CCACE Notes

The Newsletter of the University of Edinburgh Centre for Cognitive Ageing and Cognitive Epidemiology.

Brains in 3D
Welcome to the new look CCACE Newsletter. For more information please visit our website at www.ccace.ed.ac.uk or follow us on Twitter (@ccace), Facebook (CCACEEdinburgh) or YouTube (www.youtube.com/CCACEvideo).

The Best Years of Our Lives? Brain, Body and Well-Being

Assembly Hall, Mound Place, Edinburgh

Tuesday 29 April 2014, 6 pm. Chaired by Simon Callow.

Speakers: Professors Ian Deary & Catherine Ward-Thompson
Discussants: Sir Alan Peacock and Sally Magnusson

What are the best years of our lives? What are the true consequences of an ageing brain and body? How do our genes, environments and lifestyles affect our older selves? Is it time to rethink what we perceive an older person is capable of? Book at: http://tinyurl.com/badebed
Bilingualism Delays Age at Onset of Dementia

Dr Thomas Bak, working with colleagues in India, has published a paper in Neurology showing that speaking a second language delays the age of onset of dementia by 4.5 years. This effect was consistent for different forms of dementia. The paper also shows that there is no added benefit of speaking more than 2 languages.

The paper received wide interest in the national and international media and Dr Bak was interviewed on BBC Breakfast and BBC Radio Scotland. You can see some of the articles in the Daily Mail, BBC online, USA Today and CBS News USA.

Alladi S, Bak TH et al. (2013). Bilingualism delays age at onset of dementia, independent of education and immigration status. Published online before print November 6, 2013, doi: Neurology 10.1212/01.wnl.0000436620.33155.a4

Physical Function Related to Brain Volumes

Better fitness is associated with better cognition in older age, but the mechanism for this is unclear. A recent CCACE publication looked at brain structure and physical function in Lothian Birth Cohort participants in their early 70’s. The study found that physical function is associated with brain volume and declining physical function was associated with less white matter tissue.

The study looked at physical function at the ages of 70 and 73 assessed by 6-meter walk, grip strength and forced expiratory volume and brain volumes assessed by MRI at age 73. The study then looked for associations between the resulting ‘physical function factor’ and brain volumetric measures such as brain and white matter volume. A higher level of fitness at age 70 and 73 was associated with a higher brain volume. Decline in physical function between 70 and 73 was associated with smaller white matter volume.

Although these findings support improving levels of physical function, perhaps via physical fitness and activity interventions to maintain brain health in later life, longer term follow-up and mechanistic studies would be needed to fully understand the nature of the associations. The completion of the third wave of testing in the Lothian Birth Cohort (age 76) in late 2013, provides additional data which will allow the team to investigate these findings further. Aribisala, Gow, Bastin et al. (2013). PLoS ONE 8(11): e80386. doi:10.1371/journal.pone.0080386
Mental Disorders and Risk of Coronary Heart Disease

Men with mental disorders are more at risk of developing coronary heart disease, according to a recent study led by CCACE Group Leader’s Dr Catharine Gale and Prof David Batty.

Dr Gale worked with colleagues at the Karolinska Institute to identify an increased risk of non-fatal or fatal heart disease across a spectrum of mental conditions, including schizophrenia, bipolar disorder, depression, neurotic disorders, substance-use disorders and personality disorders.

The study, published in the journal Circulation (doi: 10.1161/CIRCULATIONAHA.113.002065), evaluated more than one million Swedish men who underwent psychiatric and medical assessment during military conscription examinations and were then followed up for around 22 years.

The findings demonstrate that the link between mental disorder and coronary heart disease is not confined to a few disorders or to those whose disorder is severe. Smoking and risky alcohol intake at age 18 years explained to a large degree the link between mental disorder at that time and subsequent CHD, but virtually all associations persisted after adjustment for early-life socioeconomic status, body mass index, diabetes, blood pressure and intelligence measured at conscription, and education and later-life socioeconomic position.

Catharine Gale said: “Our findings suggest that mental disorders pose a huge public health burden in terms of premature illness and death due to coronary heart disease. The physical health care of people with mental disorders needs to be a priority for clinicians if this burden is to be reduced.”
Neuroscience and Family Life: The Brain in Policy and Practice

Does neuroscience make any difference to everyday life? If so, how and to what extent? A new study supported by The Leverhulme Trust will map how neuroscience is being used in policy debates and services, and how these are regarded by the individuals and families they target. The project spans medical sociology, science and technology studies, and social policy (and collaboration with neuroscience). It brings together Centre Member Dr Martyn Pickersgill and Professor Sarah Cunningham-Burley with CCACE Director Professor Ian Deary to ask and answer key questions about science and society. Research Fellow, Dr Tineke Broer has recently joined the team to interview policymakers and families, mapping the pathways taken by neuroscientific research as it moves from science to policy to everyday family practices.

Today, people are increasingly urged to draw on scientific facts and ideas when making choices regarding the care of their family members, across the generations. Often encountered through policy and services, families may sometimes adopt and at other times resist scientific messages. Neuroscientific research is an especially important area of science that shapes policy and practice.

Dr Martyn Pickersgill said: “The relationships between science and wider society are complicated but ever more important to consider. This project will yield new understandings of why and how scientific facts and concepts travel from the laboratory to daily life.” The research will map the pathways from science to policy to everyday family practices. It will investigate how neuroscientific ideas – and the policies and services underpinned by them – are engaged with, understood and challenged through caring practices associated with childhood, adolescence and older adulthood.

New research blog from the Royal Society of Edinburgh

CCACE member Dr Alan Gow has launched his blogging career with contributions to the new Royal Society of Edinburgh Young Academy of Scotland "Research the Headlines" blog. The online blog is aimed at delving deeper into the research behind stories in the media. Being multidisciplinary, the posts come from a range of research disciplines, including psychology, neuroscience, health, etc. You can sign up to receive notifications of new posts at http://researchtheheadlines.org/ or follow them on twitter @ResTheHeadlines. Alan Gow (previously in Psychology at the University of Edinburgh, now at Heriot Watt University) is one of the bloggers, and generally writes about the various factors that are reported as being good or bad for the ageing brain. He has recently posted on subjects as diverse as fish oils and brain training. Alan is also keen for people to help suggest news items too. For more information see www.youngacademyofscotland.org.uk/news/
New Scottish Administrative Data Research Centre

Data collected for administrative purposes can be a rich research resource. CCACE researchers have expertise in this area and are part of a new Scottish Administrative Data Research Centre, to be based at NINE, Edinburgh BioQuarter (pictured).

The new Scottish ADRC will aim to make de-identified data available for research that will produce internationally important findings and guide the development, implementation and evaluation of policy. It will particularly focus on building trust between data providers, researchers and the public and will adopt the highest international standards of governance, professional practise and public engagement.

Professor Ian Deary said, "John Starr and I are delighted to be a part of this ambitious new project in medical informatics and data linkage. We have been linking the Scottish Mental Surveys' data to medical outcomes for almost 15 years now. That has brought discoveries about the association between intelligence in childhood and health and mortality in adulthood and later life. Now we have the opportunity to link the Surveys' data to a wider set of data in a secure environment. We anticipate much new information about how social background and intelligence are related to many aspects of people's life courses."

Funding News

CCACE 3D Brain Shortlisted for Innovation Award

CCACE has been shortlisted for an innovation award for its work in developing a 3D interactive brain model. The CCACE 3D interactive brain allows 3D interactive projections of living human brains to be controlled by simple hand movements. It is an attractive, fun and engaging way for members of the public to interact with real brain imaging data and come to their own conclusions. The user can “grab” the brain, turn and scale it, allowing them to explore what interests them and brains from people of different ages.

The 3D Brain has been shown at science festivals, open days and even the Science Museum in London (pictured above). It uses the latest motion capture (LEEP motion) technology to manipulate the image of the brain. In its most recent form, the 3D brain now incorporates white matter tractography data from a Lothian Birth Cohort 1936 participant provided by CCACE Group Leader Dr Mark Bastin. (cover image).
**New MRC Dementia Research Platform**

The MRC have announced the creation of a major multi-million pound programme ‘The UK Dementias Research Platform’ to accelerate progress in dementias research, and Edinburgh has been successful as a major partner with four Edinburgh PI's contributing alongside colleagues from Cardiff, Cambridge, King's College London, University College London and Swansea. Professors Ian Deary and John Starr will be part of this new public-private partnership which initiates a fresh drive to understand neurodegenerative disease onset and progression.

The Platform will bring together a broad conceptual approach with cutting-edge technologies and significant statistical power, integrating UK strengths in neuroscience, population science and clinical research capability and will provide a unique approach to dementia research, looking not just at the brain but at the whole body.

Of the £5m awarded nationally so far £1m has been allocated to Professor Cathy Sudlow’s laboratory to lead work on identification and adjudication of dementia and related neurodegenerative outcomes, with another £0.5m allocated to Professor Deary's group for work on cognitive reassessment in UK Biobank.

**Age UK Support for the Lothian Birth Cohort to Continue**

Age UK has renewed its commitment to fund the Lothian Birth Cohort 1936 for a further two years in principle. Age UK’s Disconnected Mind has supported the Lothian Birth Cohort 1936 since it began in 2004. The current (third) phase of funding began in 2011 and in agreeing to consider a further two years of funding Age UK commented on the “outstanding progress and productivity” of the project.

Professor Ian Deary said, "My research team and Age UK have been partners in studying people's differences in cognitive and brain ageing for almost 10 years now. I am delighted that we are continuing until at least the end of 2015. As the Lothian Birth Cohort 1936 extends in time, their data become richer and more informative about mental changes in later life".

The Age UK fundraising team and Disconnected Mind scientists work closely to raise funds. Recently, actress Susan Hampshire presented with CCACE Director Ian Deary at a Disconnected Mind fundraising lunch at The Royal Society of Medicine’s elegant Chandos House in London. The Monarch of the Glen and Forsythe Saga star gave a moving talk about caring for her husband - Sir Eddie Kukuludis - who has dementia. Ian Deary presented on the progress and highlights of the Lothian Birth Cohort 1936, followed by a long and interesting Q&A over pudding.
Five minutes with... Sandra Crombie

CCACE promotes postgraduate training in Cognitive Ageing and Cognitive Epidemiology. Here we interview CCACE postgraduate students about their career, their research and their hopes for the future. This issue we speak to first year PhD student Sandra Crombie (Right). Sandra is supervised by Professor Jim McCulloch and Professor Alasdair MacLullich and is part of the CCACE Mechanisms group.

What did you do before coming to CCACE?
I graduated from a degree in Pharmacology in the summer of 2012 and decided that I wanted to get some research experience before starting a PhD. I was very lucky and managed to secure a 6 month internship with Prof. Richard Morris researching the mechanisms of memory consolidation.

When did you first became interested in science?
I have been intrigued by science, especially memory, from a very young age when a close family member had a stroke and developed amnesia. However, it probably wasn’t until late high school that I came to the decision that I wanted to pursue a career in science and chose to do my undergraduate degree in biomedical sciences.

What excites you about your research?
Working in scientific research gives you the chance to be the only person to know something that no-one else knows which is extremely exciting. I also enjoy sharing my data, especially when I see the look on my supervisor’s face when I have some interesting results. I just hope that my research makes a contribution to the scientific community and helps us to understand the mechanisms that underpin cognitive ageing.

How would you describe your research to a member of your family?
Coming from a completely non-scientific family, I’ve practised my ‘elevator pitch’ on many occasions. I’m focussing on how being exposed to stress in the womb can affect the brain development of the baby and cause memory problems later on in life. It’s a topic that people can relate to and there are always plenty of questions to follow. I love explaining what I do and the reaction I get reinforces why I’m doing it.

If you could choose one moment at CCACE that inspired you, what would it be?
I helped out at both the Edinburgh Science Festival and MRC Centenary event (picture p9) this year and I had the opportunity to interact with members of the public of all ages. It was great to know that so many people wanted to hear about my research and were genuinely interested in what I am doing. I love talking to people about science. I think a job in science communication would be great.
**What have you been doing recently?**

I attended a summer school in Utrecht this year about the developing brain, which was really cool. There were 30 students from around Europe who were at different stages of their career, from neuroscientists to doctors to those who just wanted to learn a bit more about the brain. It was great to talk to people from different backgrounds and exchange ideas.

**What three words describe CCACE?**

Dedicated, inspiring, relevant.

**What do you like to do when not doing research?**

I love cooking and baking, so I’m always bringing cakes and biscuits into the office. It seems to cheer people up when they’re having a bad day!

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**Generation Scotland Showcases CCACE Expertise**

CCACE expertise was recently profiled at the Generation Scotland Symposium 2013. Generation Scotland is a research resource of considerable value for cognitive research, with cognitive assessment in over 20,000 individuals. Dr Riccardo Marioni (right), CCACE Chancellor’s Fellow presented on the CCACE-led GS Cognitive Expert Working Group.

The main aim of the Cognitive Expert Working group is to investigate the relationship between the cognitive, personality, and mood variables in Generation Scotland and their associations with health, lifestyle, and genetic variables.

Generation Scotland fits perfectly within the CCACE framework as the breadth of data available provides a resource for nearly all of the centre’s research sub-groups. For the cognitive epidemiology and individual differences groups, it allows us to extend existing work from the Lothian Birth Cohorts. Generation Scotland has a very large sample size of 24,000, of whom 10,000 have genetic data. This allows us to answer questions that would not be possible using smaller datasets. Riccardo said, “GS has enabled me to work with CCACE colleagues from across the University of Edinburgh, the UK, and internationally. It is an excellent resource to encourage cross-centre collaborations.”
Happily Marrying Psychology's Two Cultures

A perennial gap in psychology lies between the individual-differences and cognitive-neuropsychology approach to cognitive ageing. It was convincingly closed by Professor Randall Engle in his St Andrews Day lecture to CCACE on 26th November. Professor Engle (pictured right) was recently appointed as a part-time member of the Psychology Department at Edinburgh. His excellent lecture reviewed his and others' research that characterised the nature and associations of working memory, the psychological capability that allows us to store and manipulate information at the same time.

A large and multi-disciplined audience enjoyed his lively and accessible account of the importance of working memory, its diverse associations with other psychological skills and life outcomes, and its difference from fluid intelligence. With good data and a warm and open style he achieved one of CCACE's principal aims: the marriage of the differential and cognitive approaches to mental ageing. Professor Engle also met with CCACE's PhDs, post-docs, and members.

Celebrating Imaging Sciences - CIVIS Annual Meeting

The Centre for In Vivo Imaging Sciences (CIVIS) recently held its second Annual Scientific Meeting titled ‘Imaging in Tissue Regeneration’. The event was a great success with over 120 delegates from across Edinburgh and beyond, as well as NHS and industrial partners, in attendance. The day boasted an array of interesting speakers, including Dr Tobias Schwarz and Richard Collins presenting 3D printing models and Dr Will Shu on 3D organ printing opportunities.

Over 30 posters were submitted and 6 proffered papers given, on themes of ‘Breaking new technical ground’, ‘Commercial success’ and ‘Teaching and Training’. Congratulations to the winners of the poster competition, Noel Conlisk, Jennifer Adil-Smith and Elaine Sandeman respectively. The winner of the poster in the ‘visual impact of images’ category was CCACE member Maria Valdes Hernandez and the best proffered paper Dr Michael Thrippleton.

For further information on CIVIS Executive Group Members and the new online MSc in Imaging (as well as related Imaging short courses) visit www.edinburghimaging.ed.ac.uk. Please follow us on Facebook (www.facebook.com/MScImaging) Twitter (@imagingmsc).

Jane Barr
Staff Changes

We say goodbye to **Natalie Royle**, who, since the beginning of 2009, has been the CCACE Brain Imaging research assistant for structural brain image analysis on the LBC1936 in the Brain Research Imaging Centre (BRIC). During this time she has worked on both automatic and manual methods for segmenting a wide range of different brain structures from MRI, and has applied these techniques to both Lothian Birth Cohorts - more than 1000 brain scans in total!

This work has underpinned a large number of the papers produced from scanning the LBC1936, including relationships between whole brain, hippocampal and white matter hyperintensity volumes and lifelong changes in cognitive ability. It also forms the basis of her PhD which she has been working on part-time since late 2009. In parallel with this, she has also provided human brain imaging support to members of CCACE, a role she particularly enjoyed; Natalie featured in a video about her work (pictured above) which can be found at [www.youtube.com/ccacevideo](http://www.youtube.com/ccacevideo).

Away from image analysis, Natalie was a great supporter of CCACE public engagement activity, helping to create activities for school children and leading several workshops with primary and secondary school pupils. From all the members of BRIC and CCACE, we would like to thank Natalie for all her hard work over the last five years and to wish her the very best in her new life in London.

**Donald Lyall** (left) successfully completed his PhD with CCACE this summer. He studied how genetic variation in the APOE gene affected brain structure in the LBC1936. Donald has now taken up a postdoctoral position at the National Institute of Aging, Johns Hopkins University in Baltimore, USA. Donald was also a great supporter of CCACE public engagement, and even submitted to being interviewed by Ann Lingard and his story appearing as part of LBC Lifetimes ([www.lbclifetimes.org](http://www.lbclifetimes.org)) which tells the stories of research participants and staff involved in the Lothian Birth Cohorts. We wish Donald all the best in his new role and future career.

We welcome **Chloe Fawns-Ritchie** (right), the new CCACE Human Testing Development Officer. Chloe is already supporting centre members with conduct, design, analysis and training in cognitive testing. Chloe works part-time (50%) and is based at 7 George Square and can be contacted at [cfawnsr@staffmail.ed.ac.uk](mailto:cfawnsr@staffmail.ed.ac.uk).
3 February 2014 - CCACE Scientific Discussion Day.

CCACE Scientific Discussion Day: Added value: Links between CCACE and Informatics. Informatics Forum. The first in what will be a new series of CCACE Scientific Discussion Days which will become a regular part of CCACE phase 2. Title "Added value: Links between CCACE and Informatics. Led by Prof David Porteous of CCACE and Prof Dave Robertson of Informatics. 9.00am-4.30pm.

12 March 2014 - Neuroscience Day 2014

Neuroscience Day 2014. Royal College of Physicians of Edinburgh. This annual meeting is a flagship Edinburgh Neuroscience event with more than 300 researchers and students from across the university. It is a day packed with interesting neuroscience-related talks and posters. The Annual Distinguished Lecture will be delivered by Dr Jonathan Rosand, from Harvard Medical School, who is an expert in stroke genetics. Registration will open in mid-February but put the date in your diary now!

29 April 2014 - The British Academy Debate, Edinburgh

The British Academy Debate: The Best Years of our Lives? Body, Brain and Well-Being. 6.00 pm Assembly Hall, Mound Place, Edinburgh. Chaired by Simon Callow. Speakers: Professor Ian Deary, Professor Catharine Ward-Thompson. Discussants: Sir Alan Peacock and Sally Magnusson. For more information and to book, see http://www.britac.ac.uk/events/2014/The_Best_Years_of_our_Lives.cfm

27 August 2014 - CCACE Annual Research Day

Keynote speaker is Paul Thompson, Brain Research Institute, UCLA who will speak on brain imaging in ageing. The meeting is earlier next year as it was arranged to coincide with Joanna Wardlaw's SPIRIT meeting: Methods for brain image banking and atlas development? (attendance at SPIRIT by invitation only). F21 in 7 George Square.
A “Whistle-stop Tour” of Longitudinal Data Analysis

CCACE Statistician, Dr Mike Allerhand has embarked on a new course on Longitudinal Data Analysis to support cognitive and other researchers. The course attracted 50 researchers from within and outwith CCACE.

This new course breaks new ground, Mike said “Advances over the last 15 years have brought longitudinal data analysis into the statistical mainstream. Authoritative texts and excellent programs are now widely available. However it is a challenging technical area. The CCACE course on longitudinal data analysis is designed as an introduction focusing on principals and methods. The aim is to help researchers to carry out appropriate analyses.”

Feedback has been very positive with one participant describing the course as a “Very useful whistle-stop tour of longitudinal data analysis modelling.” and another commenting “The clearest I’ve had residual variances and whether or not you specify that they are allowed to co-vary with each other explained to me, ever”. Mike is planning to repeat the course in 2014, contact anna.sim@ed.ac.uk or see the CCACE website for further details.

Using CCACE Core Staff

If you have a project or grant application that would benefit from the skills offered by any of the CCACE core staff please contact them directly or e-mail ccace@ed.ac.uk.

Support Staff
Scientific Administrator: beverly.roberts@ed.ac.uk
Administrative Secretary: anna.sim@ed.ac.uk
Knowledge Exchange Officer: robin.morton@ed.ac.uk
Database Manager: dave.liewald@ed.ac.uk

Scientific staff
Statistician: michael.allerhand@ed.ac.uk
Geneticist: sarah.harris@igmm.ed.ac.uk
Genetic Statistician: gail.davies@ed.ac.uk

Technical staff
Human Testing Technician: cfawnsr@staffmail.ed.ac.uk
Brain Imaging Development Technician: ccace@ed.ac.uk
Animal Development Technician: ccace@ed.ac.uk

If you have any news, planned events, new research grants, new prominent research papers, or media coverage of your work - or any questions about the Centre - then please get in touch with Dr Robin Morton, Centre Knowledge Exchange Officer by e-mailing robin.morton@ed.ac.uk or calling 0131 650 8292.
Centre for Cognitive Ageing and Cognitive Epidemiology
Department of Psychology
University of Edinburgh
7 George Square,
EDINBURGH
EH8 9JZ

+44 (0)131 650 8275
ccace@ed.ac.uk

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