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Factors Associated with Cognitive Ability in Middle Childhood

Volume 1

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Abstract

There has been considerable debate among cognitive psychologists and epidemiologists regarding which determinants of children’s intelligence are most important. Factors such as children’s diet, maternal stress and social support are important for general health and wellbeing, but have received little research attention in longitudinal studies involving cognitive outcomes. Few studies have examined the determinants of intelligence in children born small-for-gestational age (SGA) at term even though these children may be particularly vulnerable to poorer postnatal environments. The aim of this study was to identify factors associated with cognitive ability in middle childhood in New Zealand (NZ) European children and children born SGA.

The present research was conducted as part of the Auckland Birthweight Collaborative (ABC) study. Approximately half of the children in this study were born SGA (birthweight≤10th percentile) and half were born appropriate-for-gestational age (AGA=birthweight>10th percentile). Information was collected from mothers and children on pregnancy, obstetric, socio-demographic, postnatal and dietary factors when the children were born (n=871), at one year (n=744), 3.5 years (n=550), and 7 years of age (n=591). Cognitive ability was assessed at 7 years using the Wechsler Intelligence Scale for Children – Third Edition. For the total sample, the analyses utilised weighting to allow for the disproportionate sampling of children born SGA.

Results showed that SGA and AGA children did not differ in intelligence at 7 years. Factors associated with intelligence included maternal pregnancy factors (e.g. hypertension), socio-demographic factors (e.g. paternal education), and postnatal factors (e.g. maternal social support). In general, the effects of environmental factors did not differ significantly for SGA children compared with AGA children.

A number of dietary factors were also found to be significantly and positively associated with intelligence measures including higher intakes of breads and cereals and weekly fish consumption. In contrast, daily margarine consumption was associated with significantly lower intelligence scores, particularly in SGA children, and this is the first study to report this association.
Dietary and “environmental” factors were stronger predictors of children’s intelligence in middle childhood than “biological” factors, such as infant’s birthweight. Importantly, most of the factors associated with intelligence that were identified in this study are potentially modifiable. Further research is needed to examine whether these factors continue to be associated with cognitive ability in later childhood.
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# Table of Contents

Abstract............................................................................................................................. ii  
Acknowledgments ........................................................................................................... iv  
List of Appendices........................................................................................................... x  
Abbreviations ................................................................................................................... xi  

1  Introduction............................................................................................................... 1  
1.1  Background and Aims ...................................................................................... 1  
1.2  Terminology ...................................................................................................... 3  
1.3  Structure of the Thesis ...................................................................................... 4  

2  Review of Factors Associated with Intelligence....................................................... 6  
2.1  Small-for-gestational Age (SGA) .................................................................... 6  
2.1.1  Defining SGA and Related Birth Outcomes ............................................. 6  
2.1.2  Aetiology and Risk Factors of SGA ......................................................... 8  
2.1.3  Studies of SGA Children Aged Less than Two Years ......................... 9  
2.1.4  Studies of SGA Children Older than Two Years of Age ................... 10  
2.1.5  SGA Status, Environment and Cognitive Ability .............................. 12  
2.2  Pregnancy and Obstetric Factors .................................................................... 13  
2.2.1  Maternal Age .......................................................................................... 13  
2.2.2  Maternal Pregnancy Hypertension......................................................... 16  
2.2.3  Maternal Pregnancy Iron Status.............................................................. 19  
2.2.4  Maternal Substance and Drug Use during Pregnancy ....................... 21  
2.2.5  Gender ..................................................................................................... 30  
2.2.6  Gestational Age ....................................................................................... 33  
2.2.7  Delivery Method ..................................................................................... 34  
2.3  Socio-demographic Factors ............................................................................. 35  
2.3.1  Socioeconomic Status and Parental Education .................................... 35  
2.3.2  Maternal Marital Status ......................................................................... 44  
2.3.3  Birth Order .............................................................................................. 47  
2.4  Postnatal Factors .............................................................................................. 51  
2.4.1  Maternal Stress ....................................................................................... 51  
2.4.2  Maternal Social Support .......................................................................... 55  
2.4.3  Breastfeeding .......................................................................................... 57  
2.4.4  Pacifier Use ............................................................................................. 62
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4.5</td>
<td>Developmental Delay</td>
<td>63</td>
</tr>
<tr>
<td>2.4.6</td>
<td>Iron Status</td>
<td>68</td>
</tr>
<tr>
<td>2.5</td>
<td>Dietary Factors</td>
<td>74</td>
</tr>
<tr>
<td>2.5.1</td>
<td>Dietary Measures</td>
<td>74</td>
</tr>
<tr>
<td>2.5.2</td>
<td>Diet and Cognitive Ability</td>
<td>77</td>
</tr>
<tr>
<td>2.5.3</td>
<td>Micronutrients and Cognitive Ability</td>
<td>81</td>
</tr>
<tr>
<td>2.6</td>
<td>Summary of factors</td>
<td>85</td>
</tr>
<tr>
<td>2.6.1</td>
<td>Factors that are well established</td>
<td>85</td>
</tr>
<tr>
<td>2.6.2</td>
<td>Factors that are equivocal</td>
<td>86</td>
</tr>
<tr>
<td>2.6.3</td>
<td>Factors to be explored in depth in this thesis</td>
<td>88</td>
</tr>
<tr>
<td>2.7</td>
<td>Study hypotheses</td>
<td>88</td>
</tr>
<tr>
<td>3</td>
<td>Theories of Intelligence</td>
<td>90</td>
</tr>
<tr>
<td>3.1</td>
<td>History of Intelligence Testing</td>
<td>90</td>
</tr>
<tr>
<td>3.2</td>
<td>Definitions of Intelligence and IQ</td>
<td>92</td>
</tr>
<tr>
<td>3.3</td>
<td>Limitations of IQ Testing</td>
<td>93</td>
</tr>
<tr>
<td>4</td>
<td>Cognitive Development Theories</td>
<td>95</td>
</tr>
<tr>
<td>4.1</td>
<td>Middle Childhood</td>
<td>95</td>
</tr>
<tr>
<td>4.2</td>
<td>Definitions of Cognition and Cognitive Development</td>
<td>96</td>
</tr>
<tr>
<td>4.3</td>
<td>Cognitive Perspective</td>
<td>96</td>
</tr>
<tr>
<td>4.3.1</td>
<td>Piaget</td>
<td>97</td>
</tr>
<tr>
<td>4.3.2</td>
<td>Limitations of Piaget’s Theory</td>
<td>98</td>
</tr>
<tr>
<td>4.3.3</td>
<td>Information-processing Theories</td>
<td>98</td>
</tr>
<tr>
<td>4.3.4</td>
<td>Neo-Piagetian Research</td>
<td>99</td>
</tr>
<tr>
<td>4.3.5</td>
<td>Biological Approaches</td>
<td>99</td>
</tr>
<tr>
<td>4.4</td>
<td>Contextual Perspective</td>
<td>101</td>
</tr>
<tr>
<td>4.4.1</td>
<td>Vygotsky</td>
<td>101</td>
</tr>
<tr>
<td>4.4.2</td>
<td>Bronfenbrenner’s Bioecological Theory</td>
<td>102</td>
</tr>
<tr>
<td>4.4.3</td>
<td>Theory of Mind</td>
<td>103</td>
</tr>
<tr>
<td>4.5</td>
<td>Summary</td>
<td>103</td>
</tr>
<tr>
<td>5</td>
<td>Methodology</td>
<td>105</td>
</tr>
<tr>
<td>5.1</td>
<td>Auckland Birthweight Collaborative Study</td>
<td>105</td>
</tr>
<tr>
<td>5.2</td>
<td>Participants</td>
<td>105</td>
</tr>
<tr>
<td>5.3</td>
<td>Study Phases</td>
<td>106</td>
</tr>
<tr>
<td>5.3.1</td>
<td>Birth Phase</td>
<td>106</td>
</tr>
</tbody>
</table>
5.3.2 1 year phase ................................................................. 107
5.3.3 3.5 Year Phase .............................................................. 107
5.3.4 7 Year Phase ................................................................. 109
5.4 Independent Variables ....................................................... 110
  5.4.1 Pregnancy and Obstetric Factors ................................. 110
  5.4.2 Socio-demographic Factors .......................................... 113
  5.4.3 Postnatal Factors ......................................................... 116
  5.4.4 Dietary Factors .......................................................... 120
  5.4.5 Confounders .............................................................. 122
5.5 Outcome Variables ............................................................ 122
  5.5.1 Stanford Binet Intelligence Scale - Fourth Edition ......... 122
  5.5.2 Wechsler Intelligence Scale for Children – Third Edition (WISC-III) 124
  5.5.3 Validity of the Wechsler Intelligence Scales for Children .... 126
  5.5.4 WISC-III Test Reliability ............................................. 128
5.6 Statistical Analyses ............................................................ 132
  5.6.1 Study Sample ............................................................ 132
  5.6.2 Statistical Analyses ....................................................... 133
6 Results .................................................................................. 136
  6.1 Participants at 7 Years ...................................................... 136
  6.2 Descriptive Intelligence Results ......................................... 136
  6.3 AGA and SGA Results ..................................................... 137
    6.3.1 AGA Descriptive Results ........................................... 137
    6.3.2 SGA Descriptive Results ........................................... 137
    6.3.3 AGA versus SGA ....................................................... 138
  6.4 Total Sample Results ....................................................... 139
    6.4.1 Pregnancy and Obstetric Factors .............................. 139
    6.4.2 Socio-demographic Factors ...................................... 144
    6.4.3 Postnatal Factors ...................................................... 148
    6.4.4 Dietary Factors ........................................................ 153
  6.5 Results of the SGA Children ............................................. 161
    6.5.1 Pregnancy and Obstetric Factors .............................. 161
    6.5.2 Socio-demographic Factors ...................................... 165
    6.5.3 Postnatal Factors ...................................................... 168
    6.5.4 Dietary Factors ........................................................ 171
6.6 Summary of factors found to be associated with intelligence at 7 years...... 178
  6.6.1 Confounders.......................................................................................... 180
  6.6.2 Interaction Analyses ............................................................................. 180
7 Discussion............................................................................................................. 183
  7.1 Strengths and Limitations of the Study......................................................... 183
  7.2 Intelligence at 7 Years .................................................................................. 184
  7.3 SGA versus AGA.......................................................................................... 185
    7.3.1 The Influence of Environment on SGA Status and Intelligence .......... 187
  7.4 Factors Associated with Intelligence ............................................................ 188
    7.4.1 Maternal Pregnancy Hypertension........................................................ 188
    7.4.2 Maternal Pregnancy Iron Status............................................................ 189
    7.4.3 Maternal Alcohol Intake in Pregnancy .................................................191
    7.4.4 Socioeconomic Status ........................................................................... 193
    7.4.5 Maternal Marital Status ........................................................................ 197
    7.4.6 Birth Order............................................................................................ 198
    7.4.7 Maternal Social Support and Perceived Stress ....................................... 200
    7.4.8 Breastfeeding ........................................................................................ 203
    7.4.9 Developmental Delay ........................................................................... 205
    7.4.10 Iron status.............................................................................................. 207
    7.4.11 Descriptive Dietary Patterns ................................................................. 209
    7.4.12 Dietary Patterns and Intelligence.......................................................... 210
  7.5 Factors not Associated with Intelligence ......................................................216
    7.5.1 Maternal Age ........................................................................................ 216
    7.5.2 Maternal Smoking during Pregnancy ................................................... 217
    7.5.3 Maternal Marijuana Use in Pregnancy ................................................. 219
    7.5.4 Gender................................................................................................... 219
    7.5.5 Gestational Age..................................................................................... 220
    7.5.6 Delivery Method.................................................................................... 220
    7.5.7 Pacifier Use........................................................................................... 220
  7.6 General Findings........................................................................................... 221
    7.6.1 The Importance of the Postnatal Environment ..................................... 221
    7.6.2 SGA Children and the Risk of Impaired Cognitive Development ..... 222
    7.6.3 Children’s Dietary Patterns................................................................. 223
8 Conclusions........................................................................................................... 224
List of Appendices

Appendix A: Auckland Birthweight Collaborative Study Birth Phase Maternal Interview Questionnaire.

Appendix B: Auckland Birthweight Collaborative Study 1 Year Phase Postal Questionnaire.

Appendix C: Auckland Birthweight Collaborative Study 3.5 Year Phase Maternal Interview Questionnaire.

Appendix D: Auckland Birthweight Collaborative Study 3.5 Year Phase Child Food Frequency Questionnaire.

Appendix E: Auckland Birthweight Collaborative Study 7 Year Phase Maternal Interview Questionnaire.

Appendix F: Auckland Birthweight Collaborative Study 7 Year Phase Child Food Frequency Questionnaire.

Appendix G: Published Paper: Dietary Patterns of New Zealand European Preschool Children.
Abbreviations

ABC study  Auckland Birthweight Collaborative study
AGA  Appropriate-for-gestational age
ASQ  Ages and Stages Questionnaire
CI  Confidence Interval
DDST  Denver Developmental Screening Test
FFQ  Food frequency questionnaire
FSIQ  Full Scale IQ
Hb  Haemoglobin
ID  Iron deficiency
IDA  Iron deficiency anaemia
IUGR  Intrauterine growth retardation
LBW  Low birthweight
LCPUFAs  Long chain polyunsaturated fatty acids
MDI  Mental Development Index
NBW  Normal birthweight
NZ  New Zealand
OPPS  Ottawa Prenatal Prospective study
PDI  Psychomotor Development Index
PEM  Protein energy malnutrition
PIQ  Performance IQ
PSS  Perceived Stress Scale
PUFAs  Polyunsaturated fatty acids
RDDST  Revised Denver Developmental Screening Test
R-PDQ  Revised Prescreening Denver Questionnaire
RDW  Red cell distribution width
SES  Socioeconomic status
SGA  Small-for-gestational age
UK  United Kingdom
US  United States of America
VIQ  Verbal IQ
WISC  The Wechsler Intelligence Scale for Children
WISC-R  The Wechsler Intelligence Scale for Children – Revised
WISC-III  The Wechsler Intelligence Scale for Children – Third Edition
WPPSI  The Wechsler Preschool and Primary Scale of Intelligence