



HUMAN EXPERIMENTAL & APPLIED DYNAMICS (HEAD)

OVERVIEW

Many of society's greatest problems have a foundation in behavioural questions. Real-world behavioural systems are made up of a large number of agents that interact in dynamic ways. The HEAD research group attempts to understand these dynamics in terms of memory, cognition, perception, learning, personality, and social processes. At a regional and national level, research from the HEAD group contributes to the productivity and safety of Australians.

Cognitive Science at Newcastle was ranked by the recent Excellence in Research Assessment at 4/5 (above world standard).

Sub-Groups

Chemosensory Perception & Learning Laboratory (Ourimbah Campus)
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Evolutionary Cognition Laboratory
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Memory and Cognitive Development Laboratory
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Personality Psychology Laboratory
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Spatial Cognition Laboratory
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Social Psychology Laboratory
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The Newcastle Cognition Laboratory
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FACULTY OF SCIENCE AND INFORMATION TECHNOLOGY



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OBJECTIVES

At its most general level, the HEAD research group studies the dynamics of complex human behaviour. The issues addressed by the HEAD research range from basic to applied research.

Specific cognitive topics include cognitive development, response time in choice tasks, absolute identification, speed-skill acquisition and recognition memory. Specific perception topics include odours perception and odour-taste interaction. Specific personality topics include personality structure and assessment, measurement of ethical behaviour and value-directed behaviour. Specific social topics include intergroup relations, social cognition, stereotyping, prejudice and discrimination. Applied foci include human factors in aviation, 3D interpretation of drawings, and selection of professional students.

RESEARCH SUPPORT

Each laboratory offers well appointed office space for graduate students and access to:

- a psychometric test library
- over two dozen shared and dedicated computer testing stations
- high specification dedicated workstations and grid computing facilities
- in concert with collaborators, access to functional neuroimaging facilities
- psychophysiological recording equipment
- automated systems for the delivery of taste and odour stimuli.

EXTERNAL COLLABORATORS

The Cognition and Memory & Cognitive Development Laboratories collaborate with Dr M Steyvers, UC Irvine; Drs EJ Wagenmakers & B Forstman, U. Amsterdam; Prof J Townsend, Indiana U.; Prof W Hockely, Wilfrid-Lauria U. and Dr J Burt, U. Queensland, with Dr A Patterson and Prof C Collins - Faculty of Health.

The Spatial Cognition Laboratory collaborates with A/Prof A Williams (Architecture) and A/Prof William McBride (Mechanical Engineering), University of Newcastle, and with researchers at Edith Cowan, Southern Cross, LaTrobe and Wollongong Universities.

The Chemosensory Laboratory collaborates with Prof M Yeomans, U. Sussex; Prof L Bartoshuk, U. Florida; Prof G Calvert, U. Warwick; Prof C Spence, Oxford U.; Dr D Small, Yale U. and Dr T Thomas-Danguin, INRA/Université de Bourgogne.

The Personality Research Laboratory collaborates with researchers at Bond U., Griffith U., U. of SA, Nottingham U. and Hull York Medical School in the UK and with the Karolinska Institute in Sweden.

The Social Psychology Laboratory collaborates with Prof E Cairns, U. Ulster; Dr O Christ, Philipps-Universität Marburg, Germany; Prof R Crisp, U. Kent; Prof J Harwood, U. Arizona; Prof M Hewstone, Oxford U. and A/Prof A Voci, U. Padova, Italy.



EXAMPLES OF CURRENT PROJECTS

The Newcastle Cognition Laboratory is pursuing two ARC Discovery projects:

(1) A new kind of dynamics for psychology;
(2) Choice models for learning and memory, looking at how we learn to make rapid and accurate choices and quickly assess the level of confidence we have in recognition. Another project uses state-of-the-art response-time modelling techniques to assess information-processing capacity in young and older adults.

The Memory and Cognitive Development group is currently conducting research on: the relationship between working memory, processing speed and intelligence during childhood and the development of source monitoring in children; executive functioning in children and adolescents in collaboration with Dr Frini Karayanidis; the relationship between iron deficiency and cognition in collaboration with colleagues from the Faculty of Health.

The Spatial Cognition Research group is developing a psychometric test of 3D understanding to measure spatial ability in a design context and 3D learning tasks to improve 3D understanding. Of special interest is poor performance and gender bias. This research is funded under a national grant provided by the Australian Learning and Teaching Council (ALTC).

The Chemosensory Learning Laboratory is studying :

- genetic variations in taste sensitivity
- determinants of associative odour-taste learning
- Multisensory processes in flavour perception.

The Personality Research Group is currently:

- developing a model of adaptive/maladaptive interpersonal traits
- determining the predictive validity of intelligence, values and personality variables in the selection of medical students
- examining the relationships between personality, emotions and psychiatric symptoms

The Personal Qualities Assessment test developed by the personality laboratory is being used commercially to select applicants to medicine and allied health programs in Australia, the UK, Sweden, Japan and Nepal. Experimental research also continues in several countries.

The Social Psychology Laboratory is investigating the effects of positive and negative contact with out-group members on intergroup category salience and attitudes (Paolini, Harwood, & Rubin, 2007-2010). In collaboration with Dr Griffin from the Neuroscience Group, it is researching the learning mechanisms of inter-ethnic anxiety and ethnic categorizations. These projects, and related projects, address issues such as:

- Prejudice, Stereotyping and Discrimination: Why do people discriminate in favour of members of their own social group and against members of social groups to which they do not belong?
- Prejudice-Reduction Interventions: How can we reduce prejudice, stereotyping, and discrimination in society?

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The Evolutionary Cognition laboratory is primarily concerned with asking why (from an evolutionary perspective) Social, Spatial and Perceptual Cognitive mechanisms work the way they do. We are currently investigating:

- Human faces as signals of behavioural intent, fertility, health, attractiveness, identity (ARC Discovery Project)
- Adaptations of spatial cognition in birds and in humans
- The evolution of visual sensitivities

GROUP MEMBERS

Mr Lee Averell
Dr Miles Bore
Dr Darren Burke
A/Prof Scott Brown (QEII Research Fellow)
Ms Kirstie Carrick
Dr Kerry Chalmers
Dr Ami Eidels
Prof Andrew Heathcote (AusProf Fellow)
A/Prof Don Munro
Dr Stefania Paolini
Prof David Powis
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CONTACT

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