

## 200P GENES AND ENVIRONMENT IN THE TRACKING OF BODY SIZE FROM BIRTH TO LATE ADOLESCENCE

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**Background.** Body size has been shown to track from birth to adulthood, but it is not known, whether this tracking is due to genetic or environmental effects.

**Purpose.** 1) To study the patterns of the genetic/environmental architecture on relative weight at birth and in late adolescence, and 2) to estimate the effects of marked discordance in body size at birth on the final size in twins with similar genetic background (monozygotes).

**Subjects.** A nationally representative sample of Finnish twins (born 1975–1979) with 702 monozygotic (MZ), 724 same-sex dizygotic (SSDZ), and 762 opposite-sex dizygotic (OSDZ) pairs.

**Methods.** Mailed questionnaires: birth length, weight, and gestational age reported by parents, self-reported height and weight from 16 to 18 y. Measures of relative weight: Ponderal index (PI, kg/m<sup>3</sup>) at birth and body mass index (BMI, kg/m<sup>2</sup>) in adolescence.

**Results:** 1) Twin structural equation (bivariate) modelling revealed that most of the variance of PI was explained by (prenatal) environmental (shared: 17–42% and non-shared: 38–40%) effects, whereas most of the variance of BMI was attributable to genetic effects (84–90%). Correlations between the genetic and environmental effects on PI and those on BMI were small (0.1–0.2), but overall, 67–84% of the phenotypic covariation between PI and BMI was explained by genes. 2) Fetal environmental constraints leading to differences in birth size in MZ twins affected especially the development of height, and, to a smaller degree, that of BMI.

**Conclusions.** Heritability of relative weight increases with age, and most of the genetic and environmental effects differ pre- and postnatally. However, enduring effects of fetal environment were displayed irrespective of the genetic background. These were stronger for height than for BMI, which seems to be mostly influenced by genes and postnatal behaviour and environment.

## 201S GENETICS AND COGNITIVE ABILITIES AND DISABILITIES

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At the centre of the nature-nurture debate has been cognitive abilities and disabilities. Decades of genetic research comparing identical and non-identical twins and adoption studies consistently show substantial genetic influence on cognitive abilities such as verbal and spatial abilities and on cognitive disabilities such as reading disability and dementia. Genetic research has now gone beyond simply demonstrating genetic influence to ask questions about relations between cognitive abilities, about development and about the environment. Concerning relations between cognitive abilities, genetic research has shown that the same genetic factors influence diverse cognitive abilities, suggesting that 'g' is the genetic core of cognitive abilities. A surprising developmental finding is that genetic influence on 'g' increases steadily during the life span. Research at the interface between nature and nurture shows that environmental factors that influence the development of 'g' work very differently from the way we thought they worked. An exciting new direction for genetic research is to identify some of the many genes that affect cognitive abilities and disabilities. We have conducted an initial scan of the genome using DNA pooling with two thousand DNA markers in order to find genes associated with 'g'. Scientific and social implications of finding genes for 'g' will be discussed.

## 202P TWIN BROTHERS WITH CONTINUOUS OXALURIA AND RESPIRATORY OXALOSIS

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The condition of a continuous, high urinary oxalate excretion and progressive bilateral oxalate urolithiasis and nephrocalcinosis is a widespread disturbance of St.Petersburg population. Here it is impossible to use specific adequate biochemical and enzyme observations for making diagnosis of hereditary hyperoxaluria I or II. We report on MZ twin brothers with continuous oxaluria. Proband, NN and AN, are 25 years old. Their parents are unrelated. The mother of probands, her parents and probands' father suffered from continuous oxaluria, bilateral urolithiasis and nephrocalcinosis. At birth NN weight was 2100g, his length was 42cm and AN weight was 2200g, his length was 42cm.

Now NN weight is 53kg, his length is 171cm, AN weight is 58kg, his length is 170cm. Their HLA haplotypes are A2-10B13-35. High urinary oxalate excretion was found to be from early probands' childhood. NN has all set of markers of respiratory oxalosis (G. Pospekhova et al, 1997). AN has mild signs of pulmonary disorder. Both twins have some signs of progressive oxalate urolithiasis and nephrocalcinosis but NN has more severe form of renal disease. Now NN has disability II and AN has disability III as patients with pulmonary disorder. It is obvious that this family needs specific biochemical observation.

## 203S GENETIC CORRELATION BETWEEN INSPECTION TIME AND IQ.

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Inspection time is the minimum amount of time a subject needs to make an accurate decision on an obvious stimulus, such as the discrimination between two lines. It is part of one of the first, unconscious, stages of information processing. We found a correlation of  $-0.27$  between inspection time and IQ. In order to determine whether this association is mediated by common genes or by common environmental influences, inspection time and IQ were measured in twins and their non-twin siblings. Data from 688 participants from 271 families were collected as part of a large ongoing project on the genetics of adult brain function and cognition. IQ was measured with the Dutch version of the WAIS-3R, inspection time was measured in the so-called  $\Pi$ -paradigm. Inspection time was moderately heritable (43%), whereas the heritability estimate for IQ was high (86%). The correlation between inspection time and IQ was entirely due to a common genetic factor which accounted for 14% of the total variance in IQ. Implications of the existence of a common genetic factor for inspection time and IQ are discussed in terms of a biological model. This model, derived from established theories on visual information processing, proposes that variation in inspection time is dependent partly upon variation in genetic factors that determine myelination and synaptic efficiency in the central nervous system. Thus, 14% of the interindividual variance in intelligence must be sought in those genetic factors that influence myelination and synaptic efficiency. (The financial support of HFSP grant rg0154/1998-B is gratefully acknowledged)

## 204S MEETING THE EDUCATIONAL NEEDS OF MULTIPLE BIRTH CHILDREN ON SCHOOL ENTRY

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This research is from an educational perspective, with the primary purpose of supporting multiple birth children, particularly when they start school. The research methods selected include the first national survey of schools in England and interviews with parents of multiple birth children in one Local Education Authority. The survey produced data from 3,000 schools in 73 Local Education Authorities. The sample consisted of 11, 873 twin children, 117 sets of triplets and 5 sets of quads. As only 1% of schools had a policy with regard to meeting the educational of multiple birth children and only 28% liaised with parents with regard to separation or keeping multiples together, a framework school policy and questionnaire to be completed in collaboration by teachers and parents has been devised and published on the education website ([www.twins.org](http://www.twins.org) and [multiples.org](http://multiples.org)). A theoretical model based upon the personal, social and emotional development of multiple birth children has also been developed. The model depicts the potential tension between multiple birth children of being a couple and of being an individual. It is hoped that this model will generate hypotheses and contribute to the development of educational research with regard to multiple birth children.

## 205S SEX-SPECIFIC GENETIC INFLUENCES ON THE COMORBIDITY OF ALCOHOLISM AND MAJOR DEPRESSION IN A POPULATION-BASED SAMPLE OF U.S. TWINS

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Alcoholism and depression frequently co-occur but the origins of this comorbidity remain uncertain. Most prior family, twin and adoption studies of these disorders have used cases ascertained through treatment settings, who may differ from cases in epidemiologic samples. We studied the importance of genetic influences on risk for lifetime comorbidity of major depression and alcoholism using a population-based twin sample. Lifetime major depression (MD), alcohol abuse, and alcohol dependence (AD) were assessed by structured interview for both members of 3,755 twin pairs from the Mid-Atlantic Twin Registry.