LBC1936 Christmas Newsletter

Warm Christmas greetings from the LBC1936 study team! And many happy returns on your 75th birthday which you will have celebrated this year. We hope you are well, and we would like to take this opportunity to thank you for your continued participation. This annual update contains news of what has been happening with the study during 2011, including some events that you may be interested in hearing about.

In this year's newsletter, you can read about the latest results emerging from the information you have provided us with at your first two study visits between 2004 and 2010. There are also some updates on how we are progressing through the current wave of the study, including the brain imaging. Everything you read about in the next few pages is the result of your participation, so thank you again for being so enthusiastic. We really do appreciate your willingness to contribute to the research and hope that you are interested in finding out what you are helping us to discover. From the whole team, all the best for Christmas and the New Year.

The study continues

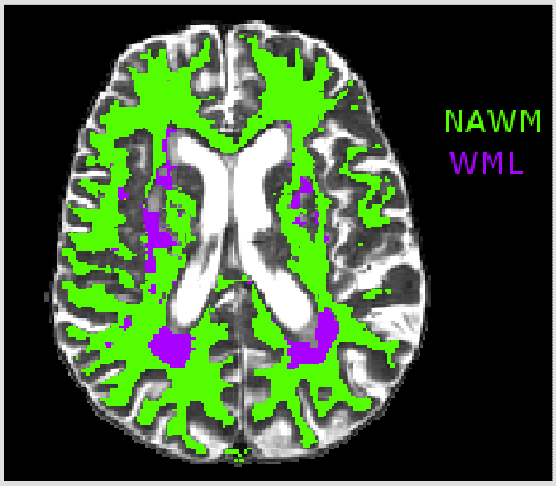
The aim of the LBC1936 study is to investigate how people's thinking and memory skills (their cognitive abilities) change as they age: why do some people experience changes over time while others do not; what factors predict these changes? As you know, our work in the LBC1936 study is part of a larger research project known as The Disconnected Mind (funded by Age UK). The project will help us to learn more about how changes in the brain's white matter – the wiring that connects different parts of the brain – might account for some of the changes seen in a person's thinking skills.

We have now begun the third wave of cognitive and medical tests! We saw the first participants for this wave in July of this year and we expect to have seen over 100 of you by Christmas. This is very important as we can only investigate how thinking skills change with age if we see people on a number of occasions over many years. Thank you to everyone who has returned to participate. If you haven't already been contacted to take part, you needn't do anything just now. We will be in touch at some point over the next two years and look forward to seeing you. However, if you have moved house, or are about to do so, please do update your address so we are able to keep in touch. Details of how to contact us can be found at the end of the newsletter.

Meantime, the team are kept very busy analysing the information from the first two waves of assessment, and you can read more about this later.

Seeing inside the brain

As we're interested in how changes in the brain might relate to cognitive skills, we are asking you to undergo a magnetic resonance brain scan for a second time. Around 50 of you in this wave will have come for your second scan by Christmas. A lot of detailed information is collected during these scans and the brain imaging team have been developing new techniques to analyse the images collected, testing these new techniques, and then relating this information to the



Using techniques specially developed by The Disconnected Mind imaging team, this composite brain image shows normal healthy white matter in green. The purple colour shows white matter lesions, which disrupt the functioning of white matter.

results of your cognitive assessments.

To develop programs to analyse the detailed brain images requires a great deal of expertise, and the brain imaging team are at the cutting edge in this regard. We are looking forward to updating you as these analyses progress over the coming years. In terms of the number of people undergoing brain imaging, you are part of one of the largest studies of its kind…anywhere in the world. So thank you, again and again!

Latest results

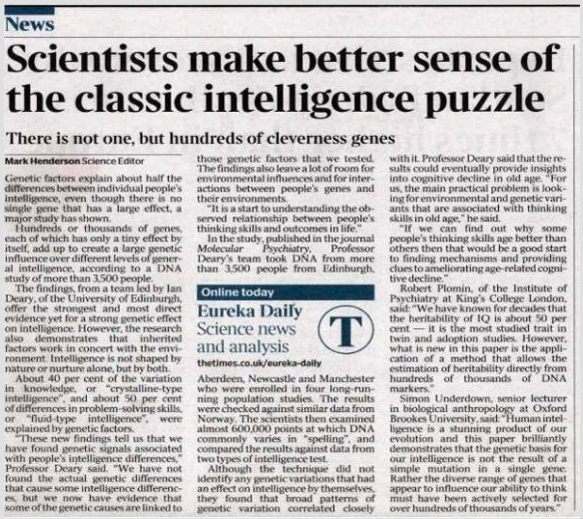
This past year has continued to be extremely productive. At the last count, 30 research papers from the LBC1936 study were published during 2011, or are due to be published early in 2012. This has been made possible by the very detailed information you have provided us with over the years.

A particularly high profile paper presented the results of the genetic study which includes you (the LBC1936) and our other cohort of individuals, the group born in 1921. 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. et al. (in press). Genome-wide association studies establish that human intelligence is highly heritable and polygenic. *Molecular Psychiatry*.



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*.

Another of the interesting findings from this year was produced by Dr René Mõttus. He analysed the personality questionnaires that you completed at ages 70 and 73, and reported that as a group there was very little change in your personality over time. Interestingly, you were a little less agreeable and conscientious than the group born in 1921, who also showed more noticeable changes as they aged. 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*.

If you would like to ask questions about, or obtain a copy of the papers listed above, or in the list at the end of this newsletter, we would be delighted to hear from you!

Still Life Dreaming

Extraordinarily, the Edinburgh Festival Fringe this year contained a production that celebrated the LBC1936 study! This was in honour of the Wellcome Trust's 75th anniversary year (the same age as you, the LBC1936 participants).

A theatre company called Spare Tyre wrote and produced the play, which told the story of the research behind the Scottish Mental Survey of 1947, and how it led to the LBC1936 study first being set up in 2004. We were delighted and grateful that 5 study participants talked about their experiences to Spare Tyre, who then wove those stories into the script. We were also delighted to see so many of you attend the play when it was on during the week of 15th-19th August.

Here is what one of the Fringe reviewers (Paul Ewing) said about the play:

"Still Life Dreaming explores the research and stories around the people involved in an epic scientific study on ageing and memory. Every Scottish schoolchild born in 1936 sat an intelligence test in 1947. Between 2004 and 2007 over 1000 re-sat the test and the study has revealed fascinating findings about what makes a healthy body and healthy mind.

The production dramatises the leading figures behind the study and its participants. It's a compelling story about a shared experience, and it's also a slick production with a mostly older cast who are terrific. It's great to see the Spare Tyre Theatre Company and Wellcome Trust explore these issues as we all head towards getting older, which surely has to be much better than the alternative!

There is a positive message about healthy bodies and healthy minds, and that while the research has shown there is much that isn't known, there is a lot to be said about getting on and living life to the fullest. Now that's always a great message to take from the theatre."

Age UK

On 7th September 2011, Age UK's new building in Tavistock Square was officially opened by HRH the Prince of Wales. Two LBC1936 volunteers and their spouses travelled to London and together with Dr Martha Whiteman, Study Co-ordinator, were there to greet Prince Charles. He spent several minutes meeting and warmly talking with the LBC1936 entourage and James Goodwin, the Research Director of Age UK. The participants told Prince Charles about the study and how they felt about taking part. Later in the day, during his official speech, Prince Charles spoke eloquently about how important the work of all Age UK's projects are for the well-being of older people in the UK.

Star turns and Royal appointments

Clockwise from top left: the poster advertising Still Life Dreaming at the Fringe; some of the cast in action (playing Professors Ian Deary and Lawrence Whalley!); Dr Martha Whiteman with HRH Prince Charles at the opening of Age UK's headquarters; and LBC1936 participants and spouses with Martha at the opening.

Staff news

With the project gaining momentum, we have welcomed a number of new researchers to the team. Dr Benjamin Aribasala joined the team at the Brain Research Imaging Centre. Benjamin is interested in the brain's white matter and how it relates to ageing. We have also welcomed Miss Lasma Ilzina as an intern on a year's placement from her Bath University Psychology course. You may remember having photos taken of the backs of your eyes. Lasma is now working on analysing that data, and will be looking at how the health of blood vessels in the eye is associated with cognitive ageing. Dr Tom Booth, recent PhD graduate, will be working on analyses of the MRI scanning data.

We are also delighted to have welcomed back Mrs Janie Corley, who returned to the team in April following her maternity leave. Miss Catherine Murray, who organised all the MRI scanning visits a few years ago, has happily returned to the team following completing her MSc (with distinction) in Health Psychology at the University of Stirling. Ms Caroline Brett has also rejoined the team having completed the same MSc, and also graduated with distinction! Caroline is now working on a project related to the LBC1936 study. Dr Martha Whiteman

joined the LBC1936 study team in April, as Study Co-ordinator. Although Martha is new to the LBC1936 study, she previously worked on the LBC1921 study and is delighted to continue her involvement with you, and the research team, in her new role.

Over the summer, Dr Alan Gow travelled to the University of Copenhagen as a visiting Professor for 3 months. He was working on one of their cohort datasets, investigating how activities (both social activities and physical activities) relate to cognitive ageing in people from age 50 up to their 80s.

Spreading the word

The LBC1936 team have been kept busy taking the latest 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. Ian also gave the first of a series of lectures in Newcastle entitled Grey Matters. These are sponsored by the British Academy and are intended to convey the cutting edge of ageing research to the general public and scientists alike. Ian was delighted to see about a couple of hundred people turn out to hear his lecture about research on the Lothian Birth Cohorts of 1921 and 1936. The attentive and enthusiastic audience was delighted to hear about the scientific achievements of the Lothian Birth Cohorts. In addition to addressing many scientific audiences, Ian has given 11 public lectures during 2011—mostly to older people's groups—on the Lothian Birth Cohorts.

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 Martha manned an interactive stand allowing people to try examples of the cognitive tests that you complete.

The summer months are always a busy

Out and about with the LBC1936

Left: Alison Pattie testing reaction times at the Wellcome Trust's Public Open Day. Right: Dr Alan Gow sharing some of the latest LBC1936 findings at an international conference during the summer.

time for conferences and meetings, and several members of the LBC1936 team have again attended a number of these to disseminate the latest results. For example, Ian Deary, the project's director, gave a Keynote address in Paris to the International Conference on Alzheimer's Disease. The conference attracted over 6000 people and provided the largest-ever audience for the LBC1936 results.

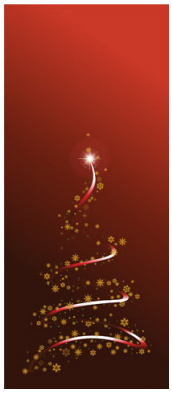
Ian also convened a symposium at the International Society for the Study of Individual Differences (ISSID) annual conference in London in July. Presentations in the symposium were given by Dr Lars Penke, Dr Alan Gow and Dr Wendy Johnson. In separate talks, Dr René Mõttus and Dr Michelle Luciano also discussed their recent LBC1936. analyses, and Wendy gave one of the keynote lectures.

Thanks again

As a member of the LBC1936 you are helping to advance our knowledge of how our thinking skills change over time. From all of the LBC1936 research team, thank you. We shall look forward to seeing you in 2012 and beyond.

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

Yours sincerely,



Professor Ian J. Deary, Study Director;
Mrs Janie Corley,
Miss Catherine Murray,
Mrs Alison Pattie, Research Associates,
Mr Paul Redmond, Database Manager,
Dr Alan Gow, Senior Research Fellow,
Dr Martha Whiteman, Study Co-ordinator.

Would you like to talk to us?

You can contact us at:

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Telephone: 0131 651 1681
(Catherine and Martha)
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Do, please, let us know if there is any change to your address.

www.lothianbirthcohort.ed.ac.uk

Research publications

The full references for some of the most recent research publications from 2011 are given below. Please get in touch if you would like a copy of any of these articles.

- Corley et al. (2011). Alcohol intake and cognitive abilities in old age: the Lothian Birth Cohort 1936 study. *Neuropsychology*, 25, 166-175.
- Gow et al. (2011). Stability and change in intelligence from 11 to ages 70, 79 and 87: The Lothian Birth Cohorts of 1921 and 1936. *Psychology and Aging*, 26, 232-240.
- Luciano et al. (2011). Whole genome association scan for genetic polymorphisms influencing information processing speed. *Biological Psychology*, 86, 193-202.
- McNeill et al. (2011). Antioxidant and B vitamin intake in relation to cognitive function in later life in the Lothian Birth Cohort 1936. *European Journal of Clinical Nutrition*, 65, 619-626.
- Murray et al. (2011). The association between cognitive ability across the lifespan and health literacy in old age: the Lothian Birth Cohort 1936. *Intelligence*, 39, 178-187.
- Valdes Hernandez et al. (2011). Reliability of two techniques for assessing cerebral iron deposits from structural MRI. *Journal of Magnetic Resonance Imaging,* 33, 54-61.