LBC1936 Christmas Newsletter

Merry Christmas from the LBC1936 Research Team

Season's greetings from the LBC1936 study team! We welcome you to the LBC1936 newsletter for 2017. We hope you have had a good year. From all of the members of the team, please accept our warmest wishes for a happy Christmas.

As usual, we would like to take this opportunity to update you on the progress of our research, and tell you about some LBC1936 events that took place in 2017. Everything you read about in this newsletter is a result of your involvement. If you wish to get in touch, our contact details are at the end of the newsletter. Please let us know if you have moved house, or are about to, so that we can update your address and keep in touch. We are always delighted to hear from you.

Wave 4 Ends and Wave 5 Begins!

It has been another busy year for the LBC1936 testing team. We saw our final Wave 4 participant at the beginning of February 2017. During Wave 4, a total of 550 LBC1936 participants came back to the Wellcome Trust Clinical Research Facility, to complete another round of thinking, memory and physical tests. Thank you again to everyone who took part in this wave of testing.

In October, we were excited to welcome back our first LBC1936 participants for a 5th Wave of testing. At the time of writing this newsletter, we've already seen over 30 participants and we look forward to seeing many more of you in the New Year.

Like previous waves, the Wave 5 visit involves thinking and memory tests, physical and medical assessments, and we'll also ask you to complete a series of questionnaires. New to this wave will be a questionnaire on musical experience and expertise, designed by Dr Katie Overy of the Reid School of Music at the University of Edinburgh. The questionnaire asks about your experience in playing musical instruments, singing, reading musical notation, and listening to music, throughout your life. As part of Wave 5, we'll also be taking a picture of your retina with the same kind of camera as your optician uses. This will help us to examine how the health of the blood vessels in the eye relates to brain health and other important aspects of ageing. The brain imaging part of the study, which takes place at a separate visit to the Brain Imaging Research Centre, will begin in early 2018.

Above: Alison Pattie with the last LBC1936 participant of Wave 4
Below: Adele Taylor with one of the first LBC1936 Wave 5 participants

LBC reunion 2017 – celebrating the 70th anniversary of SMS1947

Lothian Birth Cohorts' Reunion 2017

The 4th of June 2017 was an important date for the LBC1936 team, as it marked the 70th anniversary to the day since you, our LBC1936 participants, sat the Moray House Test No. 12. To celebrate, we held a special reunion event, which was attended by around 400 LBC1936 and LBC1921 participants and their guests. The day included an afternoon of talks from LBC936 researchers and collaborators. They spoke about some of the latest LBC developments, and gave a preview of some new results using data from waves 1 to 4. During the event, Libby Archer, Research Manager at Age UK, recorded a series of interviews with LBC participants and researchers for Age UK's radio station, The Wireless. A selection of the interviews are available to listen to online at: http://www.thewirelessradio.com/listen-again/?filterBy=13&pg=2

Following the success of this special event, we are already planning the next LBC reunion. It will coincide with the end of Wave 5 testing in 2019, and will mark the 20th anniversary of the LBC project's inception (in 1999). We hope you'll be able to join us then, and we will be in touch with more information closer to the date.

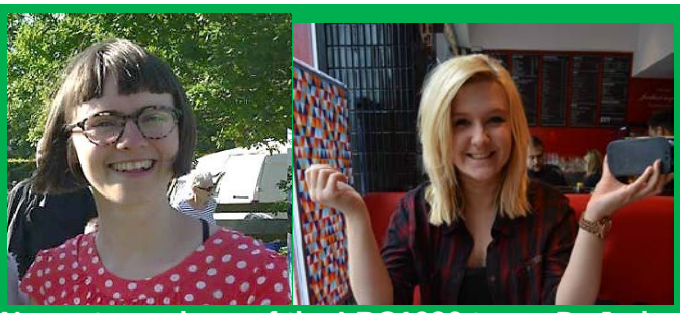
Staff News

After almost 2 years, Dr Ratko Radakovic, LBC1936 Study Coordinator, left the team in April this year. During his time with the project, Ratko saw some of you for Wave 4 testing and helped in the setup of Wave 5. We also said goodbye to Dr Dominika Dykiert in May, after almost 6 years on the project. Dominika first worked with LBC1936 Study Director, Professor Ian Deary, during her Masters and PhD, before joining the LBC1936 study in 2011. They will both be missed.

In other staff news, congratulations to Ms Adele Taylor, who was appointed to the role of LBC1936 Study Coordinator in May. Adele has worked on the LBC1936 study for almost 5 years. In her new role, Adele remains a part of the testing team, and will continue with research on cognitive ageing.

We were pleased to welcome Dr Judy Okely, who took over from Dominika in August. Judy is interested in how psychological and social experiences are related to physical health outcomes in older age. She recently passed her PhD viva on the thesis 'Psychological Wellbeing in Relation to Morbidity and Mortality Risk: Associations and Potential Mechanisms'. As a new member of the LBC1936 team, she will examine how experiences such as loneliness relate to changes in memory and thinking skills.

We were also pleased to welcome Ms Danielle Page to the team in September. Danielle is a University of Edinburgh Psychology graduate, where she studied cognitive epidemiology as part of her honours thesis. As well as testing at the Wellcome Trust Clinical Research Facility, Danielle will arrange testing appointments for Wave 5 of the study.



Newest members of the LBC1936 team, Dr Judy Okely (left) and Ms Danielle Page (right)

As ever, members of the team have been busy sharing their findings from the LBC1936 study with other researchers, policy makers and member of the public. Read on for some of our highlights from 2017.

LBC at the International Science Festival
LBC1936 director, Professor Ian Deary, gave a talk at the National Museum of Scotland as part of the Edinburgh International Science Festival in April. The talk included an introduction to the history of the Scottish Mental Surveys of 1932 and 1947, which tested every 11 year old in Scotland (including most of you). He talked about the people and organisations involved, including pioneering educational psychologist Professor Sir Godfrey Thomson: "*Godfrey Thomson saw mental ability tests as an imperfect but useful means to give poor children a chance in life*." Ian went on to describe the breadth of work currently being undertaken as part of the LBC1936 study, and was joined by LBC1936 participant, Mr John Scott, whose 3D printed brain is part of the museum's permanent collection. Mr Scott recalled the day he met the 3D printed version of his brain, and spoke passionately about the importance of staying active.

Ian Deary with LBC1936 participant, Mr John Scott, at the National Museum of Scotland

Diet, Lifestyle and Bilingualism
In June, LBC1936 Knowledge Exchange Officer, Dr Iona Beange, ran a public engagement event as part of the MRC Festival of Medical Research, in association with Leith Labs. Over 100 visitors joined LBC researchers Dr Alan Gow, Dr Michelle Luciano, Dr Stuart Ritchie, and Dr Thomas Bak to hear short presentations on cognitive ageing and diet, physical activity, bilingualism and the ageing brain, including results from the LBC studies presented on the Age UK Staying Sharp website. Each talk was followed by questions which sparked lively discussion on how to stay sharp in older age.

Successful Ageing, Royal Society London
Professor Ian Deary gave a sell-out talk on the topic of staying sharp in older age, at the Royal Society in London in June, as part of an annual Successful Ageing event organised by University of the Third Age (U3A) and European Dana Alliance for the Brain (EDAB). Ian said "*I gave almost an hour's talk, with much reference to the Lothian Birth Cohorts' findings. Then we all had a quick cup of tea and we were back for an hour of excellent questions. I should have taken notes during the questions, because there were lots of good ideas for more research, some of which I have failed to retain!*" Afterwards, well-known neuroscience blogger, Mo Constandi, posted on his twitter feed "*Great talk by Ian Deary – one of the most engaging and entertaining speakers I've ever heard*". A Dana Foundation news article by Mo Constandi, and short version of Ian's talk can be found here: http://www.dana.org/News/How_to_Stay_Sharp_in_Later_Life/

21st IAGG World Congress, San Francisco
The following month, the 21st Annual International Association of Gerontology and Geriatrics World Congress took place in San Francisco, sponsored by Age UK. LBC1936 researchers Dr Simon Cox and Dr Stuart Ritchie, and LBC1936 collaborators, Professor Benjamin Aribisala, Dr Sherif Karama, and Dr Stuart Wiseman attended the conference and presented recent findings from the study at a Presidential Symposium, which was chaired by Professor James Goodwin (Chief Scientist at Age UK). Afterwards Professor Goodwin chaired a lively and wide-ranging panel discussion with the speakers on the implications of these findings and avenues for future research.

IAGG, San Francisco (from left): Stuart Wiseman, Simon Cox, Benjamin Aribisala & Stuart Ritchie

Keynote speech in Amsterdam
Dr Janie Corley attended the second 'Food for Healthy Ageing' conference in Amsterdam in October, where she gave a keynote presentation on Lifestyle Factors and Cognitive Ageing based on LBC1936 findings. Her talk began an afternoon session on 'Food and cognitive health in ageing'. Janie said, "*This was a small but diverse conference and a new audience for the LBC studies' findings. The talk was well-received and generated some interesting debate and many questions!*" Adding a healthy dose of joviality to proceedings was the presence of a caricaturist, who created a personalised piece for each speaker during their presentation. Note – this was based on the content of their talk, and not their approach to public speaking!

Caricature from Dr Corley's keynote talk

LBC1936, Sir Francis Galton's Legacy?
Finally, in November, Ian gave an invited plenary lecture at the Royal Society in London to the Galton Institute's conference on 'Surveying (Sir Francis) Galton's Legacy'. Galton was a prolific Victorian genius – a noted explorer and geographer, inventor of fingerprinting, discoverer of the anticyclone, highly original statistician, pioneering geneticist, and much more. "*The aspects of Galton's work that were relevant to the LBCs*," said Ian "*were his interest in human cognitive function, and his enthusiasm for collecting longitudinal health and psychological data. If you look at what and how Galton collected data from thousands of the public in the 1880s, his work predates and resembles the data we are collecting these days in the LBCs and other large surveys, such as UK Biobank. He saw, before anyone else, how valuable it could be serially to assess the body and the mind, and it was a pleasure to remind the audience what Galton did and urged, and how the LBCs superb serial data confirmed Galton's judgement about the usefulness of such longitudinal data*."

Bill Turnbull visits the LBC1936
Once more, the LBC1936 study received national attention beyond the scientific world. This year, the LBC1936 study was featured on a BBC1 television series called 'Holding Back the Years'. Fronted by a different celebrity for each episode, the series focused on the processes of human ageing. The episode showcasing the LBC1936 study was hosted by University of Edinburgh alumnus, Bill Turnbull (of BBC Breakfast fame). Mr Turnbull was at the University of Edinburgh in the 1970s and so his programme was based there. He and the BBC filming team visited the LBC1936 in January. Mr Turnbull had a go at some of the same memory and thinking tests that you do each time you visit us at the Wellcome Trust Clinical Research Facility. He also spoke to some of you about your experiences in the study and your views on ageing. After Bill Turnbull's visit, Ian said, "*Mr Turnbull got on really well with the dozen LBC1936 members. My biggest surprise was when he asked them if they enjoyed being 80. All of them did!; and few wanted to be younger again.*" The Holding Back the Years series first aired on the 13th of March, and a 1 hour compilation version of the series, was aired again on the 2nd of August.


Prof Deary and Mr Turnbull with the LBC1936 members during filming

Sunday Morning with... the LBC1936

The LBC1936 also featured on BBC Radio Scotland in February this year. LBC1936 participant, Margaret Macintosh, and Study Director, Professor Ian Deary, were interviewed by presenter Cathy MacDonald on the programme 'Sunday Morning with…' Professor Deary said: "*Cathy MacDonald was clearly very taken with the uniqueness and long-term nature of the LBC1936 sample and the importance and range of the findings, and so a piece that was planned to be 5-10 minutes long ran for about 20 minutes. It was great to hear Margaret's enthusiasm for the project, her reflections on what we do, and what we might add to the study*." The radio piece was inspired by the front-page article in The Times on the 21st of February which discussed the study on personality stability that was conducted on the LBC1936's sister study, the 6-Day sample. The article featured in The Times is freely available here: http://psycnet.apa.org/journals/pag/31/8/862.pdf

LBC1936 findings in the media

2017 has been as productive as ever for the LBC1936 research team, with over 40 papers published this year. A selected sample of this year's publications is listed at the end of the newsletter. Some of these papers attracted a great deal of media attention. Dr James Cole, who is based at Imperial College London, published a study using LBC1936 data, which attracted international media recognition. Dr Cole and team analysed brain imaging data from the LBC1936 to calculate an individual's 'brain age'. The researchers assessed the discrepancy between a person's chronological age and how old their brain appeared. They found that the difference between an individual's 'brain age' and chronological age predicted a range of outcomes including thinking skills, physical health, and life expectancy. Dr Cole's findings were featured in over 50 newspapers including the Herald and the Guardian.

Another LBC1936 study which was widely covered by the media, was led by University of Edinburgh researcher, and long-term LBC1936 collaborator, Dr Michelle Luciano. Dr Luciano found that following a Mediterranean-type diet was associated with brain volume shrinkage. The Mediterranean-type diet is one which is high in fruit, vegetables, legumes and cereals, a moderate intake of fish, low-to-moderate intake of dairy products and wine (accompanying meals), and low intake of red meat and poultry, with the main source of fat being olive oil. This finding was widely featured in, for example, BBC Scotland News, The Daily Telegraph, Daily Mail and, further afield, The New York Times!

Links to some of the news stories covering Dr Cole and Dr Luciano's results can be found below:

http://www.heraldscotland.com/news/15242616.Brain_scans___39_can_identify_those_at_risk_of_early_death__39_/

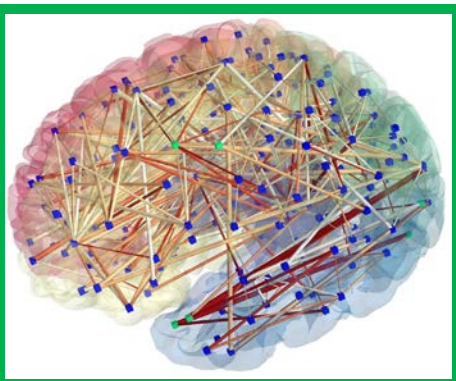
https://www.theguardian.com/uk-news/2017/apr/26/people-whose-brain-age-is-older-than-their-real-age-more-likely-to-die-early

https://www.nytimes.com/2017/01/04/well/mind/mediterranean-diet-may-be-good-for-the-brain.html?_r=0

http://www.bbc.co.uk/news/uk-scotland-38513086

Media coverage of LBC1936 latest findings

Scientific highlight: Map of brain networks
The whole brain structural connectome describes a complex map of the connections between different areas of the brain. Using LBC1936 data, we have created such a map for each participant at the first and second waves of brain imaging. From this, we have derived a number of measures which describe global properties of the brain as a network. These measures are taken from "graph theory", an approach which has been adopted from other fields, where it has previously been used to describe the complexity of transport networks, for example.



Representation of the whole-brain structural connectome (image from: http://cmtk.org/viewer/)

This year saw an exciting development in LBC1936 whole brain structural connectome research. The LBC1936 team were visited by Dr Elliot Tucker-Drob (University of Texas at Austin), in October. Elliot's visit marked the beginning of a 5-year research programme into the brain's connectome. The project was recently funded by the US National Institutes for Health, and the team (including Drs Stuart Ritchie, Simon Cox, Mark Bastin, and Professor Ian Deary), will measure connectomes in the Lothian Birth Cohort and in UK Biobank. Describing the intricate organisation of the brain in this way may offer new and important ways to understand subtle age-related brain changes and what such changes mean for complex thinking skills.

Presidential Award at the European Stroke Conference
Professor Joanna Wardlaw, Principal Investigator for neuroimaging on the LBC studies, has been honoured with the Presidential Award, at the European Stroke Conference, May 2017, in Prague. Speaking on this international recognition of her contributions to stroke research, Professor Wardlaw said "*This award is for all the people who have ever worked together with me to improve the diagnosis, prevention and treatment of cerebrovascular disease. Such improvements rely on collaboration and contributions from many many people, especially those at a risk of, or those who have already suffered, from stroke and its other effects of the brain. It is a great honour to receive the award*."

News from Age UK
Age UK has been a proud supporter of The LBC1936 since 2004. At Age UK, we are enormously grateful for all of the time and information which you have given, and continue to give, as LBC1936 members since the project began.

Our Annual Review for 2016, "Proud to be Age UK" published this year features LBC1936 participant John Scott and his brain, and highlights the success of the study. You can find both the annual review and annual report at: http://www.ageuk.org.uk/about-us/what-we-do/annual-report-and-review-2015161/

Past team member and close collaborator, Dr Alan Gow, gave a presentation on 'staying sharp to promote wellbeing', at Age UK's annual For Later Life conference in February. The conference focused on the theme of creating a culture of wellbeing, and Alan's talk featured LBC1936 results on physical activity and social engagement.

In 2017, our brand new 'Staying Sharp' hub was launched, showcasing some LBC1936 research. In the first month alone, the web pages had just under 30,000 views, and the feedback we have received has been enormously positive. Visit the hub here: https://www.ageuk.org.uk/information-advice/health-wellbeing/mind-body/staying-sharp/

Last, but not least, Age UK is a collaborator with American Association of Retired Persons (AARP) in the Global Council on Brain Health (GCBH). The GCBH convenes an international panel of experts to review current evidence on lifestyle factors and brain health and make recommendations. This year, their reports on sleep and social engagement (with LBC1936 representation), have been published. Read the reports here: http://www.ageuk.org.uk/professional-resources-home/research/about-age-uk-research/the-global-council-on-brain-health/

A copy of this newsletter with links to all of the online content is available on our website, and 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

Thanks again from the LBC1936 team
As a member of the LBC1936, you are helping to further our knowledge and understanding of how our thinking skills change over time, how to maintain thinking skills along with brain health and a healthy lifestyle. And you are helping to train the best new researchers in this important scientific field. The LBC1936 research team thanks you for that. We look forward to seeing you in 2018 and beyond.

To let us know if there is any change to your address, or if you would like a copy of any of the papers listed, contact us at:

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Your LBC1936 data produced more than 50 publications in 2017. Here are some of the highlights.

Newly 'in press'

Anblagan, D., et al. (in press). Coupled changes in hippocampal structure and cognitive ability in later life. Brain and Behavior.

Cherrie, M. P., et al. (in press). Green space and cognitive ageing: a retrospective life course analysis in the Lothian Birth Cohort 1936. Social Science and Medicine.

Cole, J. H., et al. (in press). Brain age predicts mortality. Molecular Psychiatry.

Corley, J., et al. (in press). Healthy cognitive ageing in the Lothian Birth Cohort studies. Psychological Medicine.

Cox, S. R., et al. (in press). Brain cortical characteristics of lifetime cognitive ageing. Brain Structure and Function.

Cuckic, I., et al. (in press). Cognitive ability does not predict objectively measured sedentary behaviour. Psychology and Aging.

Gale, C. R., et al. (in press). Cognitive ability in late life and the onset of physical frailty: The Lothian Birth Cohort 1936. Journal of the American Geriatric Society, 65, 1289-1295.

Hill, W. D., et al. (in press). A combined analysis of genetically correlated traits identifies 187 loci and a role for neurogenesis and myelination in intelligence. Molecular Psychiatry.

Linner, R. K., et al. (in press). Epigenome-wide association study meta-analysis of educational attainment. Molecular Psychiatry.

Marioni, R. E., et al. (in press). Meta-analysis of epigemome-wide association studies of cognitive abilities. Molecular Psychiatry.

Ritchie, S. J., et al. (in press). Risk and protective factors for structural brain ageing in the eighth decade of life. Brain Structure and Function.

Ritchie, S. J., et al. (in press). Brain structural differences between 73- and 92-years olds matched for childhood intelligence, social background, and intracranial volume. Neurobiology of Aging.

Wiseman, S. J., et al. (in press). Cognitive abilities, brain white matter hyperintensity volume and structural network connectivity in older age. Human Brain Mapping.

Newly 'in print'

Cox, S. R., et al. (2017). Interaction of APOE e4 and poor glycaemic control predicts white matter hyperintensity growth from 73 to 76. Neurobiology of Aging, 54, 54-58.

Cox, S. R., et al. (2017). Associations between hippocampal morphology, diffusion characteristics, and salivary cortisol in older men. Psychoneuroendocrinology, 78, 151-158.

Hägg, S., et al. (2017). Short telomere length is associated with impaired cognitive performance in European ancestry cohorts. Translational Psychiatry, 7, e1100.

Harris, M. A., et al. (2017). Cognitive ability across the life course and cortisol levels in older age. Neurobiology of Aging, 59, 64-71.

Hoffman, P., et al. (2017). Brain grey and white matter predictors of verbal ability traits in older age: the Lothian Birth Cohort 1936. NeuroImage, 156, 394-402.

Iveson, M., et al. (2017). Intergenerational social mobility and subjective wellbeing in later life. Social Science and Medicine, 188, 11-20.

Job, D. E., et al. (2017). A brain imaging repository of normal structural MRI across the life course. NeuroImage, 144, 299-304.

Kraja, A., et al. (2017). New blood pressure associated loci identified in meta-analyses of 475,000 individuals. Circulation: Cardiovascular Genetics.

Liu, C., et al. (2017). A DNA methylation biomarker of alcohol consumption. Molecular Psychiatry.

Li, A., et al. (2017). Identification, replication and characterization of epigenetic remodeling in the aging genome. Scientific Reports, 7, 8183.

Luciano, M., et al. (2017). Single nucleotide polymorphisms associated with reading ability show connection to socioeconomic outcomes. Behavior Genetics, 47, 469-479.

Luciano, M., et al. (2017). Mediterranean-type diet and brain structural change from 73 to 76 years in a Scottish cohort. Neurology, 88, 449-455.

MacPherson, S. E., et al. (2017). Processing speed and Trail Making Test-B performance, cortical thinning and white matter microstructure in older adults. Cortex, 95, 92-103.

McGrory, S., et al. (2017). Retinal microvascular network geometry and cognitive abilities in community-dwelling older people: The Lothian Birth Cohort 1936 study. British Journal of Ophthalmology, 101, 993-998.

Mendelson, M., et al. (2017). Association of body mass index with DNA methylation and gene expression in blood cells and relations to cardiometabolic disease. PLoS Medicine, 14, e1002215.

Mottus, R., et al. (2017). Markers of psychological differences and social and health inequalities. Journal of Personality, 85, 104-117.

Pinter, D., et al. (2017). Impact of small vessel disease in the brain on gait and balance. Scientific Reports, 7, 41637.

Shaw, R. J., et al. (2017). Relationships between socioeconomic position and objectively measured sedentary behavior in older adults in three prospective cohorts. BMJ Open, 7, e016436.

Shaw, R. J., et al. (2017). The influence of neighbourhoods and the social environment on sedentary behaviour. International Journal of Enviornmental Research and Public Health, 14, 557.

Taylor, A. M., et al. (2017). Associations between intelligence across the life course and optimism and pessimism in older age. Intelligence, 62, 79-88.

Trampush, J., et al. (2017). GWAS meta-analysis reveals novel loci and genetic correlates for general cognitive function. Molecular Psychiatry, 22, 336-345.

Valdes Hernandez, M. C., et al. (2017). Dietary iodine exposure and brain structures and cognition in older people. Journal of Nutrition, Health and Aging, 21, 971-979.

Tzioras, M., et al. (2017). Assessing amyloid-b, tau, and glial features in Lothian Birth Cohort 1936 participants post-mortem. Matters, 3, e201708000003.

Valdes Hernandez, M. C., et al. (2017). Metric to quantify white matter damage on brain magnetic resonance images. Neuroradiology, 59, 951-962.

Valdes Hernandez, M. C., et al. (2017). Hippocampal morphology and cognitive functions in community dwelling older people: the Lothian Birth Cohort 1936. Neurobiology of Aging, 52, 1-11.

Wardlaw, J. M., et al. (2017). Carotid disease at age 73 and cognitive change from age 70 to age 76. A longitudinal cohort study. Journal of Cerebral Blood Flow and Metabolism, 37, 3042-3052.