.

Downs Syndrome, motor-delayed multihandicapped and normal children differ in several ways in their social and environmental backgrounds. Parents of Downs Syndrome children are older than parents of the other two groups. Mothers of intellectually handicapped chidlren are less likely to have a job than mothers of normal children. Different health records are evident between the three populations. Normal children tend to be seen as more healthy by their parents. Intellectually handicapped children tend to have less ascorbic acid in their diet than normal chldren.

Downs Syndrome children are more susceptible to minor environmental fluctuations than motor-delayed multihandicapped or normal children. The cumulative effect of this hostile environment can be seen in their short stature and smaller overall body dimensions compared to normal children.

Motor-delayed multihandicapped children do not show the same reaction to the environment as Downs Syndrome children. In this more severely handicapped group, the effect of the motor and intellectual handicap over-rides any effect the environment might have. However, nutritional intake is closely related to physical growth in these children. This is because in most cases exercise does not mediate between nutritional intake and physical growth.

* * * * * * * * * * *

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION 1
1.1 THE NEW ZEALAND SOCIETY FOR THE INTELLECTUALLY HANDICAPPED. 1
1.1.1 Preschool/Special Care Centres 4
1.2 GROWTH AND DEVELOPMENT OF THE INTELLECTUALLY HANDICAPPED. 6
1.2.1 Downs Syndrome 8
1.2.2 Motor-delayed multihandicapped 12
1.2.3 Normal children. 13
1.3 RELATIONSHIP BETWEEN PHYSICAL AND MENTAL GROWTH. 14
1.4 SOCIAL, ENVIRONMENTAL AND NUTRITIONAL INFLUENCES. 16
1.5 ORGANISATION OF THESIS 17

CHAPTER 2

DATA COLLECTION. 19
2.1 THE SAMPLE 19
2.2 THE ANTHROPOMETRIC MESUREMENTS 23
2.2.1 Growth and normal children 25
2.3 THE PSYCHOLOGICAL ASSESSMENTS. 31
2.3.1 IQ tests and normal children 37
2.4 THE QUESTIONAIRE DATA. 39
2.4.1 The growth questionnaire 39
2.4.2 The Interview Questionnaire. 40
2.4.3 The Preschool/Special Care Centre Questionnaire. 42

CHAPTER 3

SOCIAL/ENVIRONMENTAL INFLUENCES ON GROWTH AND DEVELOPMENT. 44
3.1 INTRODUCTION 44

3.2 BIOLOGICAL AND SOCIAL VARIABLES. 44
3.2.1 Birth order and family size. 44
3.2.2 Birth weight and gestation 46
3.2.3 Parents' heights and weights 48
3.2.4 Parental ages. 50
3.2.5 Socioeconomic Status 51
3.2.6 Demographic Patterns 55
3.2.7 The effect of biological/social variables on growth and development. 63

3.3 HEALTH 73
3.3.1 Introduction 73
3.3.2 Demographic patterns 73
3.3.3 Relationship of health to growth and development. 74

3.4 MOTHERS' AGE AT MENARCHE 80
3.4.1 Introduction 80
3.4.2 Demographic patterns 81
3.4.3 Relationship between mothers' age at menarche and growth and development. 81

3.5 CONCLUSIONS. 83

CHAPTER 4

NUTRITION. 87
4.1 INTRODUCTION 87

4.2 SOCIOECONOMIC PATTERNS IN FOOD CONSUMPTION 89
4.2.1 Analyses 92
4.2.2 Results and Discussion 92

4.3 COMPARISON WITH OTHER NUTRITIONAL STUDIES. 104
4.3.1 Results and Discussion 105

4.4 POPULATION DIFFERENCES IN NUTRITION. 108
4.4.1 Analysis 109
4.4.2 Results and Discussion 109

4.5 ANTHROPOMETRY AND NUTRITIONAL STATUS 117
4.5.1 Analysis 118
4.5.2 Results and Discussion 119

4.6 CONCLUSIONS. 127

CHAPTER 5

PRESCHOOL/SPECIAL CARE SERVICE 133
5.1 INTRODUCTION 133

5.2 ANALYSES 140

5.3 RESULTS AND DISCUSSION 141

5.4 CONCLUSIONS. 150

CHAPTER 6

DATA REDUCTION 152
6.1 THE SUBSAMPLES 154
6.1.1 Method 154
6.1.2 Conclusions. 162

6.2 PRINCIPAL COMPONENTS ANALYSIS. 163
6.2.1 Birth. 163
6.2.2 Schooling. 164
6.2.3 Socioeconomic Status 166
6.2.4 Nutrition. 167
6.2.5 Health 167

6.3 REGRESSION 169
6.3.1 Regression 1 170
6.3.2 Regression 2 172

6.4 COVARIATES 175

CHAPTER 7

AUCKLAND VS OUTSIDE AUCKLAND PRESCHOOL SPECIAL CARE CENTRES 177

7.1 ANALYSES 177

7.2 DOWNS SYNDROME 180

7.3 MOTOR-DELAYED MULTIHANDICAPPED 197

7.4 CONCLUSIONS. 200

CHAPTER 8

DOWNS SYNDROME VS MOTOR-DELAYED MULTIHANDICAPPED VS NORMAL 202

8.1 ANALYSES 202

8.2 PSYCHOLOGICAL VARIABLES. 204

8.3 PHYSICAL GROWTH. 211

8.3.1 Body bulk measurements 211

8.3.2 Body length measurements 224

8.3.3 Leg measurements 229

8.3.4 Arm measurements 238

8.3.5 Head measurements. 239

8.3.6 Facial measurements. 240

8.4 CONCLUSIONS. 241

CHAPTER 9

THE RELATIONSHIP BETWEEN PHYSICAL GROWTH AND MENTAL DEVELOPMENT 244

9.1 ANALYSES 244

9.2 RESULTS AND DISCUSSION 245

9.2.1 Body bulk. 247

9.2.2 Body length. 247

9.2.3 Arm measurements 248

9.2.4 Leg measurements 250

9.2.5 Face measurements. 251

9.2.6 Head measurements. 251

9.3 CONCLUSIONS. 252

CHAPTER 10

CONCLUDING REMARKS 254

APPENDIX 1: THE QUESTIONNAIRES 269

APPENDIX 2: THE DATA 281

APPENDIX 3: THE ANTHROPOMETRIC MEASUREMENTS. 299

APPENDIX 4: OUTSIDE AUCKLAND QUESTIONNAIRE 304

BIBLIOGRAPHY 305

* * * * * * * * * *

TABLES

Table 2.1 Comparison of normal sample with Auckland standards. 26
Table 2.2 Comparison of New Zealand standards with school-aged children from this study 30
Table 2.3 Correlations between the tests 37
Table 2.4 Correlation coefficients between test/retest for nutrition variables 42
Table 3.1 Family size in precentages 56
Table 3.2 Birth order (sibrank) in percentages 57
Table 3.3 Birth weight and gestation in percentages 57
Table 3.4 Problems of pregnancy or birth in percentages 57
Table 3.5 Parental factors . . . . . .
Table 3.6 Socioeconomic Status in percentages. 60
Table 3.7 Education of parents by population in percentages 61
Table 3.8 Income of parents in early 1979 in percentages. 62
Table 3.9 Standardised regression coefficients 65
Table 3.10 Health ratings in percentages 75
Table 3.11 Standardised discriminant coefficients for function 1: health rating and psychological test scores. . . . 77
Table 3.12 Means of variables within each health category. 77
Table 3.13 Standardised discriminant function coefficients for function 1: health category and physical variables 78
Table 3.14 Means of variables within each health category. 78
Table 3.15 Age of mother at menarche 81
Table 3.16 Standardised discriminant coefficients for function 1: mothers age at menarche and the psychological test scores. . . . 82

Table 3.17 Standardised discriminant coefficients for function 1: mothers age at menarche and the physical variable set. . . . 82
Table 4.1 Foods which showed socioeconomic differences in normal children and either of the intellectually handicapped groups (in %) 93
Table 4.2 Foods which showed socioeconomic differences only for normal children (in %). 96
Table 4.3 Foods which showed socioeconomic differences in both intellectually handicapped groups but not for normal children (in %). 97
Table 4.4 Foods in which only motor-delayed multihandicapped children show socioeconomic differences (in %) 98
Table 4.5 Foods for which Downs Syndrome children only show socioeconomic differences (in %). . . 99
Table 4.6 Comparison of nutrition information from various studies. 107
Table 4.7 Compariosn of nutrient intake. 110
Table 4.8 Discriminant results for high and medium intake of nutrients for Downs Syndrome. 120
Table 4.9 Discriminant results for high and medium intake of nutrients for motor-delayed multihandicapped 122
Table 4.10 Discriminant results for high and medium intake of nutrients for normal children 124
Table 5.1 Discriminant function coefficients 142
Table 5.2 Means of variables important in discrimination. 143
Table 5.3 Pupil/teacher ratios 146
Table 6.1 Variables in groupings 155
Table 6.2 Chi-square and significance for discriminant function 157
Table 6.3 Means of variables in significant discriminations. 158
Table 6.4 Chi-squared and significance for discriminant function. 160
Table 6.5 Means for variables significant in the discrimination 161

Table 6.6 Means for variables in significant discrimination 162
Table 6.7 Principal components for birth 164
Table 6.8 Principal components for schooling 165
Table 6.9 Principal components for socioeconomic status . . .166
Table 6.10 Principal components for nutrition. 167
Table 6.11 Principal components for health 168
Table 6.12 Anthropometric categories 169
Table 6.13 Regression 1 results. 171
Table 6.14 Regression 2 results. 173
Table 7.1 ANOVA Table for Bayley/Stanford-Binet. . . .180
Table 7.2 ANOVA Table for Motor. 181
Table 7.3 ANOVA Table for Self-help. 182
Table 7.4 ANOVA Table for Socialisation. 183
Table 7.5 ANOVA Table for Cognitive. 184
Table 7.6 ANOVA Table for Language 191
Table 7.7 ROP's and DQ's for Downs Syndrome. 191
Table 7.8 Apetite ratings for the 12 Downs Syndrome children. In % 194
Table 7.9 Eating problems for 12 Downs Syndrome. In % 195
Table 7.10 ANOVA Table for MDMH Bayley 196
Table 7.11 ANOVA Table for MDMH Motor. 197
Table 7.12 ANOVA Table for MDMH Self-help. 197
Table 7.13 ANOVA Table for MDMH Socialisation. 198
Table 7.14 ANOVA Table for MDMH Cognitive. 198
Table 7.15 ANOVA Table for MDMH Language 199
Table 7.16 ROP's and DQ's for motor-delayed multihandicapped 199
Table 8.1 age means for the 3 populations. 203
Table 8.2 ANOVA Table for Bayley/Stanford-Binet. . . .204
Table 8.3 ANOVA Table for motor skills 204
Table 8.4 ANOVA Table for self-help skills 205
Table 8.5 ANOVA Table for socialisation skills 205
Table 8.6 ANOVA Table for cognitive skills 206
Table 8.7 ANOVA Table for language skills. 206
Table 8.8 DQ's and ROP's 207
Table 8.9 ANOVA Table of body bulk 212

Table 8.10 Means for body bulk 216
Table 8.11 Means for body lengths. 216
Table 8.12 ANOVA Table of body lengths 217
Table 8.13 Means for arm measurements. 220
Table 8.14 ANOVA Table of leg measurements 221
Table 8.15 Means for leg measurements. 224
Table 8.16 ANOVA Table of arm measurements 225
Table 8.17 Correlation of covariates with wrist breadth. 229
Table 8.18 ANOVA Table of head measurements. 230
Table 8.19 Means for head measurements 232
Table 8.20 ANOVA Table of facial measurements. 233
Table 8.21 Means for facial measurements 237
Table 9.1 F-values for ANCOVA with physical measurements as covariates. 246
Table 9.2 ANOVA Table for arm measurements with self-help skills 249
Table 9.3 Correlation of individual arm measurements with self-help skills. 249

* * * * * * * * * * *

TABLE OF FIGURES

Fig 2.1 Age by IQ. 35
Fig 4.1 Calories 111
Fig 4.2 Proteins 111
Fig 4.3 Riboflavin 113
Fig 4.4 Ascorbic Acid. 113
Fig 4.5 Vitamin A. 115
Fig 4.6 Calcium. 115
Fig 7.1 Downs Syndrome cognitive scores. 185
Fig 7.2 Downs Syndrome language scores 185
Fig 7.3 Downs Syndrome self-help scores. 187
Fig 7.4 Motor-delayed multihandicapped self-help scores 187
Fig 7.5 Motor-delayed multihandicapped cognitive scores 189

* * * * * * * * * *