

**Merry Christmas**from  
the**Lothian Birth Cohort 1921**  
**Research Team**

Season's greetings from the LBC1921 study team! Good tidings we bring, to you and your kin, we wish you a merry Christmas and a Happy New Year.

We would like to welcome you to the LBC1921 newsletter for 2016. We hope you have all had a good year. As usual, we would like to take this opportunity to update you on the progress and goings-on in the research and tell you about events that have occurred in the last year. It has been another productive year for the study despite not seeing you at the clinic in 2016. However, we are looking forward to seeing as many of you as possible at the LBC reunion which is taking place in June of next year. More details can be found further on in this newsletter.

Thank you again for your continued interest in the LBC1921 study. We hope that you are proud to be part of the longest cognitive ageing study in the world. You completed the first test at 11 years old, and have then completed various tests at ages 79, 83, 87, 90, and 92. We have collected so much data from you over the 5 waves of the study that we are still actively analysing and publishing results. Some of the most recent publications are listed at the end of the newsletter. The data that you have provided will help us to further our understanding of thinking skills, lifestyle and the brain in relation to growing older.

Please do let us know if you have moved house, or are about to, so that we can update your address and are able to keep in touch. Details of how to contact us can be found at the end of the newsletter.

**Life Review Questionnaire**

You may remember that, a few years ago, we asked you to fill in a brief questionnaire about your early life experiences. We asked you to reflect on aspects of your life such as your schooldays when you were around 11 years of age and how that time in your life prepared you for your adult life. We also asked you to look back over your life and tell us about your life achievements and challenges. We also asked you to reminisce about your life today, when you were at your happiest, what you found most challenging about your life, and the advice that you would give to a young person looking to the future. Our collaborator, Dr Hilary Lapsley, who is based at the University of Auckland, spent many hours analysing all the written data and found that you recalled your school and family lives positively 8 decades later. This may help us to understand how different types of life experience relate to each other in the Lothian Birth Cohort 1921 and how these may have helped to shape health later in life. The article was published in BMC Geriatrics in April 2016 and makes a fascinating read.

**Reunion Announcement!**

Another Lothian Birth Cohort reunion will be hosted at the Assembly Hall on the 4<sup>th</sup> June 2017, which falls on a Sunday. Participants of both the LBC1921 Study and the LBC1936 Study will be warmly invited to this event. It would be great if you could join us to learn about all that the project has been up to and catch up with other Cohort members, and Professor Deary and the rest of the research team. We will be sending out more information with regard to this in 2017. For the time being, please save the date.

## LBC1921 Portraits

You may remember our collaboration with the renowned artist Fionna Carlisle who has been painting and drawing portraits of the LBC research team and participants. One of our LBC1921 participants, Ms Alexa Purves was one of Fionna's models a few years ago. In September, she celebrated her 95<sup>th</sup> birthday with her relatives organising a celebratory party with her portrait proudly displayed at the event. Many happy returns Alexa!



**LBC1921 participant, Ms Alexa Purves in front of her portrait at the celebration of her 95<sup>th</sup> birthday.**

## LBC Milestone- Sequencing the future

Edinburgh Genomics, a leading UK clinical genomics facility within the University of Edinburgh, has completed the sequencing of over 1300 whole genomes of the Lothian Birth Cohorts of both 1936 and 1921. This means that, for each person in the cohorts, the scientists will know the three billion or so base pairs that make up their DNA sequence.

Professor Ian Deary said, *“The Lothian Birth Cohorts are a uniquely valuable group of people whose life-long data from childhood to older age has helped us understand healthy cognitive ageing and wellbeing across the life course. Some of the LBC have been followed across 80 years. We are delighted that, with funding support from the Biotechnology and*

*Biological Sciences Research Council (BBSRC) and the excellent service provided by Edinburgh Genomics, we have managed to sequence the entire genomes of a large number of individuals from the cohort so quickly. Such a massive undertaking on so many people in a single cohort would have been unthinkable just a few years ago. This genome sequence data will prove invaluable for understanding why some people's brains and thinking skills age better than others. The flip side of having such comprehensive genetic data is that we will also understand better how the environment and lifestyles contribute to healthy ageing.”*

Edinburgh Genomics is the University of Edinburgh's large new gene sequencing operation, and it has made a video to explain the breakthrough in technology and what it can mean for understanding illnesses and ageing. At the front of the queue to be whole-genome sequenced were the Lothian Birth Cohorts of 1921 and 1936. Watch this video and see the LBCs' Director Professor Ian Deary describe (from 4min 45sec) how the Lothian Birth Cohorts are enhanced by this new information:

<http://tinyurl.com/jbcdmyd>



**Prof Deary loading the last samples to complete the LBC whole genome sequencing**

## Grand Opening of the Godfrey Thomson Exhibition

July 28<sup>th</sup> saw the opening of an exhibition displaying and explaining a treasure trove of artefacts relating to Professor Sir Godfrey

Thomson (1881-1955), a pioneering educational psychologist. He and his work—especially the Moray House Tests of intelligence—are at the core of the LBC1936 and LBC1921 studies. The exhibition ran at the University of Edinburgh Main Library from Friday 29th July until 26th November 2016. We hope that many LBC 1921 and 1936 participants were able to attend following the invitation letter you received.

The exhibition reconstructed Thomson's life and work through personal and professional papers and the display of ledgers and other materials from the two Scottish Mental Surveys. Sir Godfrey was an innovative educator with the firm belief that educational opportunity should not be linked to social status, and, from the 1920s onwards, he advocated comprehensive-style education. Thomson was based at the Moray House School of Education, which is now part of the University of Edinburgh. His greatest legacy for today's researchers was to test the intelligence of almost every Scottish 11-year-old child in 1932, and again in 1947, resulting in the basis of the LBC1921 and LBC1936 projects. An annexe of the exhibition was devoted to the Lothian Birth Cohorts' work, showcasing the methodology and findings of the now world famous studies.

For the first time, this exhibition presented the Scottish Mental Surveys' unique ledgers to public view, with a selection of sample pages on show. These ledgers hold the world's only record of IQ-type scores from full national year-of-birth cohorts. Professor Deary has spent the past decade investigating Sir Godfrey's life and, in 2008, he rescued a mass of never-before-seen documents and objects from Thomson's family home in Ravelston Dykes in Edinburgh, just before it was demolished. A selection of those artefacts, portraits and documents featured in the exhibition, telling the story of who Sir Godfrey was and what his motivations were. The BBC took interest in this, interviewing Prof Deary about the exhibition.

Ian Deary said: "*Godfrey Thomson saw mental ability tests as an imperfect but useful means to*

*give poor children a chance in life. He was determined to look past pupils' social status, and try to see their underlying ability. By all accounts he was modest, not motivated by money, and happy to share academic wins, which in part led him to fade from the history books. I'm delighted we are now able better to understand and evaluate the pioneering work of this multi-talented and elusive man."*



**Prof Deary being interviewed by the BBC about Prof Sir Godfrey Thomson**

You can see Ian's introductory film for the exhibition here:

<http://tinyurl.com/zjylzqk>

### **Me, My Brain & My Connected Mind**

We thought that you might be interested to read that our sister study, the LBC1936 cohort has received national attention beyond the scientific world. In a new series of galleries that covers anything from fashion to science to technology, the National Museum of Scotland is now displaying the 3D-printed brain of Mr John Scott, one of the LBC1936 cohort members! Along with this, laser-etching techniques were used to map out the white matter, or neural connections, of Mr Scott's brain in a crystal block. The aim of this is to help engage people in science by making it more accessible, and specifically to show how modern brain imaging can help us to look inside the head and see the brain's structure. The 3D brain and its laser etched connections are on display at the Museum of Scotland in Chambers Street.



**Brain to brain with Mr Scott**

Mr Scott and his brain also attracted the attention of Scottish television (STV) who broadcast a news item on this fascinating display of science and art. Dr Simon Cox, a Medical Research Council Brain Imaging Research Fellow on the LBC1936 study, appeared on the news item.

Simon said, *"I am used to looking at brain images on the computer day-to-day, but seeing a real model of the brain's white matter connections in glass and the outer surface of the brain like this is a unique experience – they are incredibly striking objects"*.



**The ins, laser etched white matter connections (left) and the outs, 3D print (right), of the brain**

A blog post with details of the exhibit can be found on the link below:

<http://tinyurl.com/hta6xsy>

### **CBE for Prof Joanna Wardlaw**

Congratulations to Professor Joanna Wardlaw, FRSE, the lead of the brain imaging part of the LBC studies, who was awarded the prestigious Commander of the Order of the British Empire (CBE) in the Queen's New Year Honours list 2016. Professor Wardlaw received a CBE for services and contributions to neuroimaging and clinical science. Professor Wardlaw said, *"This is a real surprise to me, but great recognition for neuroimaging research, for stroke, ageing research, Edinburgh and encouraging for women in science and medicine too."*

### **Telling U3A about Healthy Cognitive Ageing**

On 17th March Professor Ian Deary spoke to the Science Group of the University of the Third Age at Epworth Halls in Edinburgh. The topic was Healthy Cognitive Ageing, with the focus on how the Lothian Birth Cohorts had contributed, including some LBC1921 findings.

*"They were an attentive and active audience",* said Ian. *"I talked for about 50 minutes and there was well over half an hour of questions, with no signs of that slowing when the Chair had to intervene and let people get home."* Dr Peter Edwards afterwards wrote to Ian, *"your insights into the factors which affect cognitive decline, and those which don't, were particularly interesting. The audience was bigger than expected; it was, in fact, by far the largest audience that we have ever had at one of our talks."* About 30 to 40 were expected; there were, in fact, about 100 people there.

### **Brain Maze – Amaze your Brain**

June this year saw a second edition of Brain Maze event, part of the Medical Research Council's (MRC) Festival of Medical Research. Our Centre for Cognitive Ageing and Cognitive Epidemiology joined forces with the MRC Centre for Regenerative Medicine to create an innovative open day during which the basement of the Psychology Department was transformed into a maze of corridors and activity rooms, each dedicated to an aspect of the ageing brain and body. Visitors navigated through this 'maze' and immersed themselves into an

engaging two hours of the latest ageing research.

Much of the content of Brain Maze has been inspired and informed by the research from the Lothian Birth Cohort studies of 1921 and 1936. For example, the knowledge from the many years of research into the effects of lifestyle factors on ageing has been presented in a form of a supermarket sweep game in 'The Mental Supermarket'. There was also a room dedicated to the Scottish Mental Surveys and the Lothian Birth Cohort studies.

### Latest Results

With the data from five waves of the study now available to analyse and publish on, this year has been as productive as ever. A selected sample of this year's publications are listed at the end of the newsletter.

One recent study, led by Dr Tom Russ, used the original age-11 IQ scores from you, the LBC1921, and others born in 1921 who also sat the Moray House Test in 1932. The research team managed to link these IQ records to national health records for 18,229 men and 17,265 women. This allowed the researchers to test the predictive value of childhood IQ for later-life dementia. The results showed that not only were those with a lower childhood IQ at higher risk of dementia in later life, but that this effect was significantly stronger for women than for men. The results suggest that a higher childhood IQ might be protective against dementia, especially for women.

Another interesting study we would like to highlight was led by Dr Alan Gow, who a number of you saw at the clinic during the second wave of assessments. Alan and his colleagues used the retrospective data that you provided to examine the relationship between physical and socio-intellectual activities across the entire lifespan with level of general cognitive ability at the age of 79 and with the rate of decline in cognitive ability between 79 and 90. Using cognitive data from ages 79, 83, 87, and 90 years, Alan and the team found that those of you who reported more engagement in

leisure activities during midlife tended to have higher cognitive abilities at age 79, but there was no difference in the rate of decline between 79 and 90. Those of you who reported having more physical activity when aged between 60 and 75 tended to experience less decline in cognitive skills between 79 and 90. It therefore appears that physical activity might, to some extent, protect against future cognitive decline – a useful message to share with younger generations.

### Thanks again

As a member of the LBC1921 you are helping to further our knowledge and understanding of how our thinking skills and lifestyles change over time and how to maintain these, along with brain health. From all of the LBC1921 research team, we send a big thank you. We look forward to seeing you in 2017 and beyond.

### Yours sincerely,



**Professor Ian J. Deary,**  
Study Director;

**Mrs Alison Pattie,**  
Research Associate;

**Mr Paul Redmond,**  
Database Manager

### We are here:

Department of Psychology,  
The University of Edinburgh,  
7 George Square,  
Edinburgh, EH8 9JZ  
Telephone: 0131 651 1682



You can stay up to date on the most recent LBC research by checking the regularly-updated list of publications at:

[www.lothianbirthcohort.ed.ac.uk](http://www.lothianbirthcohort.ed.ac.uk)  
and  
<https://twitter.com/CCACE>

Do, please, let us know if you would like a copy of any of the papers listed.

Email: [Alison.Pattie@ed.ac.uk](mailto:Alison.Pattie@ed.ac.uk)

## Newly 'in press'

Chen, B. (in press). DNA methylation-based measures of biological age: meta-analysis predicting time to death. *Aging*.

Gow, A. J., et al. (in press). Life course activity participation from early, mid and later adulthood as determinants of cognitive ageing: The Lothian Birth Cohort 1921. *Journal of Gerontology: Psychological Sciences*.

Joeanes, R., et al. (in press). Epigenetic Signatures of cigarette smoking. *Circulation: Cardiovascular Genetics*.

Okbay, A., et al. (in press). Education-associated SNPs are enriched for brain function and disorders. *Nature*.

Russ, T. C., et al. (in press). Childhood cognitive ability and incident dementia: follow up of participants in the 1932 Scottish Mental Survey into the tenth decade. *European Journal of Epidemiology*.

## Newly 'in print'

Deary, I. J. & Ritchie, S. J. (2016). Processing speed differences between 70- and 83-year-olds matched on childhood IQ. *Intelligence*, 55, 28-33.

Harris, S. E., et al (2016). Longitudinal telomere length shortening and cognitive and physical decline in later life: The Lothian Birth Cohorts 1936 and 1921. *Mechanisms of Ageing and Development*, 154, 43–48.

Hill, W. D., et al. (2016). Examining non-syndromic autosomal recessive intellectual disability (NS-ARID) genes for an enriched association with intelligence differences. *Intelligence*, 54, 80-89.

Howrigan, D. P., et al. (2016). Genome-wide autozygosity is associated with lower general cognitive ability. *Molecular Psychiatry*, 21, (6), 837-43.

Ibrahim Verbaas, C. A., et al. (2016). GWAS for executive function and processing speed suggests involvement of the CADM2 gene. *Molecular Psychiatry*, 21, (2), 189-197.

Lapsley, H., Pattie, A., Starr, J., Deary, I. (2016). Life review in advanced age: qualitative research on the 'start in life' of 90-year-olds in the Lothian Birth Cohort 1921. *BMC Geriatrics*, 16, 74.

Van den Berg, S. M., et al. (2016). Meta-analysis of Genome-Wide Association Studies for Extraversion: Findings from the Genetics of Personality Consortium. *Behavior Genetics*, 46, (2), 170.

Lapsley et al. *BMC Geriatrics* (2016) 16:74  
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BMC Geriatrics

RESEARCH ARTICLE

Open Access

# Life review in advanced age: qualitative research on the 'start in life' of 90-year-olds in the Lothian Birth Cohort 1921



Hilary Lapsley<sup>1\*</sup>, Alison Pattie<sup>2</sup>, John M. Starr<sup>2</sup> and Ian J. Deary<sup>2\*</sup>

*The Lothian Birth Cohort Study – Christmas 2016*