LBC1921 Christmas Newsletter

Welcome to the 2011 newsletter, and from the LBC1921 team, please accept our best wishes! We hope that you have had a good, healthy year. We would like to share with you the many things that have been happening over the past 12 months. And what a year 2011 has been for the LBC1921 study, and also for you. Many happy returns on your 90th birthday which you will have celebrated this year. It was a real pleasure seeing so many of you close to that special occasion.

As always, everything you read about in this newsletter is a result of your involvement. We hope you are interested to read more about what's been happening. If you wish to get in touch for any further information, our contact details can be found at the end of the newsletter. We are always delighted to hear from you. Thank you again for your continued participation and interest in the LBC1921 study.

A major milestone

Throughout 2011, we have been seeing many of you for the fourth time, either returning to the clinic at the Western General, or allowing Alison Pattie to visit you at home. We have been delighted by the response to this latest set of assessments. We had hoped to see 100 of you at age 90, and we will have passed this by the end of the year. In fact, we are extending the testing into next year so we can be sure to see everyone who is able.

We appreciate the time you have given to us over the years, and particularly this year, so thank you for your continued participation. The principal aim of the LBC1921 study is to find out how people maintain their health and thinking skills into old age. You have allowed us to investigate this important issue by answering our many, many questions! You can be very proud that by being part of the study you are participating in one of the longest projects of its kind: you completed the first test at 11 years old, and have then completed various tests at ages 79, 83, 87...and now 90!

For those we have still to see, you don't need to do anything at the moment, except update your address if you have moved house or are about to do so. Alison will be in touch with you very soon.

Thank you.

Latest results

2011 has been another productive year in terms of the scientific publications coming from the study. This has been made possible by the very detailed information you have provided us with over the years. A couple of the main findings from this year are summarised below, followed by a selected list of the scientific papers from throughout 2011 at the end of the

newsletter. You have directly contributed to all of them and we hope you are interested and proud to read about these latest results.

A particularly high profile paper presented the results of the genetic study which includes you (the LBC1921) and our other cohort of individuals, the group born in 1936. The paper used a new method of analysing the genetic data produced from the study and showed 40% to 50% of how people differ in thinking skills could be traced to genetic differences. The publication attracted a great deal of attention, for example you can read all about it in *The Guardian* at: www.guardian.co.uk/science/2011/aug/09/genetic-differences-intelligence?CMP=twt_gu

It became the most-viewed article on *Molecular Psychiatry's* website (the journal where the paper was published) in August, being viewed 6599 times...the next most viewed came in at 721!

If you are interested in accessing the full research paper, the reference is given below, or you can contact the research team to obtain a copy.

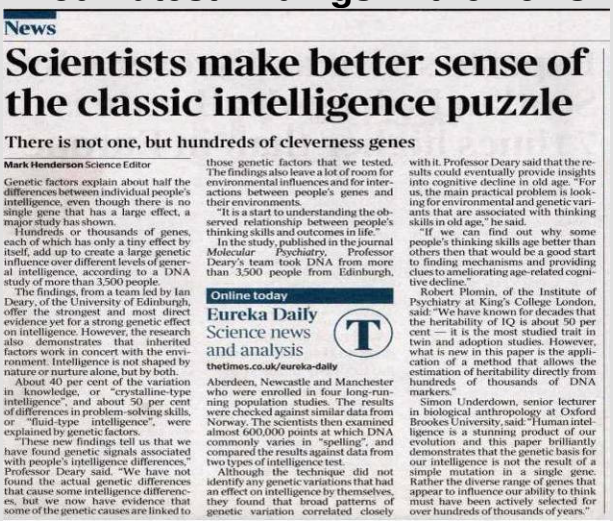
Davies, G. D. et al. (in press). Genome-wide association studies establish that human intelligence is highly heritable and polygenic. *Molecular Psychiatry*.

Another of the interesting findings from this year was produced by Dr René Mõttus. He analysed the personality questionnaires that you completed at ages 81 and 87. He reported that although as a group you generally became less extraverted and conscientious over time, for example, you were still more agreeable and conscientious than the group born in 1936. This is interesting as it supports the idea that personality is generally stable across time, but that with increasing age, any changes happen at a quicker rate. The full reference is:

Mõttus, R. et al. (in press). Personality traits in old age: Measurement and rank-order stability and some mean-level change. *Psychology and Aging*.

You can find a selected list of the other publications from this year, with short summaries, at the end of the newsletter.

Your latest findings in the news



News

Scientists make better sense of the classic intelligence puzzle

There is not one, but hundreds of cleverness genes

Mark Henderson Science Editor

Genetic factors explain about half the differences between individual people's intelligence, even though there is no single gene that has a large effect, a major study has shown.

Hundreds or thousands of genes, each of which has only a tiny effect by itself, add up to create a large genetic influence over different levels of general intelligence, according to a DNA study of more than 3,500 people.

The findings, from a team led by Ian Deary, of the University of Edinburgh, offer the strongest and most direct evidence yet for a strong genetic effect on intelligence. However, the research also demonstrates that inherited factors work in concert with the environment. Intelligence is not shaped by nature or nurture alone, but by both.

About 40 per cent of the variation in knowledge, or "crystalline-type intelligence", and about 50 per cent of differences in problem-solving skills, or "fluid-type intelligence", were explained by genetic factors.

"These new findings tell us that we have found genetic signals associated with people's intelligence differences," Professor Deary said. "We have not found the actual genetic differences that cause some intelligence differences, but we now have evidence that some of the genetic causes are linked to those genetic factors that we tested. The findings also leave a lot of room for environmental influences and for interactions between people's genes and their environments.

"It is a start to understanding the observed relationship between people's thinking skills and outcomes in life."

In the study, published in the journal *Molecular Psychiatry*, Professor Deary's team took DNA from more than 3,500 people from Edinburgh, Aberdeen, Newcastle and Manchester who were enrolled in four long-running population studies. The results were checked against similar data from Norway. The scientists then examined almost 600,000 points at which DNA commonly varies in "spelling", and compared the results against data from two types of intelligence test.

Although the technique did not identify any genetic variations that had an effect on intelligence by themselves, they found that broad patterns of genetic variation correlated closely with it. Professor Deary said that the results could eventually provide insights into cognitive decline in old age. "For us, the main practical problem is looking for environmental and genetic variants that are associated with thinking skills in old age," he said.

"If we can find out why some people's thinking skills age better than others then that would be a good start to finding mechanisms and providing clues to ameliorating age-related cognitive decline."

Robert Plomin, of the Institute of Psychiatry at King's College London, said: "We have known for decades that the heritability of IQ is about 50 per cent — it is the most studied trait in twin and adoption studies. However, what is new in this paper is the application of a method that allows the estimation of heritability directly from hundreds of thousands of DNA markers."

Simon Underdown, senior lecturer in biological anthropology at Oxford Brookes University, said: "Human intelligence is a stunning product of our evolution and this paper brilliantly demonstrates that the genetic basis for our intelligence is not the result of a simple mutation in a single gene. Rather the diverse range of genes that appear to influence our ability to think must have been actively selected for over hundreds of thousands of years."

Online today

Eureka Daily

Science news and analysis

thetimes.co.uk/eureka-daily

The report by LBC researchers about how thinking skills are influenced by genes was reported by many newspapers, including *The Times*.

Spreading the word

The LBC1921 team have been kept busy taking the latest LBC1921 results to meetings and events, in the UK and internationally. For example, Professor Ian Deary led a seminar for NHS Health Scotland which also included

presentations by Professor John Starr and Dr Alan Gow. The seminar was focussed on conveying the potential practical and policy impact of the Lothian Birth Cohort research discoveries and was attended by a range of health professionals.

In May, the team also participated in the Wellcome Trust Clinical Research Facility's Public Open Day. While Ian gave a talk summarising 12 years of collaborating with the facility, Alison and Dr Martha Whiteman manned an interactive stand allowing people to try examples of the cognitive tests that you complete. Many of you will remember Martha from the first occasion of testing. Martha has returned to the team, working with the study of those born in 1936.

Alison testing reaction times at the Wellcome Trust's Public Open Day.

And finally…

The LBC1921 team will be welcoming a new member at the end of this year. Dr Dominika Dykiert will be joining the team, having recently completed her PhD. She will be starting to analyse the latest data you are providing, and you will hear a lot more about her work in the coming years.

You might be interested to hear that Ms Caroline Brett, who some of you will have seen at the third assessment, is also returning to the team. Caroline completed a Masters in Health Psychology at the University of Stirling last year, and will be working on a new project following-up a subsample of people who completed the Scottish Mental Survey 1947.

Thank you!

We could not continue the LBC1921 study without your participation, so our sincere thanks for your ongoing support.

Merry Christmas, and best wishes for a happy New Year.

Yours sincerely,
Professors Ian J. Deary & John M. Starr, Study Directors; **Mrs Alison Pattie & Dr Alan Gow,** Research Staff.

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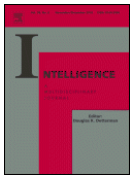
Some of the many new research publications

Many new scientific papers have been published by the LBC1921 team across 2011. We know how interested you are in these findings so the references and short summaries of a few of these are given below (a couple are also described in more detail on page 2). Do get in touch if you would like a copy of any of these.



This analysis highlighted how visual and cognitive functions are linked in old age, although it isn't clear if better vision allows people to maintain their thinking skills, that the two are linked through common processes, or if those with better thinking skills are better able to look after their sight. **Henderson, R.D., Allerhand, M., Patton, N., Pattie, A., Gow, A.J., Dhillon, B., Starr, J.M., & Deary, I.J. (2011). Vision and intelligence at age 83 in the Lothian Birth Cohort 1921. Intelligence, 39, 148-154.*

Using the genetic information from the LBC1921 in collaboration with other groups, this study searched for genes which might affect speed of information processing, thought to underlie more complex thinking skills. Some genes and mechanisms were suggested by the analysis. **Luciano, M., Hansell, N., Lahti, J., Davies, G., Medland, S.E., Raikkonen, K., Tenesa, A., Widen, E., McGhee, K.A., Palotie, A., Liewald, D., Porteous, D., Starr, J.M., Montgomery, G., Martin, N.G., Eriksson, J.G., Wright, M,J., & Deary, I.J. (2011). Whole genome association scan for genetic polymorphisms influencing information processing speed. Biological Psychology, 86, 193-202.*

Associations were found between a person's rating of their health, and their survival over the following 9 years, over and above other health behaviour and health status indicators. **Murray, C., Brett, C.E., Starr, J.M., & Deary, I.J. (2011). Which aspects of subjectively-reported quality of life are important in predicting mortality beyond known risk factors? The Lothian Birth Cohort 1921 study. Quality of Life Research, 20, 81-90.*

Although low levels of B vitamins have been associated with impaired thinking skills, this analysis didn't find a link between one of the genes known to affect vitamin B metabolism and changes in thinking skills over 8 years. **Schiepers, O., van Boxtel, M., Harris,S., Gow, A., Pattie, A., Brett, C., de Groot, R., Jolles, J., Starr, J.M., & Deary, I.J. (2011). MTHFR polymorphisms and cognitive ageing in the ninth decade: the Lothian Birth Cohort 1921. Genes, Brain and Behavior, 10, 354-364.*

Blood pressure was found to be higher in those from the more professional social classes. This is in the opposite direction to most of the other cardiovascular risk factors, where those from more manual occupational backgrounds are at a higher risk. **Starr, J.M., & Deary, I.J. (2011). Blood pressure, socio-economic status and health in the Lothian 1921 Birth Cohort: a longitudinal study. Public Health, 125, 196-200.*