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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 $\leq 10^{\text{th}}$ percentile) and half were born appropriate-for-gestational age (AGA = birthweight $> 10^{\text{th}}$ 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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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