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

A Reunion of Minds
Confessing my CCACE Sins  by Ian Deary

Welcome to our 2014 Research Day’s Newsletter. I welcome, especially, the new core staff, PhDs, post-docs, and other new members. I welcome and thank our new Scientific Advisory Board.

Not long ago I was at an MRC meeting of Directors and Units. A main item on the agenda was the new bribery legislation. If we received anything more valuable than a leaky pen we had to fill out umpteen forms and, for penance, recite the MRC’s Strategy document ‘Research Changes Lives’. Maybe it’s unflattering, but CCACE has not been sufficiently attractive to anyone to offer me an Irish sixpence. But, it made me think how hard it has been to avoid sin in CCACE since the start of our second quinquennium.

I confess pride: it’s unavoidable; our members induce it. Alan Gow’s just done a great show on the Fringe, and Stuart Ritchie (first CCACE post-doc) and Thomas Bak are all over the radio and the newspapers, each articulate on the solid science of cognitive ageing. Andrew McIntosh has led and won a Wellcome Trust Strategic Award, Joanna Wardlaw has won a European JPND award, Alasdair MacLullich has won a large MRC award for translation, Richard Morris won the 2013 Foundation Ipsen Neuronal Plasticity Prize and will be awarded a Royal
Welcome

Society of Edinburgh Royal Medal in 2014, four of us in CCACE are on the Steering Committee of the soon-to-be-formally-launched UK Dementia Platform, our core staff are leading and making valuable contributions to international consortia... I could go on. There are so many of your achievements to be proud of.

I confess the urge to sloth, especially around Christmas. It was just before Christmas when the MRC announced the call for bids for £50M for Clinical Research Infrastructure to help in the stratification of dementias. We at CCACE were asked to co-ordinate the University’s bid, and we forwent festive sloth (I did actually rush off to baste a turkey during one teleconference). The result is that Edinburgh will soon have a new PET/MRI device and stem cell capability aimed at cognitive decline.

I wonder if we in CCACE give in to greed and gluttony, but I use Freudian defence mechanisms to deny and rationalise these urges. Our expanding the Lothian Birth Cohorts and Generation Scotland into big new areas, our Hoovering-up the data from UK Biobank and Generation Scotland, our being key players in the new Administrative Data Research Centre and the proposed new Scottish Longitudinal Study (which I am still lobbying to be called Healthy Ageing In Scotland: HAGIS), our leading on several international GWAS and methylation consortia... Again, I could go on. However, I see all that and much more as a delivery on our renewal plans, and the fact that we are a University of Edinburgh and national and international go-to Centre for advice and co-ordination invokes pride again.

To avoid envy I employ Freud’s reaction formation defence, and evince the opposite. Thus, I have no envy at David Porteous’s great success in leading an application and getting to the finals of the European H2020 competition with his CCACE-laden team’s ambitious proposal for stratifying mood disorder. Certainly, I don’t envy his putting together the 36,000 words that comprise it. Good luck, David and team.

I confess wrath, though I fear it’s worsened by being sanctimonious. I commit this every time I see a flawed paper on cognitive ageing or cognitive epidemiology in a high-impact journal that I know our members will do better, with their data and knowledge. To balance that I remind myself of the large number of high impact papers we have to enter into ResearchFish every year.

I decided to leave lust to the end, assuming that you might read this until you got to it. There’s nothing to see here, move on.

CCACE Phase II has been about managing growth: in the expansion of the work we were doing, in the taking-on of new areas such as the mood-cognition interface and dementia as well as milder cognitive ageing, and in the leading roles we play in national and international cognitive ageing research bodies. So, I confess that, in the renewed CCACE, I have sinned, and I look forward to sinning even more in the coming years. Ian Deary, Director, CCACE
A Meeting of Minds

Over 400 Lothian Birth Cohort participants gathered at the Assembly Hall in Edinburgh to mark the completion of the latest phase of the Lothian Birth Cohorts of 1921 and 1936.

During the reunion of the Cohorts, Professor Ian Deary and colleagues summarised new data from the latest round of testing. This included the contributions of genetic and lifestyle factors to brain ageing, and future plans to look at the effect that factors such as sedentary behaviour and the quality of the local environment in later life has on ageing.

Marking 7 years since the first Lothian Birth Cohort 1936 reunion, the team arranged for a repeat of the iconic photograph of the cohort on the steps of the Assembly Hall. It has been interesting to compare the images (above).

The occasion marked several firsts. It is the first time that both cohorts have been brought together. It also marked the launch of Lifetimes, a book of short stories by Ann Lingard about participants in the studies (see page 9). The participants also got a preview of The Living Brain, a new short film by Anne Milne and four portraits by artist Fionna Carlisle both focussing on the Lothian Birth Cohort participants.
In a study of twins, CCACE researchers have recently shown that a twin who was better at reading at earlier ages tended to have higher intelligence than their sibling later in life.

The research capitalised on the Twins Early Development Study (TEDS), a UK-wide longitudinal study of twins, who have been tested multiple times since they were born in 1994-1996.

The researchers asked the question “does learning to read improve intelligence?”. Since reading and intelligence are correlated together, it is hard to tell whether one has effects on the other as children develop. The team were able to take a step towards understanding this causal relationship by using data from identical twins.

They found that the twin from each pair who was better at reading at earlier ages tended to have higher intelligence later in life. Since the identical twin design rules out any genetic or family-based explanations, the reasons for this relationship must be down to experiences that the twins do not share, and the researchers recommend that this should be a focus of future research. If learning to read improves intelligence, it may be part of the reason that schooling in general appears to have positive effects on intelligence – positive effects that are seen across the lifespan, and have been shown (under the rubric of ‘cognitive reserve’) to be helpful in old age.

The research was published in the journal Child Development by CCACE researchers Drs Stuart Ritchie and Timothy Bates, along with TEDS Director Professor Robert Plomin, who has previously collaborated with CCACE on several genetics projects. The results of the paper were covered widely by the national and international media, with stories appearing in newspapers including the Times, the Daily Mail, the Edinburgh Evening News, the Herald, and the Metro along with newspapers in Spain, China, Brazil, Austria, and the United States. The story was also broadcast on BBC Radio Scotland and STV News.

Is Life Too Fast When You are Slowing Down?

In April, CCACE hosted an Expert Workshop to discuss this question, and much more on the topic of processing speed.

Psychologists have studied the brain’s speed for well over a century. Since Francis Galton’s initial experiments in measuring reaction time, hundreds of experiments have examined ‘processing speed’, and many of them have linked it to more complex cognitive abilities, like general intelligence. But all this research has not led to any consensus on a fundamental question: “do differences in processing speed underlie differences in intelligence?”

11 experts from the UK, Europe, and US, joined Ian Deary and Stuart Ritchie to discuss processing speed. New results linking processing speed to intelligence, the brain, and genetic differences were presented, and theoretical debates about the nature of processing speed were discussed in depth.

The workshop, which was funded by the British Academy, was timed to coincide with the BA debate: The Best Years of Our Lives? Brain, Body and Well-Being. It was held in the Kelvin Room of the Royal Society of Edinburgh. The researchers who attended are currently collaborating on writing a ‘position paper’ on processing speed and intelligence, which will lay out the evidence on the question and act as a starting point for future research on this important, though vexed, question.

Speaking Two Languages Benefits the Aging Brain

A new study led by CCACE member Dr Thomas Bak (pictured left, with his daughter), reveals that bilingualism has a positive effect on cognition later in life. See the story on the BBC.

The study, examining 835 participants, shows that those who speak two or more languages were better on some cognitive tests than would be predicted from their performance in such tests at age 11.

A positive effect of bilingualism (including a delay in the onset of dementia) has been reported in previous studies, however it has proven difficult to determine whether people improve their cognitive functions through learning new languages or whether those with better baseline cognitive functions are more likely to become bilingual. The Lothian Birth Cohort 1936 allowed the CCACE researchers to address this question for the first time. This study shows the effect of speaking more than one language is independent of age 11 cognition.
No negative effects of bilingualism were observed in any group. “These findings are of considerable relevance”, says Thomas Bak. “Millions of people around the world acquire their second language later in life. Our study shows that bilingualism, even when acquired in adulthood, may benefit the aging brain.” Hear Dr Bak talk more about the paper here.

The study was co-authored by CCACE core staff members, Dr Mike Allerhand and Jack Nissan and CCACE Director Prof Ian Deary. These findings were published in the journal Annals of Neurology on 2 June 2014.

This study builds on earlier work which shows that speaking more than one language delays the onset of dementia by 4.5 years http://www.ccace.ed.ac.uk/news-events/latest/bilingualism


Image credit: Murdo MacLeod

**Mental Health and Cardiovascular Disease**

Two recent publications from CCACE have provided new evidence for a link between poor mental health and cardiovascular disease.

The Cognitive Epidemiology Programme has two broad streams of work: understanding the causes and consequences of cognition and mental health. Central to the mental health theme is the link between mental health and somatic health.

Over the last year we have focussed on the relationship between mental disorder and cardiovascular disease. We have previously shown that psychiatric diagnosis of a wide range of common disorders in early adulthood or later was linked with a consistently increased risk of incident coronary heart disease (1). Building on this finding, using the technique of individual participant meta-analysis comprising up to sixteen cohort studies, we have explored the link between self-reported symptoms of psychological distress (depression/anxiety) and different presentations of cardiovascular disease. In the first study of its kind, analyses revealed that the highly distressed group, relative to their distress-free counterparts, experienced an elevated risk of peripheral vascular disease and heart failure but not abdominal aortic aneurysm. These results provide new evidence of mental health-related cardiovascular disease presentations that may be of relevance to health care professionals.


Dangerous Ideas at the Edinburgh Festival Fringe

It may not be the kind of thing you’d expect in a yurt during the Fringe, but CCACE member Dr Alan Gow packed the Stand in the Square to put ‘Brain Training on Trial’.

Alan (pictured in action above) was pitched as the ‘expert witness’, with the audience as jury, prosecution and defence, and comedian Susan Morrison as Judge. What it amounted to was an entertaining, interactive and informing show.

The show started with a demonstration of brain growth using balloons, to the strains of Simple Minds ‘Don’t you forget about me’ which of course culminated in a flurry of flying balloons. Brain networks were demonstrated with wool, again more flying, wool this time.

Assisted by darts, human bar graphs and a game of jargon bingo (called Braingo), Alan covered some of the science behind how we might get better at tasks (or games and puzzles) with practice, research that underlies the market for brain training type products. The show urged caution about the apparent age-defying claims of some brain training games.

The show had the highest audience figures of all Edinburgh Beltane’s Cabaret of Dangerous Ideas shows this year.

Alan said: “As an avid Fringe goer, signing up seemed like a good idea at the time! Thankfully with the teams at the Beltane, Heriot-Watt Engage and most notably Robin Morton supporting me along the way, I’m pleased to say this was a genuinely worthwhile and (fun) experience.”

Lorna Lopez offers Science on a Soapbox

Former CCACE post-doctoral researcher, Dr Lorna Lopez (pictured left), was selected as one of Ireland’s leading women scientists to showcase her research in a public event called Soapbox Science.

On a rainy Saturday at Trinity College Dublin, Ireland, Lorna took part in an event that aimed to encourage young scientists, to raise the profile of women scientists and to show that scientists aren’t all white-haired men in stuffy lab coats! Lorna used a giant furry neuron, brain bean bags designed by Edinburgh Neuroscience and made by her Mum, and a 3D brain loaned by CCACE from an LBC1936 research participant to explain her research and to give “Clues to understanding your brain”.

CCACE KE Officer, Dr Robin Morton said "Lorna is a natural communicator, I am sure her enthusiasm hooked her audience, despite the rain. We were delighted that she was able to use some of the materials we have developed at CCACE to help engage young people".
What’s in Your Head?

Ask a class of 11 year olds “What’s in your head?” they pretty much get it spot on. This is what CCACE discovered when it recently rolled out a workshop for primary school pupils in which they learned about the brain and how it works.

Around 60 pupils from Prestonfield and Victoria Primary Schools in Edinburgh travelled to 7 George Square to hear about how the brain gets information from the outside world and then processes it and experience some of the tests themselves. Feedback from the pupils was extremely positive, their favourite activities included the Deary-Liewald Reaction Time task and interacting with brain imaging data from the Lothian Birth Cohort 1936 in the form of the CCACE 3D interactive brain developed by Dave Liewald.

The workshop was developed by CCACE KE Officer Dr Robin Morton, in close collaboration with Dr Jane Haley from Edinburgh Neuroscience.

The workshop also introduced science engagement to a group of undergraduates and postgraduates from cognitive science related disciplines as part of the University Innovative Learning Week in an initiative led by Dr Sue Widdecombe (Psychology) and CCACE member Dr Rene Motus. The students also had a significant input into the design of the workshop.

CCACE continues to offer workshops for secondary school pupils as well as a popular work experience programme.

CCACE Publishes... in Paperback!

This April saw the publication of a book of short stories about the Lothian Birth Cohorts. Lifetimes, by Ann Lingard, follows the lives of members of the Lothian Birth Cohorts and the scientists involved in the studies.

The book has proven very popular with participants and those who stop to chat at events and science festivals. It will form the basis of a “book group” event at the Midlothian Science Festival this October.

Lifetimes is also available as a free downloadable e-book on iTunes and Kobo and for a small fee on Kindle. If you would like a copy of Lifetimes, please contact robin.morton@ed.ac.uk

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New Strategic Award to Diagnose Depression Better

CCACE hosted the launch of a new grant, called STRADL (Stratifying Resilience and Depression Longitudinally) to better classify individuals with low mood into discrete categories.

The aim of the project is to apply longitudinal measures of clinical symptoms, cognition, and brain imaging to people from the Generation Scotland cohort (a study of more than 22,000 people and 6000 families across Scotland). In doing so the investigators hope to find better methods of diagnosing people with low mood that make them better targets for research and, in future, personalised and more effective treatment.

Ian Deary, an investigator on the STRADL project, spoke at the launch and highlighted the important and long-recognised association between low mood and cognitive ability. Four of the investigators, including the principal investigator Andrew McIntosh, are members of the CCACE and the Centre will take a major role in the study over the next 5 years.

Higher Resolution Research Imaging

CCACE Group Leader Prof Joanna Wardlaw and Colleagues have secured £600k from the Wellcome Trust to help purchase an advanced neuro-optimised 3Tesla Magnetic Resonance (MR) scanner for brain imaging research addressing lifecourse influences on brain health and disease.

The MR scanner will be situated in a purpose-built building at the Royal Infirmary Edinburgh, accessible to healthy and high-dependency patients. This resource will continue with major mechanistic programmes, progressing to large clinical trials of interventions, aiming to improve outcome and change practice worldwide a number of disease areas including ageing, dementia, and psychoses.

UK Dementia Platform

Researchers from CCACE - and 7 other UK universities - are joining forces with industry experts from pharmaceutical and biotech companies to form the UK Dementia Platform (UKDP).

The collaboration - which is being led by the Medical Research Council - was announced on Thursday 19th June 2014 by Prime Minister David Cameron in a speech at a summit of world health and finance leaders in London.

Four of the 14 research leaders who will steer the project are from the Centre for Cognitive Ageing and Cognitive Ageing and Cognitive Epidemiology: Professors Ian Deary, John Starr, Cathy Sudlow and Jean Manson. For more information see http://www.ed.ac.uk/news/2014/dementia-190614
Congratulations

Births and Awards

Congratulations to CCACE Scientific Administrator Dr Beverly Roberts who gave birth to her second child Dawson William Roberts who was born at the end of May. Beverly will return to work in 2015. Also congratulations to Hazel Lambert on the birth of her son Lochlan in August. As former MRC Regional Communications Manager, Hazel provided communications support to the Centre for several years.

Congratulations to Professor Sharon Abrahams who has been awarded a Personal Chair in Neuropsychology.

Finally, Congratulations to Professor Richard Morris won the 2013 Fondation Ipsen Neuronal Plasticity Prize and will be awarded a Royal Society of Edinburgh Royal Medal in 2014.

Our Director’s Two Lifetimes

Ian Deary is to receive two Lifetime Achievement Awards for his research on cognitive ability and cognitive ageing.

In December 2014 he will receive the Lifetime Achievement Award from International Society for Intelligence Research. In May 2015 he will receive the highly prestigious James McKeen Cattell Fellowship for Lifetime Achievement in Applied Psychology from the Association for Psychological Research (formerly the American Psychological Association).

Dates For Your Diary

27 August 2014 1.00—5.10 pm. Room F21, 7 George Square, open to All. Lunch & posters from 12.15 pm.

1.00—2.15 pm Keynote: Professor Paul Thompson, Brain Research Institute, UCLA. The ENIGMA Project: Investigating Brain Diseases with Imaging and Genetics in 29,000 People.

7th October 2014. Prof Karen Ritchie, Imperial College London. F21, 7 George Square.

25th November 2014. Prof George Davey Smith, Bristol. St Andrews Day Special Seminar. Note Special Venue: Edinburgh Centre for Carbon Innovation, High School Yards, Infirmary Street, Edinburgh EH1 1LZ.

24th February 2015, Prof Simon Lovestone, Professor of Old Age Psychiatry, NIHR Biomedical Research Centre for Mental Health, Institute of Psychiatry. F21, 7 George Square.

12th May 2015, Prof Nick Fox, Dementia Research Centre, Institute of Neurology, UCL. F21, 7 George Square.

1st September 2015, Prof Katri Raikkonen (Keynote Speaker for Research Day 2015), Institute of Behavioural Sciences, University of Helsinki. F21, 7 George Square.
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