

CENTRE FOR MENTAL HEALTH RESEARCH



AGEING RESEARCH UNIT



"To discover how to optimise psychosocial and cognitive wellbeing across the lifespan, through innovative, high quality psychological and epidemiological research, so that individuals may age well with their families and communities."

ANU COLLEGE OF MEDICINE & HEALTH SCIENCES

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INTRODUCTION

Officially formed in 2004 as part of the Centre for Mental Health Research, the mission of the Ageing Research Unit (ARU) mission is :

To discover how to optimise psychosocial and cognitive wellbeing across the lifespan, through innovative, high quality psychological and epidemiological research, so that individuals may age well with their families and communities.

The ARU projects are funded by various sources, with large population-based longitudinal studies forming a core resource for several studies. The most central of these is the PATH Through Life Project based at the Centre for Mental Health Research which provides information on mental health and wellbeing, cognition, genetics and brain ageing. Additional experimental work, clinical trials and studies of biomedical aspects of the ageing process contribute to our broader research program.

The ARU's research is drawn from strong methodological and theoretical traditions in psychology and epidemiology. One of our strategic goals is to apply this knowledge in practical ways by developing research outputs with direct clinical application, tools that may be used by consumers, or by producing information for use by policy makers. Another key focus of the ARU is to develop capacity in ageing research nationally, through postgraduate and postdoctoral training. We aim to produce researchers with outstanding methodological skills in addition to a sound grounding in the key theoretical frameworks of lifespan development and ageing.

Associate Professor Kaarin Anstey
Director, Ageing Research Unit, CMHR

DYNAMIC ANALYSES TO OPTIMISE AGEING

The Dynamic Analyses to Optimize Ageing (DYNOPTA) project is a new innovative multi-disciplinary program that builds on Australia's substantial investment in Longitudinal Ageing Studies. DYNOPTA draws together data from nine Australian longitudinal studies of ageing, with a combined pool of over 50000 participants. The collective information provided by the studies will be used to identify key incidence rates and risk factors for health outcomes.

This project focuses on four outcomes that significantly contribute to the burden of disease and disability, namely dementia and cognition, mental health, sensory disability, and mobility/activity limitations.

DYNOPTA will also develop the first Australian dynamic microsimulation model that will forecast the health and social outcomes of the baby boomer and older cohorts. The simulation modelling will allow researchers to evaluate the impact of modifying risk factors, and costs associated with different trajectories of health and ageing. The outcomes of this project will have significant implications for health promotion, and are likely to inform social and medical interventions for healthy ageing in Australia many years into the future.

The DYNOPTA project is led by Associate Professor Anstey with chief investigators from The Australian National University, University of Canberra, Flinders University, International Diabetes Institute, Monash University, the University of New South Wales, University of Newcastle, University of Sydney and University of Wollongong.

ARU staff working on DYNOPTA

- Associate Professor Kaarin Anstey
- Dr Peter Butterworth
- Dr Tim Windsor
- Dr Lesley Ross
- Mr Richard Burns
- Mr Kim Kiely
- Ms Lauren Bartsch

For more information visit: <http://dynopta.anu.edu.au>

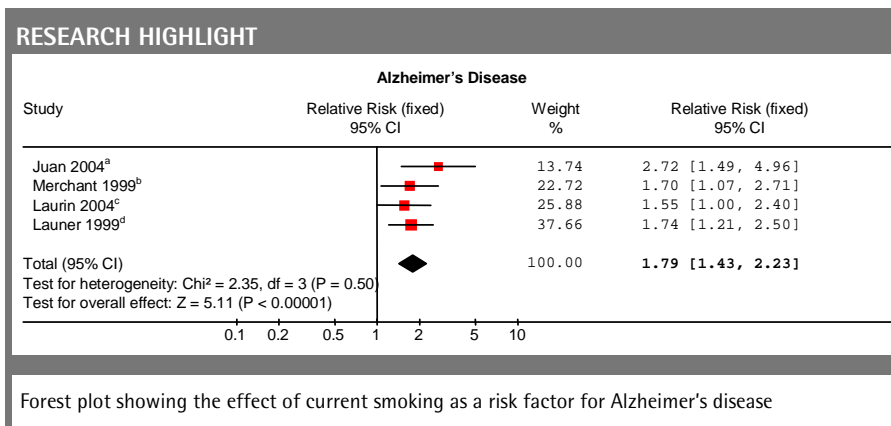
**optimising psychosocial and cognitive
wellbeing across the lifespan**

COGNITIVE AGEING, BRAIN AGEING AND DEMENTIA

Identification of risk factors

A large focus of our research is on understanding cognitive ageing and dementia, and identifying strategies for the prevention of cognitive decline and for the promotion of healthy ageing. Epidemiological work conducted on the PATH Through Life Project and the Australian Longitudinal Study of Ageing has identified health and lifestyle factors that are associated with poorer cognitive function in both late and middle-adulthood.

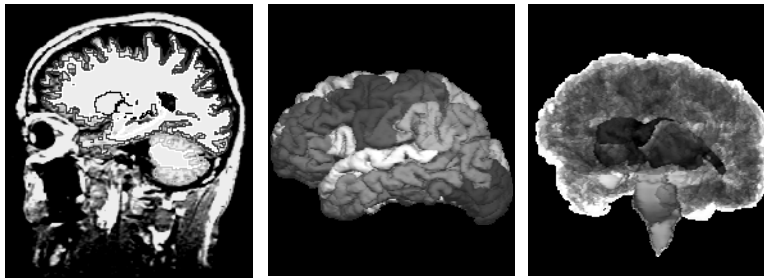
To determine the impact of these risk factors, the Dementia Risk Factor Review Project was commenced in 2005. This project involves conducting a series of systematic reviews on modifiable risk factors for Alzheimer's disease, vascular dementia, mild cognitive impairment and cognitive decline in normal ageing. We have completed reviews on smoking [6] and serum cholesterol, and are presently undertaking reviews in relation to alcohol consumption and body weight. This project is conducted in conjunction with the Dementia Collaborative Research Centre at ANU.



MRI studies

Researchers in ARU work on the MRI substudy of the PATH Through Life Project in collaboration with Professor Sachdev and Dr Wei Wen from UNSW. Recently graduated doctoral students have examined the hippocampus in relation to memory and cognition (Dr Jerome Maller) [29], and the association between hormone replacement therapy and brain structure (Dr Lee-Fay Low) [27]. Other recent studies have recently examined the association between alcohol consumption and brain structure and investigated relationships between intraindividual variability in cognitive test performance and corpus callosum area [2, 5].

RESEARCH HIGHLIGHT



The above figures show the process of brain parcellation: firstly the skull is removed from the image, then a 3D model of the brain is created. This model is then decomposed into sub-structures that can be viewed and analysed.

Dr Nicolas Cherbuin is specialising in the analysis of cerebral MRI scans to assess how brain structures are affected by the ageing process and to identify the determinants of anatomical brain ageing. A new technique called brain parcellation is being used to process scans which are composed of images representing "slices" of individual brains. The software first removes the skull from the image and, using complex algorithms, recreates a 3D model of each scanned individual's brain. This model is then decomposed into sub-structures that can individually be viewed in space and analysed to determine how they relate to other measures such as memory, health, and cognition.

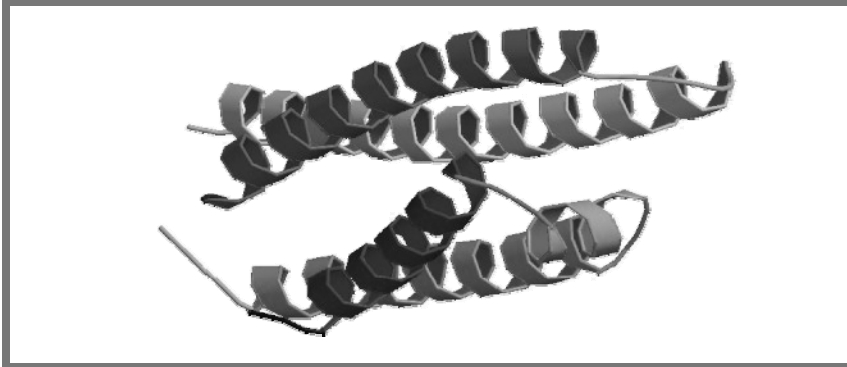
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COGNITIVE AGEING, BRAIN AGEING AND DEMENTIA

Genetic correlates and risk factors

In collaboration with Professor Simon Easteal from the John Curtin School of Medical Research, members of the ARU have been investigating the apolipoprotein E gene (*APOE*) and its relationship to Alzheimer's, cardiovascular disease, and late onset dementia (non-familial). Recent cross-sectional findings from the PATH project showed no demonstrable difference in brain structure and cognitive performance between healthy older participants who carry this version of the gene and those who do not [16]. Longitudinal analyses of these relationships are underway. These cross-sectional results suggest that APOE genotype is more important in the advanced pathological stages leading to dementia than in healthy ageing.

Apolipoprotein E



Previous studies have shown that serotonin is involved in learning and memory, however the role of serotonin in normal cognitive functioning is not well understood. We are analysing the association between functional polymorphisms of serotonin transporter gene (5-HTTLPR) and serotonin receptor gene (5-HT1A) in relation to cognitive performance over time for all PATH cohorts.

The investigation of other genetic factors, particularly those involved in pathways contributing to neurodegeneration such as inflammation and oxidative stress will also be the focus of planned research.

Online self-assessment for dementia

As part of work concerned with development of the National Dementia Website, members of the ARU have also been investigating the use of screening tools for dementia [17]. We have investigated ethical and practical concerns associated with dementia screening, as well as conducting a systematic review of available instruments. Future research will focus on adapting and validating screening instruments for the digital world.

Cognition as a predictor of injury, functional impairment and depression

Projects underway also focus on the impact of cognitive decline in later life. Our work has shown how cognitive decline is associated with increased risk of falling over an 8 year follow-up in community based older adults [9]. In our work on the Australian Longitudinal Study of Ageing cognitive performance has also been associated with increased risk of developing late life depression. We are currently examining how cognitive deficits in executive function lead to errors on an on-road driving test.

ARU staff working on Cognitive Ageing, Brain Ageing and Dementia

- Associate Professor Kaarin Anstey
- Dr Nicolas Cherbuin
- Dr Holly Mack
- Professor Helen Christensen

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SOCIAL COGNITION & LIFESPAN DEVELOPMENT

Ageing well in older couples

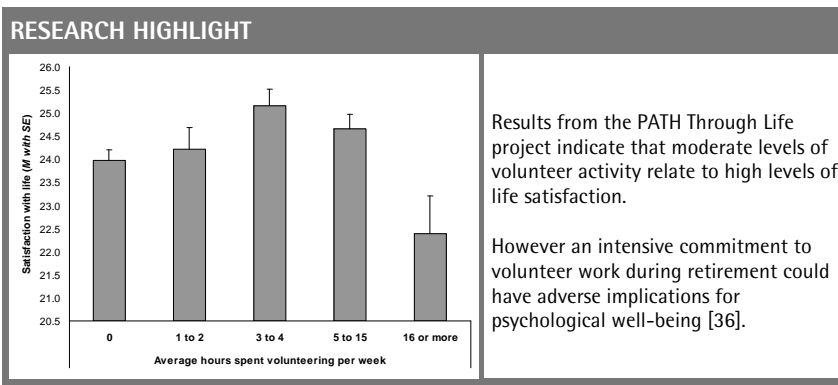
The *Ageing Well Together* study includes a sample of over 100 couples aged 55+. This study will investigate social-cognitive characteristics of ageing well, and will provide new insights into the importance of social context for promoting health, well-being and social engagement in later life.

Resilience to stress in adulthood

Theories of lifespan development indicate that the importance of different social and psychological resources for promoting well-being will vary over the adult lifespan. Researchers in the ARU are using PATH data to investigate the different extents to which protective factors buffer against the negative effects of life stressors on psychological well-being in young, midlife and older adults.

Social interactions and social engagement over the lifespan

Changes in the nature of social interactions over the life course, and the implications of different social relationships for well-being provide an additional focus for ARU researchers. Dr Windsor has also focused on issues related to social engagement and productivity in older adulthood, including a recent study of the relationship between volunteer activity and well-being (see below).



ARU staff working on Social Cognition and Lifespan Development

- Dr Tim Windsor
- Dr Peter Butterworth
- Associate Professor Kaarin Anstey
- Ms Chun Chen

PSYCHIATRIC EPIDEMIOLOGY & SOCIAL ISSUES

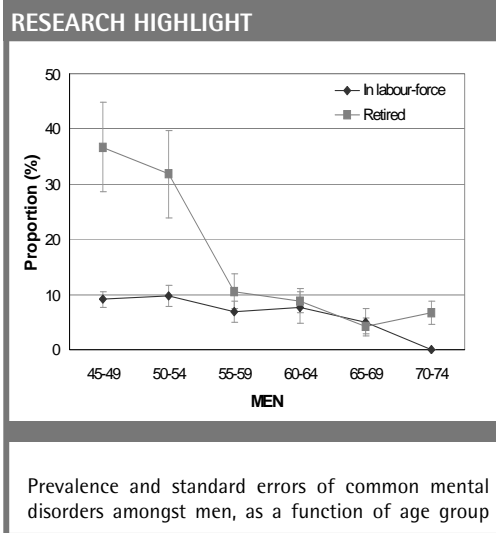
The ARU is running several research projects investigating the role of social factors in the aetiology of common mental disorders. The research adopts a lifecourse, ecological approach and considers family and community influences on health and well-being. Two specific projects are described below:

Welfare receipt, social exclusion and mental health

This project examines the relationship between social disadvantage and mental health, and considers social circumstances such as poverty, deprivation and welfare dependency across the life course. The research aims to inform contemporary social policy in areas such as welfare reform and pension provision.

Retirement, health and well-being

This project explores the relationship between labour-force status and mental health amongst older Australians, with particular attention on retirement. The research considers the impact of retirement on mental health and wellbeing, and how the experience of common mental disorders may influence decisions about retirement and labour-force participation. The project also examines the personal and contextual factors that may moderate and mediate these effects [12].



ARU staff working on Psychiatric Epidemiology and Social Issues

- Dr Peter Butterworth
- Associate Professor Kaarin Anstey
- Dr Tim Windsor

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BEYOND AGEING PROJECT

The Beyond Ageing Project aims to determine whether mental health literacy, physical activity or folate prevents depression in older individuals. The Beyond Ageing project is a randomised controlled trial which commenced in 2006 and will be complete in 2008.

Efforts to prevent depression have largely focused on young people. Given that first episodes of depression often occur in adolescence or early adulthood, this emphasis is justified. However, depression occurs also later in life. For older people, there are certain risk factors, which may make individuals more vulnerable to depression. These risk factors may require preventive action.

The primary aim of the study is to determine what works in terms of preventing older individuals from developing serious problems with depression on a large population scale. The study will incorporate a healthy ageing program and include components such as: folate and vitamin B12; physical activity; information about depression; information on healthy eating, and information on arthritis and pain management.

Approximately 800 participants aged 60-74 are enrolled in the trial. They come from two capital cities (ie Canberra and Sydney), and Wagga Wagga as the rural site. The project has just completed its 12 month follow-up.

Staff from ARU working on Beyond Ageing Project

- Professor Helen Christensen
- Dr Janine Walker

DRIVING IN LATER LIFE

ARU has involvement in several studies on older drivers in collaboration with investigators from Queensland University of Technology (Professor Wood), the University of Queensland (Dr Horswill, Assoc Professor Pachana) and National ICT Australia (Assoc Professor Barnes).

Cognitive ageing and hazard perception

This study aims to characterise the effects of cognitive ageing and visual changes on hazard perception to inform the development of interventions to improve hazard perception and road safety in older Australians. These include developing an ACT hazard perception test specifically designed for older drivers (UQ) and pilot work adapting Smart Car technology to improve safety for older drivers (NICTA). This project is funded by the Australian Research Council Linkage grant and the NRMA ACT Road Safety Trust.

Development of risk assessment tools

As part of the Prevention of Older Persons' Injury program, we have developed a screening battery to be used with healthy older drivers to assess driver safety. This battery has been validated on 270 drivers at QUT, and further research on the tool is ongoing. Other research is focussing on developing assessment tools for older drivers with cognitive impairment.

Psychological aspects of driving and driving cessation

Retirement from driving in older adulthood can bring about a major negative impact on quality of life. Driving cessation can also result in negative psychological outcomes such as an increase in depressive symptoms. Researchers in the ARU have focused on the associations of relevant psychological factors such as perceived control over driving, self-regulation and optimism bias, with self-reported driving behaviour. An additional focus is on identifying personal characteristics and resources that could reduce the negative psychological impact of driving cessation, and to inform the development of interventions for older ceased drivers .

ARU staff working on driving in later life

- | | |
|--------------------------------|---------------------|
| ■ Ass. Professor Kaarin Anstey | ■ Ms Haley Caldwell |
| ■ Dr Tim Windsor | ■ Ms Amy Dawel |
| ■ Mr Chris Hatherly | ■ Ms Ada Tam |
-

STUDENT PROJECTS

Barbara Boyer (Masters candidate)

The effect of Spousal/Partner Bereavement on Thinking Skills (Cognition) in Older Adults

This research examines the associations between spousal bereavement, cognitive change and depression in older Australians.

Data from the 60+ cohort at Wave 1 and 2 are being analysed from the PATH through life project.

Natalie Chan (PhD Candidate)

The role of formal and informal support in maintaining physical and psychological health in later life.

Research has found increasing functional disability in later life to be associated with poorer psychological health outcomes. Further, physical health decline is considered to be a significant risk factor for major depression and other mental health disorders in older adulthood. One factor that has been found to be effective in offsetting the negative effects of physical decline on psychological health is informal social support.

In contrast, very little is known about whether formal support may play a similarly protective role. This is despite the growing relevance of formal support services in Australia's ageing population.

As a result, this research aims to increase our understanding of the possible protective effects of formal support by examining who receives formal support and whether it protects against the negative effects of physical health decline on psychological health. These research questions will be examined both cross-sectionally and longitudinally using data from the Australian Longitudinal Study of Ageing.

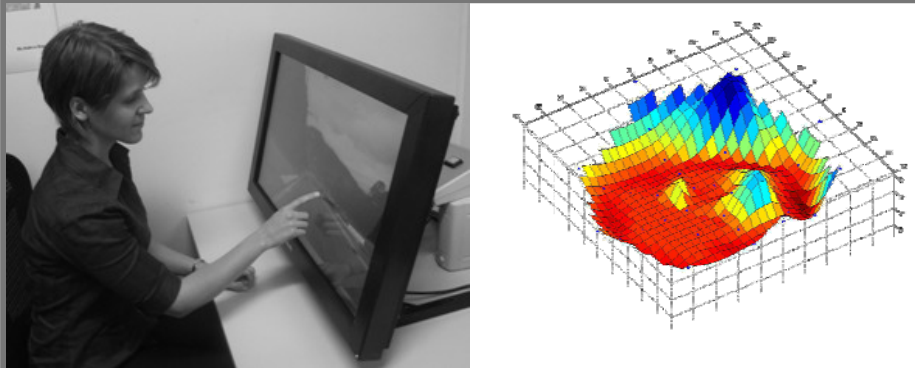
STUDENT PROJECTS

Chris Hatherly (PhD candidate)

The Relationship between Visual Attention and Safe Driving in Older Adults.

Chris' PhD project is investigating spatial and temporal aspects of visual attention and processing, focussing particularly on the periphery of vision. Initial studies will be used to develop a novel component of a safety screening battery for older drivers, based on an established visual attention screening paradigm. Chris' project will also examine short and medium term change in cognitive and visual attention and in driving performance in older adults in a study which follows participants with regular follow-up tests for several months.

RESEARCH HIGHLIGHT



Research Assistant Amy Dawel is working through the ACT Hazard Perception Test.

Visual Attention profile showing spatial performance fields across the central 30-degrees of the visual field

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STUDENT PROJECTS

Karen Mather (PhD candidate)



Karen Mather working in the Predictive Medicine Laboratory at the John Curtin School of Medical Research, ANU

Telomeres and Ageing

Telomeres are DNA-protein structures which are found at the ends of our chromosomes. As we get older, our telomeres shorten. Shortened telomeres have been associated with age-related conditions, disease and mortality in several studies. This suggests telomere length may act as an indicator of biological ageing (biomarker of ageing). In this investigation, telomere length is being explored as a biomarker of ageing in participants of the PATH Through Life Project MRI sub-studies. Relationships between telomere length, age-sensitive traits such as lung function, stress and health are being investigated.

Kerry Sargent-Cox (PhD Candidate)

Are all Measures of Self-Rated Health Created Equal? The Effect of the Point of Reference of Self-Rated Health Measures on the Health Perceptions of the Elderly.

Self-Rated Health (SRH) measures are used widely in gerontological research and clinical work and have been deemed a key measure of well-being as well as an important predictor of health outcomes including mortality.

This thesis aims to clarify the effects of using SRH measures with a comparative reference point (age and self referential) compared to a global item on health evaluation for older adults. Longitudinal change of SRH according to the point of reference, and the identification of factors that may be associated with different SRH change and subsequent mortality risk, is being examined. The study is framed within Social Comparison theory, to allow for exploration of comparison processes invoked when assessing health, and the potential adaptive function these processes hold for successful ageing. Physical health, psychological, social, and behavioural factors are investigated using longitudinal samples (65 years and older) from the Australian Study of Ageing (ALSA).

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PROFESSIONAL REPORTS (2006- present)

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44. Anstey, K.J. *Learning to Age Well from Longitudinal Studies of Ageing*, Workshop presentation, Mars and Venus; Does Gender Matter in Ageing. Conference, University of Newcastle, July 9-10, 2007.
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 56. Cherbuin, N., Anstey, K.J., Wen, W., Sachdev, P. (2006). White matter hyperintensities: Lateralisation effects. Australasian Society of Psychiatric Research, Sydney.
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 58. Hatherly, C. Screening Tests and Safety Interventions for Older Drivers. Invited address at the NRMA – ACT Road Safety Trust Postgraduate Scholars Showcase, Canberra, September 2007.
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 61. Mather K. Is telomere length a biomarker of ageing? at the upcoming Australian Association of Gerontology conference, 2007
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Opportunities for Graduate Study

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www.alzheimers.org.au

Australian Association of Gerontology

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