CCACE: Five more years

Welcome to Phase 2 of the Centre for Cognitive Ageing and Cognitive Epidemiology (CCACE). It does not seem long since I was welcoming you to the start of the new Centre. Now, after five whizzed-by-years, it is hard to think of the University of Edinburgh without CCACE.

Today, I welcome our renowned Keynote speaker Professor Sudha Seshadri from Boston University, our friends from the Oregon Health and Science University, our visitors, and CCACE students, core staff and members.

The formation of the Centre seemed an obvious step to me: bringing in infrastructure and a postgraduate training programme for a range of life-course cognitive activities that were taking place at the University of Edinburgh has given us a strong identity and platform, and boost for new activities. We thought we were working together well and doing good science, training and engagement, but the 5-year review externally-validated that. Thirteen international scientists—seven referees and six in the MRC-BBSRC visiting group—gave, in the end, a superb score for our activities; the same as the Edinburgh-based MRC Human Genetics Unit and the Centre for Regenerative Medicine obtained in their recent reviews. In their overall assessment they told us that: we were very productive in high-quality publication; that the commitment from the University of Edinburgh is outstanding; that the Cognitive Epidemiology and Individual Differences groups were especially strong; that our new areas of interest (e.g. informatics and gene methylation) were well justified; that the morale, enthusiasm and commitment of Centre students and staff was high; that we had a good new training strategy; and that our proposal for the next five years (2013-2018) was excellent value for money.

I asked CCACE group leaders to pick out some Phase 1 science highlights. There were too many to list here. A few, though. In cognitive epidemiology, the work associating intelligence with a wide range of mortality causes and morbidities (physical and mental) was strong, as was the demonstration of how intelligence is often a stronger predictor than traditional risk factors. In cognitive ageing, the firsts in genetic understanding of cognitive ability and cognitive ageing, and the contributions of brain white matter integrity and small vessel disease were published at the highest level. There were novel findings regarding which determinants of cognitive ageing appeared true, and which were confounded by childhood intelligence. There were impressive demonstrations of the importance of minimizing interference can improve memory ability. There are assessments for Alzheimer’s disease in their final stages of development as tablet computer apps, and they are in use in clinics internationally. There was the development of selective 11β-HSD1 inhibitors as effective pharmaceuticals to improve memory in ageing models; clinical trials are beginning.
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In engagement we were again prominent at the Science Festival, the Festival Fringe, and the Book Festival in Edinburgh. Our events to mark the MRC Centenary—the Brain Maze and the Grand Debate—were sold out and hugely enjoyed. There is much more, but space prevents. I have been delighted that we have drawn people from the arts—for example, the writer Ann Lingard and artist Fionna Carlisle—to CCACE. Through stories, paintings, photography and video, and plays, they have expressed our research in imaginative ways and taken us to new audiences.

Our training is progressing very well. Three PhDs have graduated from our programme: all completed early, published as they went along, and went straight into post-doctoral positions. Our young scientists responded superbly to the MRC centenary funds competition, and we were able to win and distribute £120,000 because of them. Our vision for training has been endorsed by the MRC and BBSRC. In Phase 2 we shall continue the PhD programme—across the HSS and MVM colleges—and we shall build a new cohort of CCACE tenure-track post-doctoral scientists. The first of these—Riccardo Marioni—has begun.

In addition to the CCACE Groups’ gearing up for the ambitious research programmes they set themselves in the proposal we made to MRC, I have been delighted to see our confidence in taking up new directions and responding to challenges. We have been prominent and numerous in the response to the MRC’s Dementia Platform, we have already formed groups to analyse large datasets such as Generation Scotland and UK Biobank, we have formed a joint Cognitive Genetics and Epigenetics Group with the University of Brisbane, we are leading international consortia and discussion groups on cognitive genetics and brain imaging, and we are a key part of a large EU programme to help older people remember what is important and forget what is not. You will hear much more about the ambitious plans for Phase 2 at the Research Day.

There are too many thanks to offer comprehensively: CCACE members, staff, students, and collaborators have all contributed to our success; the University of Edinburgh’s HSS and MVM colleges have helped us to develop and realize our aims; and the PPLS School and the Department of Psychology—whose staff I especially thank—have enthusiastically accommodated and applauded us. Here’s to the next five years; let’s excel, grow, influence, and keep enjoying ourselves.

Ian Deary, Director of CCACE

CCACE Leads on Standards for the Vascular Contribution to Neurodegeneration

A worldwide collaboration to standardise the terminology used to determine vascular imaging anomalies has been led by CCACE Group Leader, Prof Joanna Wardlaw, along with Martin Dichgans (Munich) and Eric Smith (Calgary). The paper describing the recommendations of the Centres for Excellence in Neurodegeneration (CoEN) Working Group on Standards for Determining the Vascular Contribution to Neurodegeneration has been published in Lancet Neurology, 12(8), 822 - 838.

Joanna Wardlaw said, “This is a major output for the whole of cerebral small vessel disease and vascular dementia (which account for 45% of dementias) and very significant for CCACE. This collaboration involved co-operation of 28 groups worldwide and three funders, including the MRC.”

The USA Alzheimer’s Association said: “The Alzheimer’s Association endorses the value of standards such as these for scientific studies of vascular contributions to dementia. The Association recognizes this is an important area of research.”
TEN FROM FIVE: Highlights from the first Quinquennium

**Professional Training**
CCACE has run a series of courses, in genetics, statistics and imaging. Dr Mike Allerhand led a series of 13 courses in the statistical programming language R. The course, which has spawned a book, attracted 280 attendees. CCACE also offers an online course in systematic reviews and of course postgraduate training.

**Facial Symmetry**
Dr Lars Penke received international press attention for his paper showing “Symmetric faces are a sign of successful cognitive ageing”. Data from the LBC1921 study suggested that individuals with more symmetrical faces were more likely to maintain their cognitive ability in later life.

**A Target for Prevention of Memory Loss**
A group led by CCACE co-director Professor Jonathan Seckl and research member Dr Joyce Yau discovered a compound an inhibitor of 11β-HSD1 (right) that could be used to create drugs to help prevent memory loss linked to ageing.

**Brain Connectivity & Intelligence**
In a paper to the journal Molecular Psychiatry CCACE showed that "Better connected brains make you smarter in older age". They found that older people with robust white matter can process information quickly and this makes them perform better in tests of general intelligence.

**BBC Study of Memory**
CCACE group leader Professor Robert Logie published on a large memory data set collected via the Internet in collaboration with the BBC. It demonstrated that the Internet is a viable method for collecting cross sectional data from large numbers of people. The paper also demonstrated changes in prospective memory compared with changes in different tests of working memory between the ages of 18-79 years.

**Genetics of Human Intelligence**
A study by Dr Gail Davies (right) and colleagues provided the first estimates of the extent to which genes determine changes in intelligence across the human life course. The study found that genetic factors may account for about 24% of changes in intelligence between childhood and old age.

**6-day Sample Follow-up Study**
50 years after they were last contacted by researchers, several hundred people received a box in the post. In it was an invitation to take part in the 6-day Sample Follow-up Study, and everything they needed to take part, including an instruction DVD.

**Exercise to Keep the Brain Healthy**
People who exercise later in life may better protect their brain from age-related changes than those who do not. This is the suggestion in a study published by CCACE member Dr Alan Gow and colleagues. The story attracted considerable international press interest.

**Psychological Distress & Mortality**
A novel paper, co-authored by Dr Tom Russ, Prof David Batty and Prof John Starr was the first to clearly show an association between low (sub-clinical) levels of psychological distress and premature mortality. It raised the possibility that low levels of distress should perhaps be treated more proactively in general practice. The paper won Dr Russ the prestigious Royal College of Psychiatrists in Scotland Research Prize 2013.

**100 Years of the MRC**
CCACE marked 100 years of the MRC with sell out events. The MRC Centenary Debate was chaired by Sally Magnusson (right) and featuring Sir Tam Dalyell. Earlier the same day our Brain Maze event captured the imaginations of over 100 members of the public.
The story behind the Lothian Birth Cohorts has always attracted a lot of interest. CCACE recently launched a project which seeks to capture the story behind the data. LBC Lifetimes: Lifetimes of the Lothian Birth Cohorts 1921 & 1936 tells the story of the individuals involved in the research.

LBC Lifetimes is a series of short stories, by author and broadcaster Ann Lingard, of some of the research participants and scientists involved in the Lothian Birth Cohort studies. From the Professor with an interest in punk and poetry to the research participant who was brought up in a lighthouse. This project brings to life the character, history and above all life stories of those involved in Lothian Birth Cohorts. The stories also tell about their relationship to the research, their experience of being part of a large study of ageing.

Ann Lingard (pictured left) said “I’m so grateful to have had the chance to meet the LBC participants, it’s been a delight for me. I had never met any of them before – but they invited me into their homes and were happy to talk about themselves, and to hunt out photos of their childhood. We had some wonderful conversations, sometimes very moving, and everyone welcomed me with so much kindness. There was a lot of laughter, too! I feel it’s been a great privilege to have met them – and I hope the ‘stories’ of their Lifetimes help to show them as people, in addition to all their cognitive and scientific data.”

Ann Lingard lives in a rural idyll in the Lake District and is a former scientist and author of fiction and non-fiction novels. These fascinating stories can now be viewed at www.lbclifetimes.org

Longitudinal data analysis is important for accurate measurement of cognitive and physical change, to disentangle influences on change, and to understand individual differences in change. However longitudinal data are expensive to collect and difficult to analyze.

This new 1-day course aims to describe methods for exploring and analyzing longitudinal data, to understand their assumptions, strengths, weaknesses, and enough about how they work to help you make appropriate modelling choices and interpret results.

The course does not require skills with any particular program. There should be something for users of most statistics programs.

For more details and to book, please contact anna.sim@ed.ac.uk or visit www.ccace.ed.ac.uk

Longitudinal Data Analysis
Wednesday 27 November 2013, 9:30am—4:30pm

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