31st BPS Psychology Section Conference 2014

3-5 September

Nottingham Trent University

The British Psychological Society

Cognitive Psychology Section

NOTTINGHAM TRENT UNIVERSITY

Welcome to the 31st Annual Meeting of the BPS Cognitive Psychology Section

Hello! As Chair of the BPS Cognitive Psychology Section I am delighted to welcome you to our Annual Conference at Nottingham Trent University. After a very successful – and also very large – conference last year (CogDev 2013, Reading University), held in conjunction with the Developmental Psychology Section, we have this year returned to our traditional conference format. This involves a smaller, more intimate meeting with a core focus on high quality talks and posters relating to cognitive phenomena and theorising. As you will see from the conference schedule, we have lined up an exciting scientific programme that we are confident will stimulate discussion and foster new research. The success of this conference is the culmination of the diligence and logistic prowess of Andrew Dunn and Duncan Guest as conference co-organisers, and as Section Chair I thank them for their very hard work over the past 18 months or so. Their meticulous planning of the conference from the very outset has ensured a well-balanced event that cuts across all contemporary areas of cognitive psychology. We are delighted to welcome keynote speakers of the very highest quality, and are set to enjoy an excellent mix of session formats, including symposia and posters as well as individual papers. We are also eagerly anticipating an exciting set of social events and entertainments, not least the intriguing addition this year of a conference magician! I trust that you have a very pleasant and informative conference within the outstanding facilities here at Nottingham Trent University. I also hope that you depart with new research ideas and fond memories of your time spent with colleagues and friends and that you will be keen to come back to our conference next year. The 2015 conference sees us returning to the University of Kent for an event that is being hosted by Bob Johnston that is again sure to be both stimulating and enjoyable.

Linden Ball - Chair BPS Cognitive Psychology Section

On behalf of the Psychology Division I'd like to welcome you all to Nottingham Trent University (NTU). This is a large and vibrant Division with expertise across a broad range of psychological disciplines. In particular we have research strengths in both theoretical and applied aspects of Cognition and so we are delighted to be hosting the 31st Annual meeting of the BPS Cognitive Section. Looking through the program it seems we are set to have a lively and informed conference that will fuel debate and discussion. I hope you enjoy the conference and your time at NTU.

Mick Gregson Head of Division of Psychology

Organising this conference has been hard work but extremely enjoyable. Our thanks go to the symposium organisers, the keynote speakers, the Cog Section committee (especially Sue and Linden), our colleagues in Finance and especially to Nicola Tait (Marketing) and Tanith Batterham (College Events Organiser) whose helpfulness has been invaluable. However, most of all, thanks to you, the delegates. We have a great set of stimulating talks, keynotes and posters and this is down to you. So, thanks for coming and enjoy the conference!

Andrew Dunn and Duncan Guest – Conference Organisers

Conference Information

Getting to Nottingham Trent University City Site

By Train. Nottingham Trent University City Site is about 5 minutes tram ride from Nottingham Station. The Nottingham Trent stop is the fourth stop from the station. Walking from the station takes approximately 20 minutes.

By Car.

As part of the conference we offer a range of discounted City Centre parking options at Q-Park Talbot Street car park:

Q-Park Talbot Street
Stanley Place
Nottingham
NG1 5GG

There are two entrances to the car park on Chaucer Street and Talbot Street. Day parking costs £7.50 per vehicle. The Talbot Street multi-storey car park is situated round the corner from the Conference Centre; this is the best option for anyone attending a single day event. Simply park in the car park as normal and bring your token to our reception team. 24 hr. parking is possible at a cost of £9.50 per vehicle. The Talbot Street car park can be accessed between 06.00 – 01.00 (GMT). For more details see;

www.nottinghamconferencecentre.co.uk/location/venue-car-parking

Alternatively, if you are coming for the day you could use Nottingham's Park and Ride services

Registration

Please register outside Lecture Theatre 4 in the Newton Building. This is on the 1st floor of the Newton building. There are two main entrances to the Newton building. One is via the Nottingham Conference Centre entrance, which is on Burton Street. Please ask here for directions to registration. The other main entrance is on Goldsmith Street. There is a staffed reception here, so please state that you are here for the conference and ask for directions to LT4 (signs will also be up indicating the registration location).

Registration will be from 10am on Wednesday the 3rd. However, the registration desk will be staffed during the entire conference.

Oral and Poster presentations

Oral presentations will either be in Newton LT4 or in the Kilpin and Hooley rooms of the Conference Centre. These are located on the 2nd floor of the conference centre. From registration (outside LT4 simply walk into the conference centre and use either the lifts or stairs).

Oral Presentations are 20 minutes, 15 minutes for the of presentation and 5 minutes for questions. Speakers should bring their Power Point presentation on a USB stick and load it onto the front computer in the break before the session begins. Speakers can use personal laptops, however we encourage you not to do this if at all possible in order to save time switching between speakers and avoid technical failure.

Poster Session 1 (Wednesday at 18.30 pm) will be in the area outside the Old Chemistry Theatre. The poster boards will be up at 18.00 to allow presenters to put their posters up. Please note that after the poster session, the poster boards will be moved to the open area outside LT4 where tea and coffee are served in between Oral sessions. Those in Poster Session 1 are welcome (and encouraged) to leave their posters up so that attendees can browse through them the following day. The posters from Poster Session 1 should then be removed by the end of Lunch on Thursday 4 September.

Poster Session 2 (Friday) will be in the open area outside LT4. Poster presenters are welcome to put their posters up from the Thursday afternoon coffee session onwards. Poster Session 2 will be split into two parts. There will be an extended

coffee break in the morning of Friday 5 in which the posters will be presented. The poster session will continue after lunch on Friday 5.

The poster boards will be 7ft x 3ft. A0 will fit portrait and A1 will fit landscape on the boards.

Coffee/Tea

Coffee and Tea will be served in the Coffee Breaks scheduled outside Newton LT4. In addition to these breaks, the Hooley and Kilpin rooms in the conference centre have small coffee hubs attached to them. Please feel free to use these, they are free of charge (there will also be some pastries in these rooms in the mornings).

Conference attendees also get free access to the Sillitoe Lounge on Level 3 of the Conference Centre. This room has comfortable informal seating, free tea and coffee, Wi-Fi access and several PC stations. This is an ideal place to talk research!

Lunch

Lunch will be served daily in the Old Library and is included in your conference package. The Old Library is just along from the registration outside Newton LT4 on the 1st floor of the Newton Building. Please check the schedule each day to see when Lunch is scheduled for.

Conference Dinner and Entertainment

For those who have booked The Conference Dinner will also be held in the Old Library. If you have any special dietary requirements, please contact the booking office at least two weeks prior to attending. Note that the conference dinner is included in all the 3 day packages.

Entertainment will include Psychological Illusionist, Duncan William (**www.magicduncan.co.uk**) alongside music. A cash bar will be open from 7.00pm until late.

Cashpoint

There is a cashpoint in the Newton building near the Santander Bank in the large Open Area on level 0. Alternatively, a range of banks and building society cash points surround the University and are only a short walk away.

Internet

If you have your own laptop/mobile device and are a staff member or a student at any UK university, then you can Log onto the Eduroam Wi-Fi network using your university login details. If you do not have a UK University log on, then you can log on to our guest Wi-Fi network. Please ask at registration for details.

Facebook/Twitter

Follow the conference on the section's Facebook page BPS Cognitive Section (**www.facebook.com/BpsCognitiveSection**) and their twitter page **@BPSCogntive**. Tweet about the conference using **#CogSec2014**.

Cognitive Section Committee

Chair Prof. Linden J. Ball - University of Central Lancashire

Honorary Secretary Dr. Sue M. Sherman - Keele University

Honorary Treasurer Dr. Laurie T. Butler - University of Reading

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Dr. Andrew Dunn (Annual Conference 2014 organiser) - Nottingham Trent University

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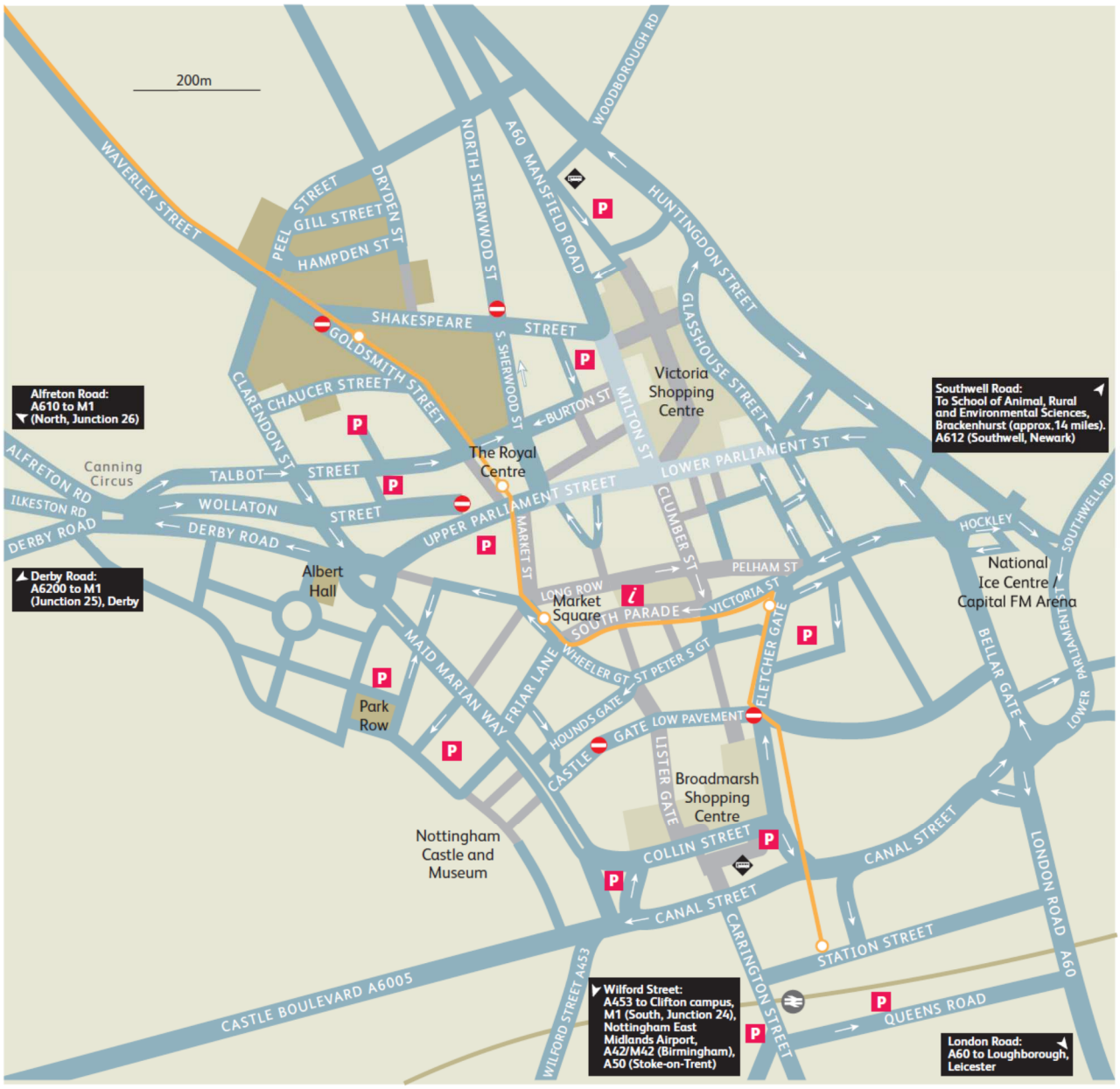
Dr. Duncan Guest (Annual Conference 2014 organiser) - Nottingham Trent University

Prof. Bob Johnston (Annual Conference 2015 Organiser) - University of Kent

Dr. Lauren Knott - City University, London

Map of Nottingham City Centre



One-way street

Pedestrian street

Buses, taxis, cyclists and blue badge only

General parking

University buildings

Bus station

Railway station

No entry

Tram route and stops

City Information Point

Map of City Centre Site

Map of City Centre Site - Key

Schools

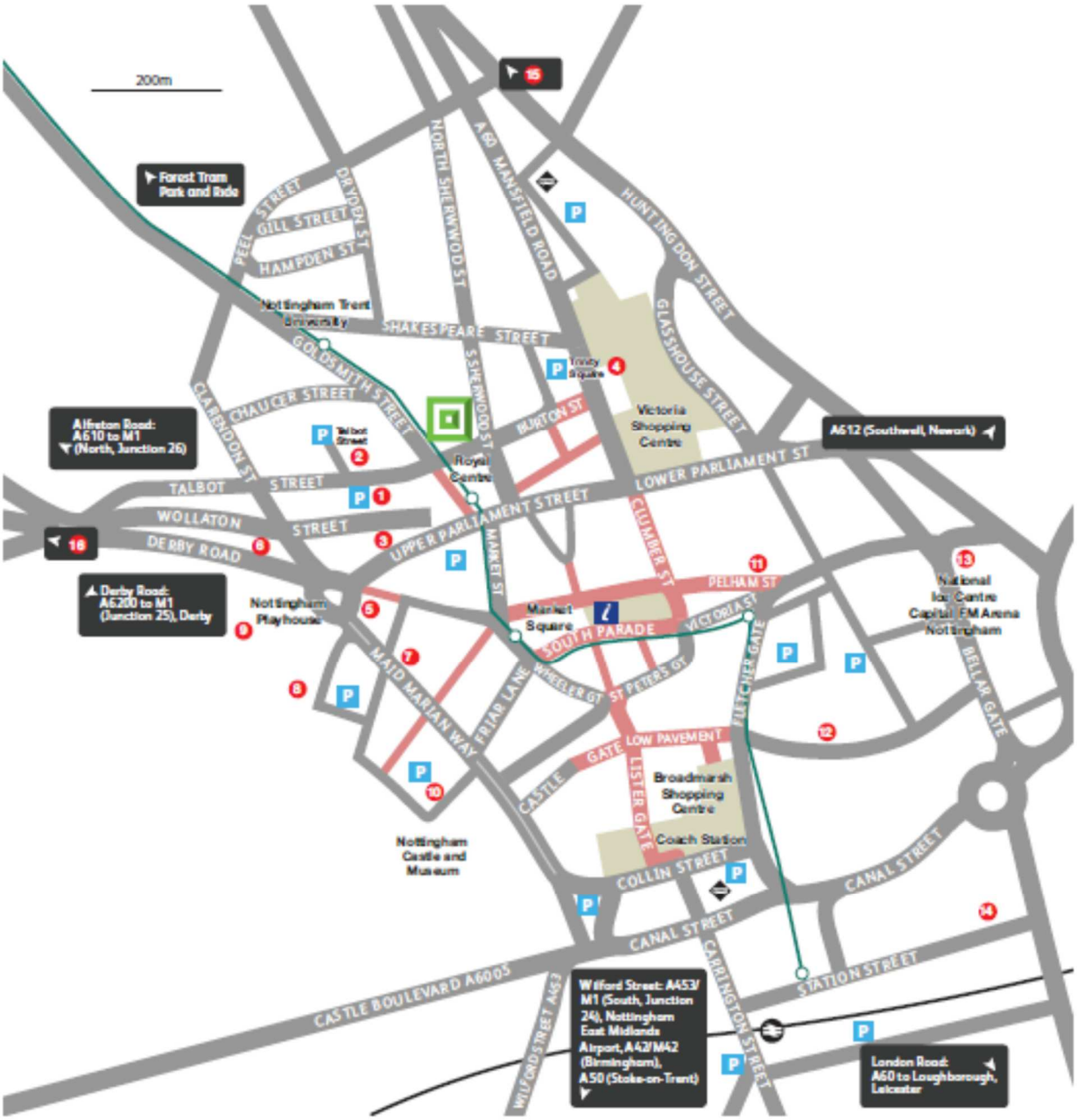
Nottingham Business School 11
Nottingham Law School 1
School of Social Sciences 1
School of Art & Design 5 8
School of Architecture, Design and the Built Environment 10 12
School of Arts and Humanities 23
School of Education 12

Academic Registry 9
Arkwright building 10
Barnes Wallis building 17
Belgrave Centre 13
Bonington building 8
Bonington Colour Bureau 8
Bonington Gallery 8
Bookshop 1
Boots Library 3
Business Innovation Team (BIT) 1
Central Admissions 9
Central Court 14
Centre for Broadcasting & Journalism 23
Chaucer building 1
Chaucer Pin 23
City Sports Centre 2
Coffee Bars 1 8 14
Djanogly International Centre (DICe) 6
Dryden Centre 9
Employability Team 14
Finance Office 9
Halls of Residence 7
Health Centre 19
Human Resources 9

Security 3
Tel: 0115 848 2468

International Development Office 9
IoD Business Centre 18
IT Operations and Development 17
Maudslay building 12
Muslim Prayer Facilities 20
Newton building 11
Nottingham Conference Centre 18
Nottingham Language Centre 6
Nottingham Trent International College (NTIC) 1 13 24
Notts TV 23
Occupational Health 4
Print Shop 1
Safety Office 9
Shops 8 16
Sir Harry and Lady Djanogly Lecture Theatre 22
Student Accommodation Services 14
Student Services Centre 14
Student Support Services 14
Students' Union 16
Taylor building 24
Terrace Royal 20
The Hive 12
Waverley building 5

Hotel Location Map



1. Crowne Plaza Nottingham
2. Welbeck Hotel
3. Ramada Nottingham City Centre
4. Hilton Nottingham
5. Holiday Inn Express Nottingham City
6. The Strathdon Hotel
7. Park Plaza Nottingham
8. Hart's Hotel Nottingham
9. SACO Serviced Apartments
10. Rutland Square Hotel
11. Mercure Nottingham
12. Lace Market Hotel
13. Premier Apartments Nottingham
14. Jurys Inn Nottingham
15. Park Inn Hotel
16. The Nottingham Belfry

- Nottingham Conference Centre
- Pedestrian street
- General parking
- Tram route and stops
- Bus station
- Railway station
- City Information Point

Keynote addresses

Opening Keynote

Professor Simon Liversedge, Professor of Psychology, Centre for Vision and Cognition University of Southampton

Abstract – Binocular processing during reading.

Humans have two, frontally placed eyes and during reading oculomotor and sensory processes are needed to combine the two visual inputs into a single unified percept of the text. Generally, double vision does not occur during reading even though the left and right eyes display a degree of disparity in the position of their respective fixation. Panum's fusional area, that is, the range of disparity wherein sensory fusion of the two retinal images is achieved, is critical to the formation of a unitary sensory percept. In this talk, I will discuss a series of eye movement studies that we have carried out to explore the nature of binocular coordination and processing during reading. The work has involved the use of eye contingent change, dichoptic presentation techniques in association with very precise binocular Dual Purkinje Image eyetracking. Our findings provide descriptive data in relation to horizontal and vertical fixation disparities, as well as corrective vergence responses that occur in normal reading. Furthermore, we have quantified the binocular advantage associated with parafoveal and foveal lexical processing. In our most recent investigations we have focused on the role of binocularity in relation to visual and linguistic processing within the perceptual span. All of these findings will be considered in the broader context of how the visual system delivers information to the linguistic processing system in order for successful language comprehension to occur.

Broadbent (Prize) Lecture

Professor Graham Hitch, Emeritus Professor of Psychology, University of York

Abstract - Working memory and attention

One of Donald Broadbent's many lasting contributions was to recognize the close relationship between short-term memory (STM) and attention. This insight also appears in the concept of a limited capacity working memory system, albeit in a different guise (Baddeley & Hitch, 1974). The multi-component model of working memory was influential, but emerging problems led to the proposal of an additional component, a multi-modal episodic buffer that forms integrated episodic representations by combining information from modality-specific buffers and long-term memory (Baddeley, 2000). Shortly afterwards, I joined Alan Baddeley, Richard Allen, and others in attempting to explore the episodic buffer. We began with a long series of null results that failed to support our hypothesis that executive control is required to form integrated episodic memory representations. We did however stumble on the observation that visual STM for the feature combinations of objects is especially fragile, being highly susceptible to interference from subsequent attended visual stimuli. We followed this up by examining the interfering effects of exposure to an unattended visual stimulus. As before, recent items were remembered best and were also those most susceptible to interference. However, other items could show just the same pattern if task instructions assigned them priority. We interpret these results in terms of items entering a 'privileged state' in which information is both highly accessible and yet highly vulnerable to displacement and we suggest a new model in which perceptual selective attention and executive processes combine to determine the 'focus of attention' in the episodic buffer, thereby illustrating the continuing value of Broadbent's original insight.

Biography

My first degree was in Physics at the University of Cambridge in 1967 and in the following year I took the MSc in Experimental Psychology at the University of Sussex. After that I returned to Cambridge to study short-term memory with Donald Broadbent as my PhD supervisor. Since then I have worked in psychology departments at Sussex, Stirling, Cambridge, Manchester and Lancaster Universities before moving to York in 2000. I retired in 2011 and have held an emeritus position at York since.

My general area of interest is working memory and cognition. Some time ago Alan Baddeley and I developed the multi-component model of working memory. In the late 1980s I started to apply the model to the development of working memory in children and its role in arithmetic. This involved collaborations with Sebastian Halliday, John Towse and others. Starting in the early 1990s, Neil Burgess and I collaborated on a neural network model of the phonological component of working memory, going beyond the initial formulation to address the classical problem of serial order and the interface between working memory and long-term memory. I continue to be interested in this topic, most recently collaborating with Tom Hartley on an oscillator model of serial order for auditory-verbal sequences and with Mark Hurlstone on serial order for non-verbal sequences. I am also collaborating with Richard Allen, Alan Baddeley and many other colleagues on a range of topics that include the episodic buffer and attention, visual working memory, long-term memory, learning and cognitive correlates of bilingualism.

Cognitive Section Award

Richard Harris, Andy Young* and Tim Andrews* - Department of Psychology and York Neuroimaging Centre, University of York (* presenters)

Abstract – Neural representation of facial expression

A longstanding controversy has concerned whether facially expressed emotions are perceived in terms of discrete emotion categories or in terms of a small number of underlying continuous dimensions. Debate has continued because different behavioural findings seem to support each approach.

Harris et al.'s (2012) study addressed the issue in a new way by looking at the response of different brain regions with a combination of carefully validated behavioural techniques, computer image manipulation, and functional brain imaging (fMR-adaptation). They were able to offer a resolution to the controversy over the neural representation of facial expression by demonstrating that both categorical and continuous representations are involved. Moreover, these divergent processes involve different parts of the neural network for face perception. This dissociation between continuous and category-based responses across face-selective regions clarifies how components of this network work together, providing a novel perspective on the way that socially meaningful information from faces is processed in the brain.

Harris, R.J., Young, A.W. and Andrews, T.J. (2012). Morphing between expressions dissociates continuous from categorical representations of facial expression in the human brain. *Proceedings of the National Academy of Sciences,* USA, 109, 21164-21169.

Biography

Rich Harris was an undergraduate student, postgraduate (PhD) student and then a postdoctoral researcher at the University of York. The Harris et al. (2012) paper reports studies from his PhD.

Andy Young is Professor of Neuropsychology at the University of York. He has worked for 40 years on different aspects of face perception.

Tim Andrews is Professor of Psychology at the University of York. He has specialist expertise in neuroimaging of vision, especially using fMRI

Pre Conference Workshop
Tuesday 2nd September

Pre-Conference specialist workshop - **An introduction to the Python programming language for beginners**

The objective of this workshop is to introduce and motivate the use of the Python programming language in research in cognitive psychology.

Within the last ten years, the development of scientific and numerical libraries in Python has grown to the point where Python can now be used as a scientific and numerical computing environment comparable to products like Matlab, R and Mathematica. As of yet, however, it appears that knowledge of the potential applications of Python to research in cognitive psychology is still rather limited.

The aim of this tutorial, therefore, is to describe these areas of application and to advocate the advantages and appeals of using Python as the principal programming language in cognitive psychology research.

This is a “bring your own” lap-top event. Further details will be sent to you about the event after booking. The workshop costs £15 and booking information can be found on the conference website.

Location

Chaucer Building Room 424 (Level 4).

Please report to reception, specify that you are here for the workshop and ask reception to call either Andrew Dunn or Duncan Guest

Schedule

9.00 - Registration

10.00 – 12.00 – Session 1

12.00 – 13.00 – Lunch

13.00 - 16.30pm – Session 2

Wednesday 3rd September

10.00	Registration opens (Foyer Outside LT4 – Level 1 Newton Building)			
11.00	Cognitive Section Committee Meeting Chaucer Building Room 3501 (3rd Floor)			
12.00	**Keynote 1 – Professor Simon Liversedge** **Newton LT4**			
13.00	Lunch (The Old Library)			
14.00	**Session 1**	Newton LT4	Kilpin Room	Hooley Room
		Symposium: Face processing in the forensic context	Language 1	Attention
15.40	Coffee Break (Foyer Outside LT4 - Level 1 Newton Building)			
16.00	**Session 2**	Newton LT4	Kilpin Room	Hooley Room
		Face Processing I	*Symposium:* Thinking and Reasoning	Memory 1
17.40	British Psychological Society Cognitive Section - Annual General Meeting Newton LT4			
18.30	Drinks Reception & Poster Session 1 Old Chemistry Theatre			

Thursday 4th September

9.00	**Session 3**	Newton LT4	Kilpin Room	Hooley Room
		Symposium: Talking heads: Issues in face-voice processing I	*Symposium*: Learning and memory in visual search I	Language II
10.20	Coffee Break (Foyer Outside LT4 - Level 1 Newton Building)			
10.40	**Session 4**	Newton LT4	Kilpin Room	Hooley Room
		Symposium: Talking heads: Issues in face-voice processing II	*Symposium*: Learning and memory in visual search II	Reasoning, Decision Making and Problem Solving
12.00	Lunch (The Old Library)			
13.00	**Session 5**	Newton LT4	Kilpin Room	Hooley Room
		Symposium: Attention Capacity	Cognition and Emotion	Applied Memory Research
14.40	Coffee Break (Foyer Outside LT4 - Level 1 Newton Building)			
15.00	**Session 6**	Kilpin Room	Hooley Room	
		Symposium: More than a feeling: Current approaches to the experimental study of emotion and cognition	Memory II	
16.50	**Keynote 2 – Broadbent (Prize) Lecture: Professor Graham Hitch Newton LT4**			
19.00	Conference Meal			

Friday 5th September

9.00	**Session 7**	Newton LT4	Kilpin Room	Hooley Room
		Symposium: Eye tracking in applied settings I	Sensation, Perception and Attention	Memory III
10.20	Coffee Break (Foyer Outside LT4 - Level 1 Newton Building) Poster Session 2 (Foyer Outside LT4 - Level 1 Newton Building) (continued after lunch)			
11.00	**Session 8**	Newton LT4	Kilpin Room	Hooley Room
		Symposium: Eye tracking in applied settings II	Face Processing II	Cognition, Training and Control
12.25	**Keynote 3 – Cognitive Section Award :Rich Harris, Andy Young & Tim Andrews** **Newton LT4** Harris, R. J., Young, A. W., & Andrews, T. J. - Morphing between expressions dissociates continuous from categorical representations of facial expression in the human brain.			
13.25	Lunch (The Old Library)			
14.00	Poster Session 2 (continued) (Foyer Outside LT4 - Level 1 Newton Building)			

Detailed Program - Wednesday PM (Session 1)

Newton LT4 – Symposium: Face processing in the forensic context

The impact of changing-state speech on person identification
Skelton, Faye., Marsh, Everett, John., Frowd, Charlie., Vachon, Francois., & Thorley, Rachel.
(University of Central Lancashire, University of Central Lancashire, University of Winchester, Université Laval, Canada, University of Central Lancashire)

In the face of distraction: The impact of background mobile phone conversations on eyewitness testimony
Marsh, John Everett., Patel, Krupali., Skelton, Faye., Frowd, Charlie., & Vachon, Francois.
(University of Central Lancashire, University of Central Lancashire, University of Central Lancashire, University of Winchester, Université Laval, Canada)

Understanding facial composite construction
Ness, Haley., & Carruthers, Lindsey.
(Open University, Edinburgh Napier University)

Own race bias in the recognition of facial composites
Ogidan, Benny., & Johnston, Robert.
(University of Kent)

Techniques for substantially improving the effectiveness of feature-based composites
Frowd, Charlie., Skelton, Faye., Battersby, Kirsty., & Fodarella, Cristina.
(University of Winchester, University of Central Lancashire, University of Central Lancashire, University of Central Lancashire)

Kilpin Room – Language 1

Modeling the role of background knowledge in memory for texts
Andrews, Mark.
(Nottingham Trent University)

Individual differences in the development of semantic short-term memory and its relation to reading comprehension
Roome, Hannah., & Towse, John.
(Lancaster University)

Children's on-line processing of inconsistencies in text: The influence of memory load
Ammi, Sabrina., & Cain, Kate.
(Lancaster University)

Reading sentences with words of the same length
Cutter, Michael., Drieghe, Denis., & Liversedge, Simon.
(University of Southampton)

Hooley Room – Attention

If and how do irrelevant distractors influence object substitution masking?
Camp, Sarah., & Pilling, Michael.
(Oxford Brookes University)

Visual processing of human body and non-body distractors in natural scenes
Kroll, Victoria R., Dunn, Andrew K., Howard, Christina., & Baguley, Thomas.
(Nottingham Trent University)

The illusion of space: Vision selects objects, not locations
Nikolova, Atanaska., & Macken, Bill.
(Cardiff University)

Gender differences in visual attention: The role of mental rotation in global-local processing

Judge, Jeannie., & Christopher, Thomas.
(University of Central Lancaster)

Detailed Program - Wednesday PM (Session 2)

Newton LT4 – Face Processing I

Direct evidence that visual variation, not view variation, drives Face Recognition Unit formation from two face learning experiments
Etchells, David., & Johnston, Robert.
(University of Kent)

Experiencing natural variability between different instances of a person's face enables the development of stable representations
Andrews, Sally., & Burton, Mike.
(University of Aberdeen)

Prototype and exemplar based systems in face processing
Longmore, Chris.
(University of Plymouth)

The eye dominance effect: Findings from an eye tracking study
Thompson, Sarah., Foulsham, Tom., & Jones, Catherine.
(Cardiff University, University of Essex, Cardiff University)

Heterogeneity in Developmental Prosopagnosia
Ulrich, Philip I N., Wilkinson, David T., Ferguson, Heather J., Bindemann, Markus., & Johnston, Robert A.
(University of Kent)

Kilpin Room – Symposium: Thinking and Reasoning

Slower isn't always better: Response-times present challenges for the cognitive miserliness account of the Cognitive Reflection Test
Stupple, Edward J N., Hunt, Tom., Pitchford, Melanie., & Ball, Linden.
(University of Derby, University of Derby, University of Bedfordshire, University of Central Lancashire)

The effect of feedback on belief bias: A signal detection analysis
Crane, Nicola., Ball, Linden., & Monaghan, Padraic.
(Lancaster University, University of Central Lancashire, Lancaster University)

Incubation in creative thinking
Gilhooly, Ken., & Georgiou, George.
(University of Hertfordshire)

A psychological model of delusional belief: Integrating reasoning biases with perceptual, cognitive, self-concept and emotional factors
Galbraith, Niall., & Manktelow, Ken.
(University of Wolverhampton)

Delusional thinking, reasoning and apophenia
Jones, Claire., Galbraith, Niall., & Manktelow, Ken.
(University of Wolverhampton)

Hooley Room – Memory I

Contributions of trait anxiety and situational stress on backward word span efficiency are moderated by mental effort
Edwards, Elizabeth., Edwards, Mark., & Lyvers, Michael.
(Bond University, Gold Coast, Australia)

Effects of time pressure and maths anxiety on solving mental arithmetic problems
Lipka, Sigrid., & Clarke, Lauren.
(University of Derby)

The effect of responsibility attitude and stimulus valence on recognition and confidence in recognition
Manoussaki, Kallia.
(University of the West of Scotland)

Digital memories? Interactive technologies and the mental representation of social relationships
Binder, Jens.
(Nottingham Trent University)

Proactive interference in short term olfactory memory
Moss, Andrew., Johnson, Andrew., Elsley, Jane., & Miles, Christopher.
(Bournemouth University, Bournemouth University, Bournemouth University, Cardiff University/Bournemouth University)

Detailed Program - Thursday AM (Session 3)

Newton LT4 – Symposium: Talking heads: Issues in face-voice processing I

Processing vocal identity under cognitive demand
Stevenage, Sarah., & Neil, Greg J.
(University of Southampton)

Protecting voices from the effects of interference
Neil, Greg J., & Stevenage, Sarah.
(University of Southampton)

The effect of degrading the auditory signal on the ability to locate a talking face
Stacey, Paula., Murphy, Thomas., Sumner, Christian., Kitterick, Pádraig., & Roberts, Katherine.
(Nottingham Trent University, Nottingham Trent University, MRC Institute of Hearing Research, NIHR Nottingham Hearing Biomedical Research Unit, University of Warwick)

Effects of pathogen priming on judgements of face and voice attractiveness and health.
Dunn, Andrew K., Wheatley, Kimberley., & O'Meara, Carolyn.
(Nottingham Trent University)

Kilpin Room – Symposium: Learning and memory in visual search I

Visual marking in 3-D space
Dent, Kevin.
(University of Essex)

Building configural representations of visual context
Vadillo, Migue A., Street, Chris N H., Beesley, Tom., & Shanks, David R.
(University College London, University of British Columbia, University of New South Wales, University College London)

Dimensional cues, VSTM, and the detection of feature change and feature repetition
Pilling, Michael.
(Oxford Brookes University)

Memory for simultaneous abrupt onsets in visual search
von Mühlenen, Adrian., & Sunny, Meera Mary.
(University of Warwick, Indian Institute of Technology Gandhinagar)

Hooley Room – Language II

Morphological awareness and reading comprehension: a developmental study
Cain, Kate., & James, Emma.
(Lancaster University)

Morphological awareness in poor comprehenders: an investigation of the source of difficulty
James, Emma., & Cain, Kate.
(Lancaster University)

Children's knowledge and production of two-clause sentences containing before and after: the influence of event order, background knowledge, and memory
Blything, Liam., Cain, Kate., & Davies, Robert.
(Lancaster University)

The effect of lexical stress on visual word recognition in Greek skilled reading
Kyparissiadis, Antonios., Ledgeway, Timothy., Pitchford, Nicola., & van Heuven, Walter.
(University of Nottingham)

Detailed Program - Thursday AM (Session 4)

Newton LT4 – Symposium: Talking heads: Issues in face-voice processing II

Integrated processes in person perception: Matching novel faces and voices
Smith, Harriet., Dunn, Andrew K., Baguley, Thomas., & Stacey, Paula.
(Nottingham Trent University)

The development of children's face and voice matching skills
Calderwood, Lesley.
(Nottingham Trent University)

Individual differences in attraction to differing faces and voices
Saxton, Tamsin., DeBruine, Lisa., Jones, Ben., Little, Anthony., Rowley, Katie., & Steel, Catherine.
(Northumbria University, Glasgow University, Glasgow University, University of Stirling, Northumbria University, Northumbria University)

Emotion perception: Just how similar are voices and faces?
Kuhn, Lisa., Lucia, Garrido., & Wydell, Taeko.
(Brunel University)

Kilpin Room – Symposium: Learning and memory in visual search II

When and why does encoding precision in visual search decrease with set size?
van den Berg, Ronald., Mazyar, Helga., & Ma, Wei Ji.
(University of Cambridge, University of Southern California, New York University)

A colour in working memory interferes with colour search without becoming a search target
Menneer, Tamaryn., Kaplan, Elina., Stroud, Michael J., & Cave, Kyle R.
(University of Southampton, University of Massachusetts, Merrimack College, University of Massachusetts)

Stimulus-driven competition for attentional control during dual-target search
Barrett, Doug.
(University of Leicester)

Feature processing and target representations in dual target search
Guest, Duncan.
(Nottingham Trent University)

Hooley Room – Reasoning, Decision Making and Problem Solving

Framing effects in moral judgments about risk
Parkinson, Mary., & Byrne, Ruth, M J.
(Trinity College Dublin)

Structured thinking techniques improve fluency and originality in a problem finding task
Hocking, Ian., & Vernon, David.
(Canterbury Christ Church University)

Jumping to conclusions in delusional thinking
Rhodes, Stephanie., Galbraith, Niall., & Manktelow, Kenneth.
(University of Wolverhampton)

Information reduction – all or nothing?
Rowell, Nancy., Green, Alison., Kaye, Helen., & Naish, Peter.
(The Open University)

Detailed Program - Thursday PM (Session 5)

Newton LT4 – Symposium: Attention Capacity

Object tracking by hemifield: is it a ghost in the machine?
Allen, Roy.
(University of Aberdeen)

Individual differences in spatial memory and multiple object tracking
Howard, Christina J., & Guest, Duncan.
(Nottingham Trent University)

Role of attention in manipulating representational states in working memory
Zokaei, Nahid., Feredoes, Eva., & Husain, Masud.
(Oxford University, University of Reading, Oxford University)

Effects of working memory load and capacity on selective attention
de Fockert, Jan., & Ahmed, Lubna.
(Goldsmiths University of London, St Mary's University College)

Capacity or extent? Accounting for simultanagnosia
Humphreys, Glyn W.
(University of Oxford)

Kilpin Room – Cognition and Emotion

Quick, dirty & all consuming: The prioritisation of angry faces across domains of attention and memory
Maratos, Frances.
(University of Derby)

Frontal N250 is generated near the temporo-parietal junction and reflects recognition of emotions from both faces and non-social objects
Athilingam, Jegath., Jones-Rounds, James., Post, David J., Ganzel, Barbara L., & Belmonte, Matthew K.
(University of California San Francisco, Cornell University, University of Illinois, Binghamton University, The Groden Center, Providence, Rhode Island, USA / Nottingham Trent University)

The association between event-related potentials evoked to emotional faces and callous-unemotional and aggressive traits
Fido, Dean., Sumich, Alexander., Bloxsom, Claire., & Gregson, Michael.
(Nottingham Trent University)

Cognitive trait anxiety, situational stress and mental effort predict shifting efficiency: Implications for attentional control theory
Edwards, Mark., Edwards, Elizabeth., & Lyvers, Michael.
(Bond University, Gold Coast, Australia)

Hooley Room – Applied Memory Research

The effect of mindfulness at study and test on false memories
Sherman, Susan., & Tudor, Lucy.
(Keele University)

Sleep increases negative emotional false memories
Knott, Lauren., & Aslam, Aisha.
(City University London)

Crime, hoodies and the video identification process: An applied investigation.
Noon, Elizabeth., Hill, Lisa., Scase, Mark., & Wildbur, Diane.

(De Montford University)

Fit to last: Exploring the longevity of the survival processing effect in location memory

Clark, Dan.
(Liverpool Hope University)

Detailed Program - Thursday PM (Session 6)

Newton LT4 – Symposium: More than a feeling: Current approaches to the experimental study of emotion and cognition

Bang you lost it all! Children's physiological and behavioural response to risky decisions for self and other in the BART
Ziegler, Fenja V., & Chipchase, Susan.
(University of Lincoln, University of Lincoln, University of Nottingham)

Emotion regulation and memory: context-dependent memory deficits following expressive suppression
Chipchase, Susan., & McFadden, Aisling.
(University of Lincoln)

Approaching, avoiding, and attending to emotional information in a large-scale virtual environment
Chapman, Peter.
(University of Nottingham)

Controlling our memory for emotional experiences : The role of attention in real-world directed forgetting
Bailey, Kate.
(University of Nottingham)

The influence of object-based attention on driver anxiety
Humphreys, Louise., & Leese, Adele.
(Staffordshire University)

Kilpin Room – Memory II

What predicts confidence in long-term memory for location?
Baguley, Thomas., & Kaye, Danny.
(Nottingham Trent University)

Thinking with your tongue: Evidence for performative manifestations in inner speech from memory and reading tasks
St John, Alexander.
(Cardiff University)

Order memory contributes to adult mathematicians' superior spatial working memory capacity
Hubber, Paula., Gilmore, Camilla., & Cragg, Lucy.
(University of Nottingham, Loughborough University, University of Nottingham)

Contribution of working memory to perspective calculation and selection
Qureshi, Adam.
(Edge Hill University)

Detailed Program - Friday AM (Session 7)

Newton LT4 – Symposium: Eye tracking in applied settings I

Commentary driving: The effect of task relevant speech on eye movements and hazard perception
Young, Angela., Crundall, David., & Chapman, Peter.
(Nottingham Trent University, Nottingham Trent University, University of Nottingham)

The negative influence of mindwandering on visual search behaviour
Bower, Carl., & Thompson, Catherine.
(University of Salford)

Performing under pressure: Quiet eye training improves surgical knot-tying performance
Causer, Joe.
(Liverpool John Moores University)

Keeping your eye on the rail: Gaze behaviour of horse riders approaching a jump
Hall, Carol., Varley, Ian., & Crundall, David.
(Nottingham Trent University)

Kilpin Room – Sensation, Perception and Attention

Gender differences in the Stroop Colour-Word Test: a meta-analysis
Sjoberg, Espen., & Cole, Geoff.
(University of Essex)

Searching for pitch invariant representations in auditory cortex
Susi, Karima., Hall, Deb., Dunn, Andrew K., & Premkumar, Preethi.
(Nottingham Trent University, Nottingham Hearing Biomedical Research Unit-University of Nottingham, Nottingham Trent University, Nottingham Trent University)

Pathogen priming affects preferences for male and female body weight
Mutale, Gabriella., Dunn, Andrew K., Stiller, James., & Larkin, Rebecca.
(Nottingham Trent University)

'Global' Hebb repetition effects for tactile sequences
Johnson, Andy., High, Callum., & Miles, Chris.
(Bournemouth University)

Hooley Room – Memory III

Do strategies aid children's short-term temporal memory?
Marshall, Zoe., Allen, Richard., Brown, Charity., Mon-Williams, Mark., & Waterman, Amanda.
(University of Leeds)

To do or not to do… Enhancing prospective memory in mild cognitive impairment
Pereira, Antonina., de Mendonça, Alexandre., Freeman, Jayne., & Ellis, Judi.
(University of Chichester, University of Lisbon, University of Reading, University of Reading)

The effects of normal cognitive ageing on the incidental binding of "what" to "where" in visual short term memory
Ferneyhough, Simon., Elsley, Jane., & Johnson, Andrew.
(Bournemouth University)

Differences in theory of mind performance and executive function in older adults
Aldridge, Dominic., & Qureshi, Adam.
(Edge Hill University)

Detailed Program - Friday AM (Session 8)

Newton LT4 – Symposium: Eye tracking in applied settings II

Over-control gives the game away: detecting deception through eye movements
Crundall, David.
(Nottingham Trent University)

Do visuomotor strategies for upper-limb prosthesis control resemble those for intact limbs?
Galpin, Adam., Sobuh, Mohammad., Kenney, Laurence., & Thies, Sybille.
(University of Salford, University of Jordan, University of Salford, University of Salford)

Eye guidance strategies in multiple-scene viewing: evidence from the lab and the CCTV control room
Scott-Brown, Kenneth C., Stainer, Matthew J., & Tatler, Benjamin W.
(Abertay University, University of Melbourne, University of Dundee)

Audiovisual correspondences and their influence on attention and arousal during film viewing
Smith, Tim.
(Birkbeck, University of London)

Kilpin Room – Face Processing II

Improving unfamiliar face matching: Two heads are better than one
Dowsett, Andrew, J., & Burton, Mike A.
(University of Aberdeen)

Adaptation to familiar and unfamiliar faces
Hancock, Peter.
(University of Stirling)

Revisiting a Social-Cognitive explanation of own-group biases in face recognition
Harrison, Virginia., Hole, Graham., & Habibi, Ruth.
(Open University, University of Sussex)

Instructing to mimic improves facial expression recognition
Lewis, Michael., & Dunn, Emily.
(Cardiff University)

Hooley Room – Cognition, Training and Control

Computerized attention training – an intervention with older adults
West, Melanie., Mevorach, Carmel., & Humphreys, Glyn.
(University of Birmingham, University of Birmingham, University of Oxford)

Attentional profiles and intervention efficacy in adolescents across levels of academic achievement
Khng, Kiat Hui., & Lee, Kerry.
(Nanyang Technological University, Singapore)

Does the pattern of reinforcement associated with mobile app use lead to sustained gambling?
James, Richard., Tunney, Richard., & O'Malley, Claire.
(University of Nottingham)

Association between schizotypy, theory of mind and executive function
Emmison, Katie., & Qureshi, Adam.
(Edge Hill University)

Poster Presentations

Session 1 – Wednesday

1. Emotion Perception Ability in Older Adults is Dependent upon the Mode of Presentation and not General Processing Ability
Dimelow, Nicola., Morgan, Jane., Reidy, Lisa., & Verrier, Diarmuid.
(Sheffield Hallam University)

2. Attentional biases towards ambiguous expressions as a function of individual differences
Morgan, Alannah Jodie., & Maratos, Frances.
(University of Derby)

3. Emotional stimuli modulate spatial memory in high anxious participants
Birkinshaw, Hollie., & Maratos, Frances.
(University of Derby)

4. Internet Gaming Disorder: Cognitive components and implications for treatment
Pontes, Halley M., & Griffiths, Mark D.
(Nottingham Trent University)

5. Spatial orientation in MCI patients and normal elderly
Tagarelli, Maria Luana., Caffò, Alessandro., Spano, Giuseppina., Calia, Clara., DeCaro, MariaFara., & Bosco, Andrea.
(University of Bari. University of Bari. University of Bari. Queen Margaret University, University of Bari, University of Bari)

6. Spoken English discrimination training with bilingual speakers: A novel individualized adaptive training regime
Leong, Christine Xiang Ru., Price, Jess., Pitchford, Nicola., & van Heuven, Walter.
(University of Nottingham Malaysia Campus, Nottingham Malaysia Campus, University of Nottingham, University of Nottingham)

7. Number words as mental shortcuts: “万 wàn” in Chinese & “Million” in English
Chan, Clara Gek-Hoon.
(Nanyang Technological University)

8. Language-specific lexical representations for speech production in Arabic-English bilinguals
Alasmari, Abdullah., & Barry, Christopher.
(University of Essex/Imam University (KSA), University of Essex)

9. Linguistic processing effects in reading dynamic horizontally scrolling text
Harvey, Hannah., Walker, Robin., Liversedge, Simon., & Godwin, Hayward.
(Royal Holloway, University of London, Royal Holloway, University of London, University of Southampton, University of Southampton)

10. Examination of N-gram frequencies effects on orthographic processing in keystroke production
Vernon, Michael., & Torrance, Mark.
(Nottingham Trent University)

11. Earwitness memory: Factors that influence voice recognition accuracy across the lifespan
Gous, Georgina., Dunn, Andrew K., Baguley, Thomas., & Stacey, Paula.
(Nottingham Trent University)

12. Learning to listen: Auditory and cognitive training for people with hearing loss
Henshaw, Helen., & Ferguson, Melanie.
(NIHR Nottingham Hearing Biomedical Research Unit, University of Nottingham, NIHR Nottingham Hearing Biomedical Research Unit, University of Nottingham/Nottingham University Hospitals NHS Trust)

13. Effects of action observation on the perception of musical groove
Eaves, Daniel., Burridge, Emily., Griffiths, Noola., McBain, Tom., & Butcher, Natalie.
(Teesside University, York St John University, Teesside University, Teesside University, York St John University/Teesside University)

14. Development of positivity bias in children's intention judgment and its adaptive role in social development
Sato, Tomomi., & Wakebe, Toshihiro.
(Chubu University, University of Tokyo)

15. Effects of dyslexia on problem solving: Strategies and interventions for syllogistic reasoning
Rawlins, Kay., & Monaghan, Padraic.
(Lancaster University)

16. Does positive experience affect syllogistic reasoning when reasoning about related material?
Lucas, Erica., & Banks, Sarah.
(Staffordshire University)

17. Lying through the eyes: How a combination of ocular measurements may elicit cues to improve deception detection and how psychopathy, machiavellianism and narcissism affect such ocular cues
Gibbons, Luke., & Teicher, Sebastian.
(Nottingham Trent University)

18. Evidence for both retinocentric and headcentric maps, but not body or world-centric maps in visual perception
Parwaga, Sandeep., & Duke, Philip A.
(University of Leicester)

19. Looking at hands, objects or words? Tracking eye movements on an action-based categorisation task
Shipp, Nicholas., Vallée-Tourangeau, Frédéric., & Anthony, Susan.
(University of Hertfordshire, Kingston University, University of Hertfordshire)

20. Development of context-specific and context-general memory traces: Is their consolidation process interactive or independent?
Wakebe, Toshihiro., & Sato, Tomomi.
(Chubu University)

Session 2 - Friday

1. Subjective age-of-acquisition ratings for over 3,200 German words
Birchenough, Julia., Davies, Robert., & Connelly, Vincent.
(Oxford Brookes University, Lancaster University, Oxford Brookes University)

2. Visual continuous recognition memory
Smith, Amy., & McKeown, Denis.
(University of Leeds)

3. Intraindividual differences in executive and memory processing in young and old adults
Ames, Michelle., McKeown, Denis., & Bunce, David.
(University of Leeds)

4. Smartphones as external memory: How we learn with and without the internet for backup
Dunstan, Ryan., & Galpin, Adam.
(University of Salford)

5. The influence of glucose ingestion on memory for emotional stimuli during a cognitively demanding dual-tasking paradigm
Elliott, Jade M., & Bonner, Angela.
(Staffordshire University)

6. Categorisation of olfactory perception: normative data for a large set of odours
Moss, Andrew., Johnson, Andrew., Elsley, Jane., & Miles, Christopher.
(Bournemouth University, Bournemouth University, Bournemouth University, Cardiff University/Bournemouth University)

7. Determining the relative contributions of the visuospatial sketchpad and the articulatory loop when solving Sudoku and Wordoku puzzles

Petersen, Johanna Maria., & Fine, Philip.
(University of Buckingham)

8. Operator and authority effects on facial composite effectiveness
Gentry, Natalie., & Johnston, Robert.
(University of Kent)

9. Visual cues influence dot comparison task reliability
Clayton, Sarah., Gilmore, Camilla., & Inglis, Matthew.
(Loughborough University)

10. Attention restoration reduces change blindness (except for those who feel sad)
Thompson, Catherine., & Bendall, Robert.
(University of Salford)

11. Risk perception and physiological differences between fear and anxiety during a driving-based task
Barnard, Megan., & Chapman, Peter.
(University of Nottingham)

12. The influences of age, experience and gender on driving behaviour and dorsolateral prefrontal cortex (DLPFC) activity
Foy, Hannah., Chapman, Peter., & Runham, Patrick.
(University of Nottingham)

13. Eliminating dual-task interference in skilled typewriting: Automaticity or optimal scheduling
Garner, Lauren., & Yamaguchi, Motonori.
(Edge Hill University , Edge Hill University)

14. The time course of eye movements in visual search
Guest, Duncan., Scott, Craig., & Torrance, Mark.
(Nottingham Trent University)

15. Eye movements demonstrate top-down control in singleton search
West, Melanie., & Humphreys, Glyn.
(University of Birmingham, University of Oxford)

16. The effect of presentation time on the own-race bias in a face matching task
Harris, Kathryn., & Johnston, Robert.
(University of Kent)

17. Improving the design of passport photographic identity information
Tummon, Hannah., & Johnston, Robert.
(University of Kent)

18. Recognition of universal, subtle and neutral facial expressions in learning disabled adults
Owen, Sara., & Maratos, Frances.
(University of Derby)

19. Gender differences in a negative priming Stroop Task
Sjoberg, Espen., & Cole, Geoff.
(University of Essex)

Symposia Abstracts – Grouped By Symposia

Face processing in the forensic context

Symposium Organiser – Faye Skelton

Symposium Abstract

This symposium begins by considering aspects of the environment that might impact upon a witness' ability to subsequently recognise a face or construct a good quality composite, looking particularly at auditory distraction in the form of irrelevant speech and mobile phone conversations. Additionally, the symposium will consider influences on facial composite construction. These include individual differences in the use of face processing strategies, and their impact on composites, as well as the influence of the cross-race effect, where a witness may need to construct a composite of a perpetrator of a different ethnic origin to themselves. Finally, we consider techniques prior to and post-construction that can be used to improve the quality and success rates of facial composites.

Talks

The impact of changing-state speech on person identification

Skelton, Faye., Marsh, John Everett., Frowd, Charlie., Vachon, Francois., & Thorley, Rachel (University of Central Lancashire, University of Central Lancashire, University of Winchester, Université Laval, Canada, University of Central Lancashire).

Spontaneous subvocal rehearsal facilitates learning of unfamiliar faces: If subvocal vocalisation is prevented--through requiring participants to engage in articulatory suppression during face encoding--then face recognition performance suffers. Articulatory suppression also impairs short-term serial recall of visually presented items as does task-irrelevant sound providing it changes in state. According to the interference-by-process account the involuntary processing of the order of sounds competes for a similar process applied deliberately to perform a focal task (subvocal rehearsal). In this study participants were either presented with quiet, task-irrelevant steady-state speech or task-irrelevant changing-state speech whilst viewing a face. They then completed a distractor task before selecting the target face from a line-up. This was repeated for 26 trials. Changing-state speech impaired identification performance relative to quiet and steady-state speech. It is concluded that changing-state speech impairs subvocal rehearsal of face information that, when unimpeded, can facilitate face recognition.

In the face of distraction: The impact of background mobile phone conversations on eyewitness testimony

Marsh, John Everett., Patel, Krupali., Skelton, Faye., Frowd, Charlie., & Vachon, Francois (University of Central Lancashire, University of Central Lancashire, University of Central Lancashire, University of Winchester, Université Laval, Canada).

Background speech is omnipresent within our natural environments and therefore it is inevitable that we will occasionally be distracted. The current study investigates whether irrelevant background sound impairs eyewitness memory for a perpetrator. Participants viewed a video of a mock-crime. Twenty-four hours later, participants underwent a face recall interview whereby they recalled the perpetrator's face in as much detail as possible before constructing a composite image of the perpetrator and then attempting to select the offender from a lineup. Using a between-participants design, participants witnessed the staged-crime either in the presence of a to-be-ignored mobile phone conversation between two persons (dialogue), half of a mobile phone conversation (spoken by one person; halfalogue), or quiet. Since the unpredictability of auditory stimulation (e.g., a halfalogue) can impair visually-based task performance (e.g., Emberson, Lupyan, Goldstein, & Spivey, 2010) it was expected that performance would be impaired by the presence of the to-be-ignored halfalogue as compared to the to-be-ignored dialogue and quiet. Consistent with this hypothesis, participants in the halfalogue condition recalled fewer correct facial descriptors compared to the quiet and dialogue condition. Moreover, participants in the halfalogue condition, as compared to the dialogue and quiet conditions, were also less accurate at selecting the perpetrator from a lineup. However, likeness ratings demonstrated that to-be-ignored speech did not impair face construction. The results suggest that to-be-ignored mobile phone conversation impairs eyewitness testimony and are important inasmuch as they demonstrate that eyewitness testimony is not inviolable to distraction from the auditory world around us.

Understanding facial composite construction

Ness, Haley., & Carruthers, Lindsey (Open University, Edinburgh Napier University).

While advances in technology have improved the process of constructing a composite, we still don't understand why there are often large individual differences in the ability to construct an identifiable image. This study is part of a larger body of work that has started to examine the processes involved and early results have found that witnesses differ both in the way they perceive external and internal feature information and in the way they process configural and featural information. Furthermore, our experiments have also found that witnesses who construct a good likeness using the PROfit composite system (a feature based system) are less accurate at recognising faces in Mooney face stimuli, which is a configural task. This suggested that those witnesses who preferred a more featural style of processing, constructed better likenesses with a feature based composite system while those who were more configural constructed significantly poorer likeness. This experiment expands on this work by examining this effect with a newer, more holistic composite system – EvoFIT. As EvoFIT displays whole faces, emphasises configural processing and allows very little opportunity to manipulate individual features, the opposite pattern of results were expected. However, the results show a similar pattern. Those participants who constructed better likenesses using EvoFIT were less accurate and significantly slower at the configural Mooney face task. This suggests something important about the nature of composite construction. As it is an act of 'reconstructing' a face, the task may utilise similar processes regardless of how systems display the images.

Own race bias in the recognition of facial composites

Ogidan, Benny., & Johnston, Robert (University of Kent).

Own race bias (ORB) occurs when people show superior performance in recognizing own race faces compared with faces of another race. Facial composites are constructed by witnesses who have viewed a crime but who are unfamiliar with the suspect and are likely to be influenced by ORB. However, composites are shown to an end user who may be familiar with the suspect (a police officer or local resident). Any difference in race between suspect and witness may be further modified by the race of the end user. Black and Caucasian pseudo-witnesses constructed composites of either Black or Caucasian target faces. Subsequently, additional independent judges (both Black and Caucasian) rated their effectiveness. A significant three way interaction revealed a complex pattern of findings between race of suspect, race of witness and race of judge. The implications of these findings for how composite construction is vulnerable to ORB are discussed.

Techniques for substantially improving the effectiveness of feature-based composites

Frowd, Charlie., Skelton, Faye., Battersby, Kirsty., & Fodarella, Cristina (University of Winchester, University of Central Lancashire, University of Central Lancashire, University of Central Lancashire).

Face construction via the selection of individual facial features is a process which is known to rarely produce an identifiable face. However, techniques are emerging which indicate how performance can be facilitated, and three of these methods were employed in the current project. Participants looked at an unfamiliar target face and 24hr later received a face-recall interview (CI), or a holistic-cognitive interview (H-CI) which involved face recall followed by character attribution. Participants then constructed a single composite in the normal way, by selecting individual features either in the context of a complete face, or by focusing first on the inner region of the face (with the outer region masked) and then the reverse (to construct the outer region). Further participants who were familiar with the targets attempted to name the composites, first by looking at the face from the front and then from the side. Results indicated a reliable benefit of the H-CI (cf. CI), as found previously, but superior naming performance occurred (M = 85% correct) when composites were constructed by separate facial regions and were named from the side. The work indicates for the first time how highly identifiable composites can be produced using this type of technology.

Thinking and Reasoning

Symposium Organiser – Linden Ball

Symposium Abstract

The field of thinking and reasoning is experiencing major empirical and conceptual developments at the moment. On the empirical side researchers are increasingly challenging the use of entrenched laboratory tasks and are either looking to augment such tasks in ways that render them more representative of real-world problems, or else are abandoning traditional paradigms altogether and seeking out fresh tools to understand thinking and reasoning processes. On the theoretical side new ideas are emerging that are facilitating the development of both a broader and a deeper understanding of thinking and reasoning processes. To reflect the exciting changes that are taking place in the field this symposium aims to capture the state-of-the-art in relation to important themes such as the role of dual processes in reasoning, the basis of delusional beliefs

in reasoning, the role of unconscious processing in creative cognition, the involvement of pragmatic factors in hypothesis testing, and the importance of individual differences in thinking.

Talks

Slower isn't always better: Response-times present challenges for the cognitive miserliness account of the Cognitive Reflection Test

Stupple, Edward J N., Hunt, Tom., Pitchford, Melanie., & Ball, Linden (University of Derby, University of Derby, University of Bedfordshire, University of Central Lancashire).

The Cognitive Reflection Test (CRT) is considered to measure the ability to inhibit fast intuitive answers to favour slow analytic ones and, as such, is a useful tool for researchers who apply dual process theory to higher cognitive processes. Toplak, West, and Stanovich (2011) proposed that it is a measure of cognitive miserliness and have since developed an expanded version of the CRT based on this proposal. Stupple, Gale, and Richmond (2013), however, demonstrated that the relationship between miserliness and performance on tasks where correct/normative responses are associated with slower responses was not clear-cut. Two experiments were conducted to examine participant response times to items when engaging with the standard CRT and an expanded set of CRT items. Data revealed that correlations between response times and response accuracy were not universally strong, and in some cases, faster responses were associated with greater accuracy. Moreover, some participants responded with answers that were inconsistent with both the 'intuitive' and 'analytic' answers. These participants were typically observed to complete the questions more slowly. These data were inconsistent with the claim that incorrect responses to the CRT are indicative of cognitive miserliness. The efficacy of individual items in measuring the tendency for slow, analytic processing will be assessed and the implications these data present for utilising the CRT will be considered.

The effect of feedback on belief bias: A signal detection analysis

Crane, Nicola., Ball, Linden., & Monaghan, Padraic (Lancaster University, University of Central Lancashire, Lancaster University).

When an individual attempts to evaluate the logical validity of an argument, the believability of the conclusion can interfere with their reasoning. This phenomenon is known as the belief bias effect. Recent research has suggested that a signal detection approach is necessary to separate the reasoning-stage and response-stage components of this effect. The present study aimed to examine whether evaluative feedback could be used to reduce or eliminate belief bias. Participants were shown a total of 80 syllogistic reasoning problems across 5 separate sessions, and their responses, response times, and subjective confidence ratings were recorded. Both a standard analysis and signal detection theoretical analysis were conducted for comparison purposes. It was found that the standard analysis appeared to show an increase in logical responding for participants in the feedback condition; however, the signal detection analysis revealed that there was in fact no effect of feedback on accuracy, but it did alter their response bias. These data highlight the importance of distinguishing between reasoning and response stage effects when assessing the effectiveness of an intervention designed to reduce the belief bias effect.

Incubation in creative thinking

Gilhooly, Ken., & Georgiou, George (University of Hertfordshire).

Creative problem solving, in which novel solutions are required, has often been seen as involving unconscious processes. Other explanations are also possible in terms of intermittent work or beneficial forgetting and weakening of misleading sets. We outline some recent studies of divergent thinking using the Alternative Uses Task that we have carried out regarding immediate versus delayed incubation and the effects of resource competition from interpolated activities. These studies tend to support a role for unconscious work as against intermittent conscious work, forgetting or set weakening. Spreading activation and thought suppression as candidate processes in incubation will be discussed.

A psychological model of delusional belief: Integrating reasoning biases with perceptual, cognitive, self-concept and emotional factors

Galbraith, Niall., & Manktelow, Ken (University of Wolverhampton).

Reasoning biases may play a role in the formation and/or maintenance of delusions, alongside a cluster of other psychological variables, encompassing self-concept, perceptual, emotional and cognitive factors. Previous attempts to integrate these factors into an inclusive model of delusional belief, such as McKay, Langdon, and Coltheart's (2005) two-factor model and Freeman's threat anticipation model (2007), have made significant progress and are highly influential, but

still leave questions unanswered about the role of reasoning biases. Building on these earlier models, we articulate a new integrative model which synthesizes various reasoning biases with the other influential psychological theories of delusional belief.

Delusional thinking, reasoning and apophenia

Jones, Claire., Galbraith, Niall., & Manktelow, Ken (University of Wolverhampton).

Previous studies (Colbert & Peters, 2002; Galbraith, Manktelow & Morris, 2008; LaRocco & Warman, 2009; Linney, Peters & Ayton, 1998) have demonstrated that people in the general population who hold unusual beliefs display reasoning biases similar to those displayed by people with delusions. The current research aimed to investigate how people in the general population who are classified into high and low delusion-prone groups reason about narratives containing either delusional or neutral content and to investigate the relationship between delusional thinking and apophenia in the form of coincidences. Participants (N = 101) completed the Peters et al., Delusions Inventory (PDI; Peters, Day & Garety, 1996) and assessed a series of narratives containing either delusional or neutral content. The Coincidences Questionnaire (Bressan, 2002) was completed as a measure of apophenia. Results revealed that those high in delusional ideation display reasoning biases compared to those low in delusional ideation, even on neutral stimuli. Coincidental experiences were found to significantly predict delusional ideation. Furthermore, those high in delusional ideation tend to attribute coincidences to destiny, divine intervention and the fact that everything is connected to everything else in the universe; while those low in delusional ideation tend to attribute coincidences to pure chance. Taken together these findings provide new insight into factors that may underpin reasoning biases in delusion prone individuals. Furthermore, in conjunction with other reasoning biases that have previously been identified in delusion-prone individuals, these findings may have implications for the formation and maintenance of delusions.

Talking heads: Issues in face-voice processing

Symposium Organiser – Andrew Dunn

Symposium Abstract

This symposium is concerned with issues relating to how we process, perceive, recognise and remember faces and voices. Here we present 8 talks. The talks encompass tests of a new voice recognition framework (Stevenage), protecting voices recognition from interference (Neil), the role of attention in locating faces from distorted voice signals (Stacey), the effects of pathogen load priming on judgements of face and voice attractiveness and health (Dunn), and exploration of adult face-voice matching and integration skills (Smith), the effects of memory load on children's face-voice matching performance (Calderwood), an exploration of emotional (anger, happiness) superiority effects in voices as well as faces, for children and adults (Khun) and developmental and experiential influences on variability in face and voice preference (Saxton).

Talks

Processing vocal identity under cognitive demand

Stevenage, Sarah., & Neil, Greg J (University of Southampton).

Two experiments are presented which provide a test of a new theoretical framework for voice recognition (Stevenage & Neil, 2014). Within this framework, voice recognition occurs in the context of vocal speech and vocal affect. However, the processing of speech and affect are prioritised at the expense of vocal identity. Experiment 1 explored voice and message recognition both when the voice sounded neutral and when it sounded angry. Performance suggested that the angry tone biased participants to orient to the message and away from the messenger. Consequently, message recognition remained stable but voice recognition significantly fell relative to a neutral baseline condition. Experiment 2 biased participants away from attending to the message by disrupting intelligibility through using scrambled or backwards clips. Results suggested that participants nevertheless worked hard to process the message and, thus, still oriented away from the messenger. Consequently, voice recognition significantly fell when the message was hard to interpret. Notably, however, distinctive voices were protected against these competing demands relative to typical voices. Taken together, these results provide clear guidelines as to when voice recognition can be deemed most reliable in a forensic context.

Protecting voices from the effects of interference

Neil, Greg J., & Stevenage, Sarah (University of Southampton).

Two experiments investigate the extent to which voices can be protected from the effects of interference. Hearing other voices between an initial presentation of a voice and a later recognition attempt greatly reduces voice recognition performance. However, it may be possible to protect voices from the effects of interference by natural (distinctiveness) and artificial (repetition) means. The effect of both distinctiveness and repetition were investigated using a same/different paradigm. Study and test voices were presented to participants, separated by a fixed interval. In both experiments, the interval contained either silence or a series of four intervening voices. In Experiment 1 we demonstrate that distinctive voices are less prone to interference than are typical voices. Similarly, in Experiment 2 we demonstrate that repeated voices are less prone to interference than are voices heard only once. These results show that although voices are weak as a means of person identification, voice recognition performance can be protected by both natural and artificial variables.

The effect of degrading the auditory signal on the ability to locate a talking face

Stacey, Paula., Murphy, Thomas., Sumner, Christian., Kitterick, Pádraig., & Roberts, Katherine (Nottingham Trent University, Nottingham Trent University, MRC Institute of Hearing Research, NIHR Nottingham Hearing Biomedical Research Unit, University of Warwick).

Recent evidence from Alsius and Soto-Faraco (2011) suggests that selective attention is required to locate a talking face in a multi-talker array, seemingly in contrast to previous claims that the integration of faces and voices is preattentive (McGurk and MacDonald, 1976). The current study investigated what effect degrading the auditory signal has on the ability to locate a talking face. Twenty participants were presented with between 2 and 4 moving faces, each of which was articulating a different sentence. The task was to decide, as quickly as possible, which of these faces matched the auditory sentence that they heard at the same time. The results showed that in the least demanding auditory condition (clear speech in quiet), increasing the number of faces on screen did not increase visual search times. However, when speech was presented in background noise or was processed to simulate the information provided by a cochlear implant ('sine-wave vocoded speech'), search times increased as the number of faces increased even though intelligibility of the sentences was unchanged. The results suggest that under conditions of low perceptual load it is possible for audiovisual correspondence to 'pop out', but if perceptual load is increased then selective attention is required to bind faces and voices.

Effects of pathogen priming on judgements of face and voice attractiveness and health

Dunn, Andrew K., Wheatley, Kimberley., & O'Meara, Carolyn (Nottingham Trent University).

It has been shown (e.g. Wells et al., 2011) that whilst individuals can use both face and voice quality to make judgements of perceived attractiveness and health, in face-voice compounds, face quality typically overshadows (dominates) the judgement. It has also been shown that priming about environmental pathogen load can have a significant effect on a range judgements and behaviours (e.g. Dunn & Chambers, 2011; Little et al., 2011). Here we report on two experiments (Exp. 1 & Exp. 2), in which we explored the effects of implicit pathogen priming on face/voice attractiveness ratings (Exp. 1) and voice health ratings (Exp 2). In Exp. 1 we show that although average attractiveness ratings for component (face or voice) and compound (face-voice) targets do not significantly change, following priming, the amount of variance accounted for by the component voice ratings in relation to the compound face-voice ratings, significantly increased, thereby removing face overshadowing. In Exp. 2 we show that whilst priming significantly shifts voice health judgements, relative to baseline, there is also a significant difference between priming the past environment (time of target stimulus collection) or the present environment (time of rating). The difference was such that priming the past produced a significantly smaller shift in voice ratings than priming the present. The findings from both experiments demonstrate that personal preference changes when pathogen load is perceived to be high, and that temporal information mediates this influence. These findings are consistent with a behavioural immune system hypothesis (e.g. Schaller & Duncan 2007).

Integrated processes in person perception: Matching novel faces and voices

Smith, Harriet., Dunn, Andrew K., Baguley, Thomas., & Stacey, Paula (Nottingham Trent University).

A series of studies investigated whether people can match novel faces and voices of the same age (20-30) and sex at a level significantly above chance. The studies also tested whether accuracy is affected by facial stimuli type: static or moving, and the order of stimuli presentation: face first or voice first. In Experiment 1 participants saw a face and heard a voice one after the other. They had to decide whether the stimuli were matching or not matching. When the correct matching stimulus was present participants consistently performed above chance level, regardless of facial stimuli type or stimuli order. When the correct matching stimulus was not present participants were either just guessing (voice first) or significantly below chance (face first). In Experiment 2 and 3 participants had to select the correct matching stimuli in a two-alternative forced choice task. The correct matching stimuli was always present in Experiment 2. It was never present in Experiment 3. Experiments 2 and 3 replicated the results of Experiment 1. Participants in Experiment 2 were more accurate when the correct matching

stimulus was present in position 1. Experiment 3 showed that a response bias was operating; participants selected stimulus 1 more often than stimulus 2. However, the bias did not wholly explain the overall above-chance accuracy levels in Experiment 2. This set of results show that people can accurately match novel faces and voices, indicating that faces and voices offer concordant information. Face and voice perception appears to be an integrated process.

The development of children's face and voice matching skills

Calderwood, Lesley (Nottingham Trent University).

Previous research shows a steady age-related increase in children's abilities to recognise unfamiliar faces and voices (e.g., Carey, Diamond & Woods, 1980; Flin, 1980; Mann, Diamond & Carey, 1979) between the ages of 6 and 10 years, followed by either a dip or a plateau between 10 and 12 years and then an increase into adolescence. There is some debate over whether these changes are due to general cognitive development. One way to investigate this possibility is to use a matching task as this reduces the memory and cognitive demands of the task for children. In study 1, children aged 6, 8, 10, 12 and 14 years and adults carried out a face matching task where they were presented with a 'target' face above a line-up containing 10 faces. The target was present in half of the trials. The results showed that only 14-year-olds performed as accurately as adults on target-present line-ups and on target-absent line-ups all age groups performed significantly worse than adults. In study 2, participants listened to a target voice for 30 seconds and then listened to a line-up of 6 voices and had to decide whether one of the 6 voices matched the target or not. The results showed that performance was very poor overall, and that children feel a strong tendency to choose in the target-absent line-up with 90% of participants picking someone in the target-absent line-up. This pattern of responding on 'target-present' and 'target-absent' line-ups is discussed in relation to the eyewitness literature.

Individual differences in attraction to differing faces and voices

Saxton, Tamsin., DeBruine, Lisa., Jones, Ben., Little, Anthony., Rowley, Katie., & Steel, Catherine (Northumbria University, Glasgow University, Glasgow University, University of Stirling, Northumbria University, Northumbria University).

Human attraction is of academic interest because of its implications for human sexual selection and evolution. People vary in their perceptions of which features, faces and individuals are attractive, but many of the reasons for this variability are unknown. Here, I present two studies that examine how developmental processes and experiences might lead to some of this variability in the perceptions of the attractiveness of differing faces and voices. The first study tested an evolutionarily-motivated hypothesis, whereby preferences for features that indicate a biologically high-quality partner might arise or strengthen significantly during adolescence, when mate choice becomes relevant. We found evidence that girls preferred lower-pitched boys' voices more as they grew up, consistent with increasing preferences for 'biological quality' in partners. Boys appeared also to prefer lower-pitched girls' voices more as they grew up, perhaps because lower voice pitch in female adolescents might represent an older and more sexually mature partner. The second study tested the extent to which family members may provide a form of template for choosing partners. It found that women select partners who bear some resemblance to those women's brothers. This may be mediated by feelings of trust, and from a biological perspective, may encourage people to reproduce with others who are optimally (not closely) related to them. Together, the two studies show how individual differences in judgements of attractiveness may arise systematically.

Emotion perception: Just how similar are voices and faces?

Kuhn, Lisa., Lucia, Garrido., & Wydell, Taeko (Brunel University).

We aimed to investigate how similar the recognition of the six basic emotions across two independent modalities, -visual (faces) and auditory (voices) is. In particular, this study investigated whether happiness (Becker et al., 2011) or anger Damjanovic et al., 2013) superiority effects are predominantly a feature of visual emotion recognition or whether they are also observable within the auditory domain. Additionally, developmental trajectories are investigated. Forty-nine English adults (18 male, 31 female, aged 18-61, =30.8) and fifty-four English children (23 male, 31 female, aged 5-10, =7.52) rated Ekman faces (Ekman, 1976) as well as non-verbal vocalisations (Belin, Fillion-Bilodeau & Gosselin, 2008) for perceived emotion intensity. Faces received higher intensity ratings than voices, especially for happiness, fear and surprise. Happy and surprise stimuli received highest intensity ratings and anger received the lowest intensity ratings in both modalities. The same pattern was observable for reaction times. Additionally, confusion matrices of the six basic emotions are highly correlated across the two independent modalities. Emotion recognition patterns developed with age. The happiness superiority observed both within facial emotion recognition and vocal emotion recognition, combined with the highly similar confusion matrices across modalities, suggest that modality independent mechanisms are crucial for emotion recognition. Data suggests gradual development of emotion perception across three age groups. This study has been funded by the ESRC studentship to the first author.

Learning and memory in visual search

Symposium Organiser – Duncan Guest

Symposium Abstract

Visual search requires searching for a target or multiple targets amongst distracting objects in a scene that may or may not be novel. At the very least visual search requires forming and maintaining a representation of the target (or targets) and forming representations of the distracting objects. Typically, it also requires learning about the characteristics of the targets, distractors and the search scene and using this information to facilitate search. Moreover, in everyday situations, visual search is often completed whilst performing other cognitive tasks that can place demands on the resources required in search. There are therefore multiple learning and memory demands in visual search and multiple processes through which learning and memory operate. This symposium aims to explore a number of these processes and provide insight into the many different ways in which learning and memory operate in visual search.

Talks

Visual marking in 3-D space

Dent, Kevin (University of Essex).

In visual search when one set of items appears one second before the remaining items and the target, observers may effectively ignore the earlier appearing items. This ability has been attributed to an active mechanism of "visual marking" that serves to inhibit the locations of the early distractors. The current experiments examined the nature of the underlying memory representation. In particular we asked if the inhibition accruing as a result of visual marking would spread to other items sharing a common depth or surface with the early appearing distractors. Experiment 1 showed that when the new items appeared at two different depths, the target was very difficult to find when it appeared at the same depth as the early appearing distractors. Experiment 2 showed that this substantial cost to performance was maintained in the face of a probability bias towards the target appearing in the "old" depth, suggesting that inhibition of the ignored depth could not be overridden by top-down control. Experiments 3-5 demonstrated similar effects for items that did not necessarily share depth, but that were part of a common coplanar surface slanted in depth. Overall, the results demonstrate that the memory representation that supports visual marking in search includes a description of the search items in terms of well-formed three-dimensional surfaces

Building configural representations of visual context

Vadillo, Migue A., Street, Chris N H., Beesley, Tom., & Shanks, David R (University College London, University of British Columbia, University of New South Wales, University College London).

Current research on visual search shows that it is easier to find target objects when they appear in familiar contexts. In contextual cueing experiments, participants are instructed to find a target hidden among a number of distractors. Unbeknownst to participants, some of the search displays are presented several times during the experiment. Search times show a systematic advantage for repeated over non-repeated search displays. According to the most popular model of contextual cueing, this effect takes place because, with repeated experience, people learn associations between each of the distractors in the search display and the location where the target is most likely to appear. However, experiments conducted in our laboratory suggest that participants also learn associations among the distractors themselves: Building a configural representation of the whole pattern of distractors seems to be a key factor in successful performance. Furthermore, eye-movement data show that these configural representations change the way participants deploy their attention. When a search display includes both distractors that have been consistently trained together and randomly distributed distractors, participants make fewer fixations on the former and spend less time looking at them. These results suggest that configural representations not only guide attention towards the target, but also inhibit attention towards locations where the target is unlikely to appear.

Dimensional cues, VSTM, and the detection of feature change and feature repetition

Pilling, Michael (Oxford Brookes University).

Visual changes have been found to detected more efficiently when observers have a-priori information about the feature dimension of the change, either via an explicit cue (Aginsky & Tarr, 2000), or because such changes have had a higher prior-probability within the task (van Lamsweerde & Beck, 2008). Are such dimensional effects a consequence of how sensory

information is encoded into VSTM, or of how information held in VSTM is compared with current sensory input? To explore this question a 'one-shot' change detection task was given in which changes could occur to the colour or shape of one display item; a verbal cue indicated the feature dimension of the change (80% validity on change trials). The temporal position of the cue was varied across trials (cues were presented either before the pre-change array, during the 500 ms ISI, or simultaneously with the post-change array). Valid cues facilitated performance above invalid only when presented before the pre change array. This suggests that dimensional cues influence encoding of the pre-change display but have limited/no effect on comparison or decisional processes between information held in VSTM and sensory input. Similar results were found in a sameness detection task (observers had to detect the presence of feature-repetitions at display locations across pre- and post-change displays from amongst feature changes, and were cued to the repetition dimension). Findings are related to processes in search tasks in which perceptual comparisons are required with information held in VSTM.

Memory for simultaneous abrupt onsets in visual search

von Mühlenen, Adrian., & Sunny, Meera Mary (University of Warwick, Indian Institute of Technology Gandhinagar).

The automatic capture of attention by a single abrupt onset is a robust and a fairly undisputed finding. However, it is not clear how attention is allocated when there are several simultaneous such events. Yantis and Johnson (1990) argued that up to four onsets can be automatically prioritized. However, in their study the number of onsets co-varied with the total number of items in the display, allowing for a possible confound between these two variables. In the present study, display size was fixed at eight items while the number of onsets was systematically varied between zero and eight. In the first experiment we found a systematic increase in reactions times with increasing number of onsets. This increase was stronger when the target was an onset than when it was a no-onset item. Surprisingly, this pattern is best explained by a one-tag model according to which only one onset is automatically prioritized. Even when the onsets were marked in red, nearly half of the participants continued to prioritize only one onset item. Only when trials with onset and with no-onset targets were blocked, participants started to search selectively through the set of only the relevant target type. These results taken together support the finding that attention is only captured by one onset item. Many bottom-up models of attention capture, like masking or saliency accounts, can account for these findings. Thus, in the case of multiple simultaneous onsets, there seems to be no memory for more than one item.

When and why does encoding precision in visual search decrease with set size?

van den Berg, Ronald., Mazyar, Helga., & Ma, Wei Ji (University of Cambridge, University of Southern California, New York University).

The brain encodes visual information with limited precision. Contradictory evidence exists as to whether the precision with which an item is encoded depends on the number of stimuli in a display (set size). Some studies have found evidence that precision decreases with set size, but others have reported constant precision. In this talk, I will present results from a range of experiments and computational modelling studies that were aimed at identifying which factors determine whether or not encoding precision decreases with set size. The results suggest that distractor predictability is the most important factor: encoding precision is independent of set size when distractors are the same across trials (fully predictable), but it decreases with set size when they change from trial to trial (unpredictable). Furthermore, it appears that neither memory load nor heterogeneity of the stimulus set plays a role in the relationship between precision and set size.

A colour in working memory interferes with colour search without becoming a search target

Menneer, Tamaryn., Kaplan, Elina., Stroud, Michael J., & Cave, Kyle R (University of Southampton, University of Massachusetts, Merrimack College, University of Massachusetts).

Searching for two targets simultaneously produces a dual-target cost in comparison with single-target search. In search for two different colours, specificity in guidance to target colours is reduced compared with single-target searches, as evidenced by fixations to colours that are different from either target colour. The cost may therefore reflect interference between two target templates held simultaneously in working memory (WM). Previous measures of interference between WM and search have yielded mixed results. The current experiments tested whether a colour held in WM affected search guidance. In separate experiments, participants searched for a single target colour while simultaneously holding one of the following in working memory: 1) a colour patch, 2) a letter, 3) a dot pattern), or 4) an oriented bar. The colour held in WM had relatively little influence on the fixations to that colour, suggesting that the WM representation is not confused with the search representation. However, search was more disrupted when WM contained a colour than a letter, dot pattern, or orientation, demonstrating a general interference between the colour representations. These results suggest that the resources for representing colour may be used by both visual search and working memory, and that these colour resources are relatively independent from those for other types of visual representations (orientations and spatial patterns).

Stimulus-driven competition for attentional control during dual-target search

Barrett, Doug (University of Leicester).

Simultaneous search for two targets is often slower and less accurate than independent searches for the same two targets. This 'dual-target cost' may reflect an increase in stochastic noise at the decision level, or a reduction in sensitivity when attention is distributed across multiple items during encoding and discrimination. To investigate these possibilities, the current study used one or two cues to elicit single- and dual-target searches for orientation-defined targets. In Experiment 1, a method of constant stimuli was used to manipulate target-distractor similarity (± 0 to 30°) in displays with a set-size of 1. In Experiment 2, single- and dual-target search accuracy at a fixed target-distractor separation were compared at set sizes of 1, 2 and 4. The results revealed a significant decrease in sensitivity (d') on dual- compared to single-target searches, but only when set size varied across trials. The magnitude of the reduction was modulated by the relationship between each cue and objects in the display, and exceeded that predicted by stochastic noise alone. These findings suggest the dual-target cost is partly attributable to stimulus-driven competition for attentional control when search is guided by more than one item in working memory.

Feature processing and target representations in dual target search

Guest, Duncan (Nottingham Trent University).

A current issue in visual search is how targets are represented when searching for two targets (dual target search). Dual target search could be based on two internal representations, requiring either a sequential or task-switching search process for two targets, or alternatively these target representations could be yoked to form a summary representation which is then used during search. To date these questions have been asked by examining latency, accuracy or patterns of eye movements. As yet, the time course of performance in these tasks, how search performance changes as display duration increases, has received very little attention. Thus almost nothing is known about how people represent targets in dual target search under considerable time pressure -where perceptual information is not fully available to guide search. Yet these are often the conditions under which search is completed outside the laboratory. In this talk I apply a previously developed model of the time course of visual search (the EGCM-VS, Guest and Lamberts, 2011) to data from three dual target search studies. Modelling these tasks can help show the extent to which we can use independent target representations to complete search, as well as telling us about the processing dynamics involved in single and dual task search.

Attention Capacity

Symposium Organiser – Christina Howard

Symposium Abstract

Visual attention is a limited resource that can be measured in terms of several different aspects of processing. The symposium will include recent work in the area, covering the spatial focus of attention, temporal aspects of processing, precision of encoding, the relationship with working memory as well as the neuroanatomical underpinnings of these capacity limitations.

Talks

Object tracking by hemifield: is it a ghost in the machine?

Allen, Roy (University of Aberdeen).

In 2005 Alvarez & Cavanagh proposed a model of attentional tracking, based on their research, in which "tracking capacity is independently constrained in the left and right visual fields as if separate tracking systems were engaged, one in each field" (p.637). Here I report on two experiments. The first used a multiple-object tracking paradigm, very similar to Alvarez & Cavanagh's. The second used a multiple-identity tracking paradigm in which the underlying object-tracking performance was extracted. Each had the same three aims: (1) To replicate their findings; (2) To test a crucial prediction of their model; (3) To investigate an alternative explanation for their findings. In neither experiment was I able to replicate their results, despite similar paradigms each with a good number of participants (42), and their model's prediction was also not supported. However, I was able to demonstrate a potential source for their findings that does not require independent resources for each hemifields.

Individual differences in spatial memory and multiple object tracking

Howard, Christina J., & Guest, Duncan (Nottingham Trent University).

We investigated the relationship between spatial memory performance and multiple object tracking (MOT). In the spatial working memory task, participants viewed complex patterns and then made same-different judgements after a filler task. In the MOT task, participants tracked the spatial positions of four discs amongst four distractors. At the end of each MOT trial, participants were queried to report the final position of one of the targets and we calculated the precision of these position reports. Memory performance, particularly under high load, was related to spatial and temporal precision of responses. Temporal precision was assessed by comparing position reports with those of the queried target over the final moments of the display. As previously reported (e.g. Howard, Masom & Holcombe, 2011), we find that responses were more similar to the recent past states of the target than its final state. Memory performance was related to these perceptual lags. Further, memory performance was also related to a task requiring perception of fine timescales, namely a flicker phase simultaneity judgement. Some have suggested that spatial information is updated serially during MOT (Oksama & Hyona, 2008). These results suggest that spatial memory may be supporting performance in MOT and this is consistent with serial component models of tracking.

Role of attention in manipulating representational states in working memory

Zokaei, Nahid., Feredoes, Eva., & Husain, Masud (Oxford University, University of Reading, Oxford University).

The relationship between working memory (WM) and attention is a highly interdependent one, with evidence showing that attention determines the state in which items in WM are retained. Through the focusing of attention, an item – or a subset of items – might be held in a more prioritized state, commonly termed as the focus of attention (FOA). We investigated the changes in representational states of items in WM maintenance through both top-down and bottom-up influences of attention. We used a more sensitive measure of WM precision that relies on participants to reproduce the exact qualities of a feature in memory. By having attention focused on retained items, some were represented in a more prioritized state, with their recall later improved over non-privileged items. Privileged state was achieved through incidental cueing in WM maintenance (a task regarding an irrelevant feature of items in WM) or automatically, by virtue of recency. But can items flexibly move in and out of the FOA? Using double incidental cueing and sequential presentation of memory array, we demonstrated that when an item remains behaviourally relevant, despite not being inside the FOA, focusing attention upon it can increase its recall precision suggesting that information regarding these items can be later retrieved. We further investigated causal evidence for different representational state in WM maintenance in early visual cortex using transcranial magnetic stimulation (TMS). TMS to early visual cortex disrupted only the memory of items in FOA suggesting that maintenance of these items only rely on sensory cortex.

Effects of working memory load and capacity on selective attention

de Fockert, Jan., & Ahmed, Lubna (Goldsmiths University of London, St Mary's University College).

There is mounting evidence that working memory plays a key role in selective attention: loading working memory during a flanker task enhances the processing of irrelevant distractors, and individuals with low (vs. high) working memory span show higher levels of distractibility. Here we investigated the combined effects of working memory load and capacity on selective attention. Participants with either low or high working memory span performed a flanker task while having a low or high load on working memory. Distractibility was low when working memory load was low and capacity high, greater when either working memory load was high or capacity was low, but surprisingly smaller again when load was high and capacity low. A follow-up experiment revealed that the inverted-U pattern of distractibility effects can be explained by differences in the spread of the attentional window as a function of the availability of working memory. These findings suggest that a key function of working memory is to constrain the spatial distribution of selective attention.

Capacity or extent? Accounting for simultanagnosia

Humphreys, Glyn W (University of Oxford).

Simultanagnosia is a delibitating deficit in which, after damage to posterior parietal cortex, patients only seem to perceive one stimulus at a time. A variety of accounts of simultanagnosia have been made, including the idea that such patients have an abnormally reduced 'window' of spatial attention. Here I will review evidence on the functional and neuroanatomical basis of simultanagnosia and I will present data that indicate that the disorder reflects a loss of capacity under conditions of distributed attention where multiple field elements are normally processed simultaneously, with this capacity limitation masquerading as a loss of the extent of visual processing under certain circumstances.

More than a feeling: current approaches to the experimental study of emotion and cognition Eye tracking in applied settings

Sympoosiuum Organiser – Susan Chipchase

Symposium Abstract

Emotion has a fundamental role to play in cognition, and the interplay between those processes has important implications for many areas of life. Five papers chart the systematic study of the role of emotion: risky decisions for self and someone else in children (Ziegler, Chipchase & Tunney), memory deficits and the suppression of facial expression in emotion regulation (Chipchase & McFadden), considering how we approach, avoid and attend to emotional stimuli (Chapman), role of attention in real-world directed forgetting for emotional experiences (Bailey) and the influence of object based attention on anxiety whilst driving (Humphreys & Leese). The wide variety of approaches used to study emotion in an experimental setting in these areas point to the importance of understanding emotion in cognition and to future directions for investigation

Talks

Bang you lost it all! Children's physiological and behavioural response to risky decisions for self and other in the BART

Ziegler, Fenja V., & Chipchase, Susan (University of Lincoln, University of Lincoln, University of Nottingham).

The central role of emotion in decision-making and risk-seeking is beginning to be well understood. Yet, we still know very little about how people make decisions for others or how decision making develops. We tested 3-11 year old children's risky decisions for self and others using the Balloon Analogue Risk Test (BART). In the BART participants blow up a series of virtual balloons to win prizes; the bigger the balloon, the bigger the prize, but as the balloon can pop at any time, pursuing larger prizes is a risky strategy. Children played the game for themselves and for another child (either their best friend or a stranger). As risk is related to emotion, we measured Galvanic Skin Response (GSR) on all trials. Children made more risky decisions for strangers than for themselves or their best friends. These results will be discussed in relation to the Somatic Distortion theory of decision making (Tunney & Ziegler, under review).

Emotion regulation and memory: context-dependent memory deficits following expressive suppression

Chipchase, Susan., & McFadden, Aisling (University of Lincoln).

Emotion regulation is a process often used by individuals in everyday life. Suppression of emotional expressions allows us to hide the expression of our emotions from others. This can have a deleterious effect on cognition, with memory for emotional materials worse if individuals are instructed to suppress their facial expressions when first viewing this material. Typically, such studies involve participants regulating their emotions when encoding materials into memory, but not when retrieving items from memory. We investigated whether this pattern of memory deficits could result from a change of context with regards to processes of emotion regulation. Participants viewed negative images under conditions of normal viewing or whilst suppressing their emotional expressions. Memory retrieval was by free recall under conditions of expressive suppression or no emotion regulation. We found a significant interaction between emotion regulation at encoding and emotion regulation at retrieval. We replicated previous findings of worse memory for images viewed with expressive suppression at encoding and no emotion regulation at retrieval. However, memory deficits were reversed when expressive suppression was also performed at retrieval, with better memory for images viewed with expressive suppression at encoding and retrieval. In our own life experiences we may try to regulate emotions both when experiencing an event and when retrieving details of that event from memory. These findings demonstrate the importance of considering emotion regulation at both these time points when examining its on cognition and suggest that emotion regulation as a process may lead to context dependent memories.

Approaching, avoiding, and attending to emotional information in a large-scale virtual environment

Chapman, Peter (University of Nottingham).

Many theories of emotion treat tendencies to approach or avoid emotional information as central to the understanding of positive and negative emotions. Relatively few studies have actually measured approach and avoidance of emotional information directly, and even fewer have linked such behaviour to other measures of emotion. In the current study participants had to navigate through a large-scale virtual environment in which emotional information from the International Affective Picture System was presented on large poster boards. Their eye movements were monitored to obtain measures of initial attentional orienting towards and sustained attentional engagement brought about by emotional stimuli as

participants moved through the environment. The results showed clear and spontaneous approach towards positive information and avoidance of negative information along with typical physiological reactions to such stimuli. Approach of positive emotional material was generally accompanied by orienting and engagement of visual attention. Negative emotional information produced a typical pattern of attentional orienting, and a surprisingly high level of engagement of visual attention even while participants moved away from the stimuli. Arousal substantially modified the degree of avoidance shown for negative stimuli but did not predict the level of approach shown to positive stimuli.

Controlling our memory for emotional experiences : The role of attention in real-world directed forgetting

Bailey, Kate (University of Nottingham).

While forgetting is often considered a failure in memory, the ability to intentionally forget unwanted information is extremely important in our day-to-day lives. Lab research using directed forgetting (DF) procedures has demonstrated that we are generally very good at controlling what we go on to remember in the case of neutral information; however, the experiences we would most like to keep from memory may be those with negative emotional content. Despite this, affective material is often attended to preferentially and subsequently well-remembered. Here, two experiments are reported which investigate the influence of DF instructions and emotion on attention and memory when cues to remember or forget are presented simultaneously with the study items themselves. In a novel variant of the standard item-method procedure, multiple IAPS images of varying emotion were displayed concurrently during encoding. In the first study, items were shown on a computer screen, while a large-scale virtual environment was used in the second to approximate a real-world experience. Results from both studies showed dramatic DF effects in recognition, and eye-movements data indicated that attention was effectively allocated towards to-be-remembered and away from to-be-forgotten images during encoding. Influences of emotion were also apparent across measures of memory and both attentional orienting and engagement. Overall, attention allocation at encoding was closely related to subsequent memory, indicating that attentional processes may be critical in real-world DF. These findings have important implications for our understanding of how we might attempt to control our memory for emotional experiences in the real world.

The influence of object-based attention on driver anxiety

Humphreys, Louise., & Leese, Adele (Staffordshire University).

A number of studies have investigated the impact of anxiety on attention whilst driving, with results generally showing that anxiety causes a narrowing of attention. However, anxiety experienced whilst driving has not been considered as a consequence of what drivers attend to. A study was conducted to examine the effect of attention (object-based versus space-based) on driver anxiety. Participants took part in a decision-making task whilst viewing images of everyday traffic situations. Participants' heart rate and eye movements were monitored whilst they completed this task; the former as a measure of anxiety, and the latter to determine whether participants used object-based or space-based attention. Results showed that participants that used object-based attention had higher heart-rate fluctuation whilst completing the task (compared to those that used space-based attention), suggesting higher levels of anxiety. The results of this study have important implications in terms of road safety and could be utilised by the driver training industry.

Eye tracking in applied settings

Sympoosiuum Organiser – David Crundall

Symposium Abstract

Eye movements provide insight into the thought processes of individuals engaged in real-world tasks, and can aid in the design of both products and user training. The fields in which eye tracking technology is being applied are becoming ever more diverse, led both by our theoretical understanding of how eye movements relate to task performance, and by the development of new eye trackers that can record accurately in some very surprising situations (such as show-jumping!). This symposium provides an introduction to a varied range of real-world topics that have benefited from eye tracking methodologies. However, while the areas of application may differ, there are many common themes to be found underlying these studies including the effects of experience, conscious control of eye movements, and the impact of varying cognitive load.

Talks

Commentary driving: The effect of task relevant speech on eye movements and hazard perception

Young, Angela., Crundall, David., & Chapman, Peter (Nottingham Trent University, Nottingham Trent University, University of Nottingham).

Commentary driver training involves the trainee providing a running verbal commentary on the driving environment and is expected to improve hazard perception skills. However, there is some evidence that being trained in commentary is detrimental to hazard perception performance when a commentary is produced at test. This detriment is also associated with a change in visual search when people are asked to speak aloud. In the current study four groups of drivers completed four phases of commentary training and testing with their eye movements recorded, including a final test phase in which all drivers completed a hazard perception test in silence, to reveal the effect of commentary training and practice on later eye movements and behavioural responses in a hazard perception test. In the remaining phases, whether a trainee was exposed to or produced a commentary was varied to isolate the effects of commentary training and practice and establish whether previously observed effects of commentary training on visual search and behavioural responses are due to commentary training or active production of a verbal commentary at test. The results of this study have important theoretical and practical implications and will be discussed in relation to the effect of speech on visual attention in the driving scene and the potential risks of commentary driver training.

The negative influence of mindwandering on visual search behaviour

Bower, Carl., & Thompson, Catherine (University of Salford).

The effective allocation of attention and visual search is critical in many real-world tasks and there are several factors that influence the distribution of resources. These range from positive influences (e.g. top-down search that is guided on the basis of task experience) to more negative influences (e.g. bottom-up capture due to irrelevant stimuli). Mindwandering, also known as daydreaming, or engaging in task-unrelated thoughts, falls into the second category; utilising valuable resources that would otherwise be devoted to task-relevant information. Findings show that mindwandering narrows visual search and affects task performance. The current study investigated how the complexity of the visual environment interacts with mindwandering, to determine the circumstances in which daydreaming is most deleterious. Participants were asked to make a judgement to 120 real-world scenes that were each presented for five seconds and eye movements were recorded. The complexity of the scenes was manipulated and at regular intervals participants were asked to state the extent to which they had just been mindwandering. When mindwandering was reported participants made fewer fixations and horizontal and vertical spread of search was reduced, compared to when they were allocating attention fully. This was particularly evident in the more complex, cluttered scenes. The results support previous findings that show a negative effect of mindwandering on visual search and further indicate that the consequences of mindwandering may be more severe in demanding environments.

Performing under pressure: Quiet eye training improves surgical knot-tying performance

Causer, Joe (Liverpool John Moores University).

We examined the effectiveness of traditional technical training (TT) and quiet eye training (QET) on the performance of one-handed square knot tying in first-year surgery residents under normal and high anxiety conditions. Twenty surgery residents were assigned randomly to the two groups and completed pretest, training, and simple and complex retention tests under conditions of high and low anxiety. The TT group received traditional instruction on improving hand movements; the QET group received feedback on their gaze behaviours. Participants wore an eye tracker that recorded simultaneously their gaze and hand movements. Dependent variables were: knot tying performance (%), quiet eye duration (%), number of fixations, and total movement time (s). Both groups improved their knot tying performance ($p < 0.05$) from pretest to the low anxiety conditions (mean difference: QET = 28%; TT = 17%), however, only the QET group maintained their knot tying performance in the high anxiety conditions (mean difference: QET = 18%; $p < 0.05$) with the TT group decreasing their performance close to pretest levels ($p > 0.05$). The QET group also demonstrated more efficient gaze and hand movements post training. These data demonstrate the effectiveness of training gaze behaviours, not only to improve the effectiveness and efficiency of performance, but also to mediate any negative effects of anxiety on performance. These findings may have important implications for medical educators and practitioners, as well as surgeons who may be (re)training or learning new procedures.

Keeping your eye on the rail: Gaze behaviour of horse riders approaching a jump

Hall, Carol., Varley, Ian., & Crundall, David (Nottingham Trent University).

The gaze behaviour of riders during their approach to a jump was investigated using a mobile eye tracking device (ASL Mobile Eye). The timing, frequency and duration of fixations on the jump and the percentage of time when their point of gaze (POG) was located elsewhere were calculated. The jumping skill of experienced but non-elite riders (n=10) was assessed by means

of a questionnaire. Their gaze behaviour was recorded as they completed a course of three identical jumps five times. Gaze behaviour throughout the overall approach and during the last five strides before take-off was assessed following frame-by-frame analyses. Differences in relation to both round and jump number were found. Significantly longer was spent fixated on the jump during round 2, both during the overall approach and during the last five strides ($p<0.05$). Jump 1 was fixated on significantly earlier and more frequently than jump 2 or 3 ($p<0.05$). Significantly more errors were made with jump 3 than with jump 1 ($p=0.01$) but there was no difference in errors made between rounds. Although no significant correlations between gaze behaviour and skill scores were found, the riders who scored higher for jumping skill tended to fixate on the jump earlier ($p=0.07$), when the horse was further from the jump ($p=0.09$) and their first fixation on the jump was of a longer duration ($p=0.06$). Trials with elite riders are now needed to further identify sport-specific visual skills and their relationship with performance.

Over-control gives the game away: detecting deception through eye movements

Crundall, David (Nottingham Trent University).

Can eye movements be used to discriminate between 'murderers' and 'innocents'? A staged video was created using a head-mounted video camera to create a point-of-view perspective of a criminal who breaks into an apartment and stabs a student. Participants were either shown this video, or a control video, before being tested by an ostensibly blind experimenter whose task (as far as each participant knew) was to determine their guilt via a series of eye movement tests. Participants were then asked to perform a room discrimination test (which included rooms from the murder video), a kitchen utensil test (which included the murder weapon), a memory test for CCTV footage of the murderer discarding the weapon in a bin, and a task requiring participants to read a statement of the crime and answer questions. While room discrimination and utensil discrimination did not discriminate between murderers and non-murderers, the guilty participants were found to read the crime statement faster than innocent participants, and avoided dwelling on the weapon in the CCTV footage compared to innocent participants who demonstrated weapon focus. It appears that 'murderers' can control eye movements in order to deceive, but without a correct model of innocent eye movements, they may inadvertently identify themselves as guilty.

Do visuomotor strategies for upper-limb prosthesis control resemble those for intact limbs?

Galpin, Adam., Sobuh, Mohammad., Kenney, Laurence., & Thies, Sybille (University of Salford, University of Jordan, University of Salford, University of Salford).

A consistent finding is that familiar reaching actions involve visual fixations on the target of the action and rarely on the hand itself. Research suggests that the gaze patterns of amputee users of myoelectric prostheses differ markedly from those seen in anatomically intact subjects (Bouswema et al., 2012), possibly reflecting the use of vision to compensate for absence of proprioceptive and tactile feedback. The aim of our study (Sobuh et al., 2014) was to characterise gaze strategy in prosthesis use over learning, using a carton pouring tasking involving reach and manipulation. We assessed task performance of seven anatomically intact users of a trans-radial prosthesis simulator, first with their anatomic hand (baseline), then after initial fitting of the prosthesis, and again after two and four training sessions. We also compared their patterns of visuomotor behaviour with those of four experienced prosthesis users. The data revealed that first use of the prosthesis involved increased fixation on the hand and more transitions between areas of interest. Further, fixations during anatomical hand actions suggested evidence of preparing for the subsequent pouring action, but this was absent during prosthesis use. Whilst learning was evident from reduced task completion times, the pattern of gaze behaviour did not change significantly with training, and was markedly similar to that of the experienced users. It is concluded that the uncertainty inherent in controlling myoelectric prostheses prohibits similar visual strategies to those involved in anatomical upper limb movements.

Eye guidance strategies in multiple-scene viewing: evidence from the lab and the CCTV control room

Scott-Brown, Kenneth C., Stainer, Matthew J., & Tatler, Benjamin W (Abertay University, University of Melbourne, University of Dundee).

Multiplex video arrays present particularly challenging constraints to models developed to inform the prediction of eye-guidance in natural scenes. Perhaps nowhere is this divergence from natural single-scene or single-screen viewing more apparent than the modern CCTV control room. Operators can choose a wide range of video sources distributed across the control room. Using a lightweight, unobtrusive mobile eye-tracker we recorded 15-minute periods of live surveillance activity for two experienced operators during day and night time periods. Fixations were predominantly distributed on the operators' individual 'spot monitors' rather than the multiplex data wall. However, despite low frequencies of multiplex fixations during the recorded periods, we observed highly systematic use of camera displays on the multiplex and spot monitors to ensure continuity of coverage. This level of pro-active sophistication in search strategy suggests that gaze locations were principally guided by the observer's representation of their surveilled world, incorporating likely emerging activity across the working

day. When considered in conjunction with patterns of gaze allocation observed in static multiple-scene viewing paradigms, we similarly find that the observer's task defines the reference frame around which viewing is arranged. Together, these findings support the important role of systematic strategies, observer task and prior knowledge in the allocation of gaze in complex visual environments.

Audiovisual correspondences and their influence on attention and arousal during film viewing

Smith, Tim (Birkbeck, University of London).

Even in the early days of silence film, live musical accompaniment would be used to accentuate the emotion, mood and drama on the screen. Sergei Eisenstein believed that he could guide viewer eye movements by creating correspondences between the audio and visuals when editing his films. In a recent test of Eisenstein's theory I showed that vertical saccades during his film Alexander Nevsky (1938) matched pitch changes in the musical score (Smith, 2014). However, it is unclear whether different music would elicit changes in eye movements. In the present study I will explore the idea of audiovisual (AV) correspondences further by manipulating the tempo of AV information. Hochberg & Brooks (1978) introduced the idea of visual momentum: the optimal pace at which viewers wish to acquire information from a visual scene which is observable in the frequency of saccades. Music tempo has also been shown to have an effect on viewer responses to film (Gomez & Danuser, 2007) as measured by physiological measures of arousal (skin conductance) and heart rate. However, the influence of music on eye movements and the interaction between music and visual tempo on psychophysiology is not known. I will present evidence from an empirical study in which the rate of presentation of audio (i.e. tempo) and visual (i.e. shot length) information was be manipulated. The findings of this study will be interpreted in relation to filmmakers use of audiovisual correspondences to shape viewer cognitive and physiological experience of a film.

Oral Paper Abstracts A-Z by first author surname

Differences in theory of mind performance and executive function in older adults

Aldridge, Dominic., & Qureshi, Adam (Edge Hill University).

Developmental literature has proposed that executive function may be required for the development of theory of mind (ToM), the ability to understand that other agents have different beliefs, knowledge and mental states to ourselves. Evidence from adult studies has suggested that executive function may also be required for effective ToM performance. However, the specific nature of the executive functions that underlie ToM in adults is unclear. This study examined the contributions of working memory, inhibitory control and age to theory of mind performance; twenty young adults and twenty older adults completed a digit-span test, a go/no-go task and a L1 visual perspective-taking task. Separate ANOVA analyses, using median splits on working memory and inhibitory control performance and comparing between age groups, revealed that the high working memory group (higher digit span scores) showed better ToM performance as compared to the low working memory group. Differential ToM performance was also seen between older and younger adults. However, inhibitory control was not related to ToM. Additionally, older adults showed better inhibitory control but lower working memory ability. Results suggest there is a differing relationship between executive functions and ToM and that there may be variations in age-related courses of executive functions.

Children's on-line processing of inconsistencies in text: The influence of memory load

Ammi, Sabrina., & Cain, Kate (Lancaster University).

We investigated comprehension monitoring in 7- to 10-year-olds. Children's reading times (Experiment 1), eye-movements (Experiment 2) and accuracy to a sense question (both experiments) were measured as they read short stories, some of which contained an internal inconsistency. Inconsistent information was separated by one or three filler sentences (near and far conditions). Independent measures of working memory were also administered to relate to task performance. Experiment 1 revealed that older children were better than younger children at correctly judging whether or not a passage made sense. Children made more correct sense judgements for consistent than inconsistent passages, and a similar number of correct judgements for the near and far conditions. Overall, children had longer reading times for the target sentence when it was inconsistent than when it was consistent, however differences only reached significance in the far condition. Verbal working memory was found to be a good predictor of monitoring performance. Analyses of the eye-movement data are underway. The preliminary analyses show convergence with the reading time data. These findings suggest that the distance between two pieces of inconsistent information influences children's on-line reading behaviour. Further, findings highlight that off-line and on-line measures provide different information about children's comprehension monitoring.

Modeling the role of background knowledge in memory for texts

Andrews, Mark (Nottingham Trent University).

Beginning with the seminal work of Bartlett (1932), but especially since the widespread adoption of schema-based accounts of text memory in the 1970's,there has been close to a broad consensus that our memory of any coherent body of language is based on querying a memory representation of its gist whose nature is strongly dependent on our prior experiences and background knowledge. Despite the agreement on these general characteristics, computational models that afford precise empirical predictions about which words will and will not be remembered from any given text have not been forthcoming. In this work, using a Bayesian model of coarse-grained statistical patterns across spoken and written language, we infer a probabilistic representation of the gist of arbitrary texts. This provides us with precise predictions about exactly what words will be remembered, whether veridically or erroneously, from any text. We then compare these predictions from data collected from a recognition memory experiment where adults read natural everyday texts. In a recognition memory experiment, 66 native English speakers read five 250-300 word texts that were randomly sampled from the British National Corpus .Overall, the probabilistic model predicted recognition memory performance at correlations values of over r=0.75. This is dramatically higher than models based on text characteristics such as frequency of occurrence of individual words or co-occurrence statistics.

Experiencing natural variability between different instances of a person's face enables the development of stable representations

Andrews, Sally., & Burton, Mike (University of Aberdeen).

Natural variability between different photos of an unfamiliar face often results in instances not being identified as the same person. This was recently demonstrated with an image-sorting task, where unfamiliar observers sorted forty naturally varying face instances into as many different identities as they thought were present. Although the images depicted only two people, unfamiliar observers sorted them into many identities, the modal response being 9 piles (Jenkins et al., 2011). Using the sorting task, we first show that it is possible to overcome the disruptiveness of variability by instructing viewers that only two people are present. Under these conditions, unfamiliar observers make few confusions between identities. We then describe two further experiments that explore the possibility that experimentally-induced experience of natural variability enables us to learn faces. That is, whether experiencing natural variability enables the development of stable face representations, which allow the identification of previously unseen instances of that person's face. Conclusions and future research implications will be discussed in relation to understanding how unfamiliar faces become familiar.

Frontal N250 is generated near the temporo-parietal junction and reflects recognition of emotions from both faces and non-social objects

Athilingam, Jegath., Jones-Rounds, James., Post, David J., Ganzel, Barbara L., & Belmonte, Matthew K (University of California San Francisco, Cornell University, University of Illinois, Binghamton University, The Groden Center, Providence, Rhode Island, USA / Nottingham Trent University).

Emotion recognition is a necessary and crucial component of social interaction that subserves the interpretation and comprehension of another actor's mental state. The current study aimed to factor out the process of emotion recognition from facial encoding by recording event-related potentials during emotion recognition of both social (face) and non-social (object) stimuli in 22 normal young adults. The N170, N250, P300, and late positive (LPP) event-related potentials were examined for the effect of task set (simple discrimination vs.emotion recognition), stimulus type (face vs. object), and valence (emotional vs. neutral). Results showed that the N170 is face specific, consistent with its putative role in encoding facial structure. P300 and LPP amplitudes increased with emotion regardless of stimulus type, suggesting that emotion processing and recognition are indeed separable from facial encoding. The LPP also seemed modulated by attention as its amplitude was greater during the emotion recognition task than during discrimination. Consistent with another recent report, the N250, the putative emotion recognition component, was greater in amplitude to neutral than to emotional faces during the emotion recognition task, possibly reflecting increased integrative processing associated with difficulty in perceiving an emotion. Independent component clustering and dipole source localisation revealed that the N250, most often reported in fronto-central electrode locations, is in fact generated near the temporo-parietal junction, a major node of information integration. These results provide the first examination of the neural correlates of emotion processing in non-social stimuli, and convergent evidence for a posterior generator of the anterior scalp N250.

What predicts confidence in long-term memory for location?

Baguley, Thomas., & Kaye, Danny (Nottingham Trent University).

Laboratory research has suggested that confidence in long-term memory for location is predicted by the availability of a memory, but not by the precision of recall. One possible explanation for this finding is that a brief exposure to stimuli in a laboratory setting provides insufficiently rich information for accurate meta-mnemonic judgments. We use multilevel ordinal regression to model confidence ratings of both laboratory and everyday memory for location to test this explanation. In both cases both availability of a memory and being able to recall the exact location of an item predicts confidence. However, in the everyday location memory data, but not the laboratory data, we also find that precision - as indicated by the distribution of errors around the correct location - predicts confidence, albeit weakly. We propose that confidence judgments in these tasks are inferences that draw on multiple features of the memory representation (e.g., recency and episodic richness).

Digital memories? Interactive technologies and the mental representation of social relationships

Binder, Jens (Nottingham Trent University).

This research focusses on the information processing accompanying social interactions, in particular the encoding into and retrieval from autobiographical memory. Quality and self-relevance of relationships are reflected in the traces interactions leave in memory, and traces are further supposed to differ depending on the type of interactive technology used. Social media can potentially lead to less memorable interactions and, consequently, weakened relationships. Two experiments are presented in line with the theory. Experiment 1 demonstrates the link between retrieval from memory and friendship quality. Friends' names sampled from participants' social networks were used to generate event descriptors. Participants predicted the likelihood of future occurrence for each predictor. Systematic asymmetries for positive and negative events were found for close and less close friends. Experiment 2 investigates the causal link between memory processes and technology use by manipulating fictitious interaction histories. Different mixes of media corresponding to asynchronous,

synchronous and mixed interaction histories were displayed to participants. With questionnaire measures and card sorting techniques media impact was assessed on quality and self-relevance of fictitious friendships at different levels of closeness. Findings indicate that closest friendships were most difficult to maintain through technology compared to moderately strong ones. Further, the mix of media channels had an impact on friendship variables suggesting that media differ in their impact on memory processes. Both experiments support a theoretical integration of social-evolutionary accounts of relationships with models of autobiographical memory. Findings contribute to debates surrounding potential long-term drawbacks to social media use.

Children's knowledge and production of two-clause sentences containing before and after: the influence of event order, background knowledge, and memory.

Blything, Liam., Cain, Kate., & Davies, Robert (Lancaster University).

In a cross-sectional investigation of 3- to 6-year-old's knowledge and production of before and after, we examined the influence of key factors predicted to influence understanding and processing of complex sentences containing temporal connectives. A sentence-repetition task assessed knowledge and production of two-clause sentences linked by a temporal connective. Children listened to the sentence while viewing animations of the actions in each clause. We manipulated whether the presentation order matched the chronological order of events: 'He finished his homework, before he played in the garden' (chronological order) vs 'Before he played in the garden, he finished his homework' (reverse order), and whether the temporal relation between the two events was arbitrary (as above) or predictable from background knowledge: 'He brushed his teeth, before he went to sleep.' An independent measure of memory was administered. There were main effects of age, connective, and order, and the latter two effects were qualified by a significant two-way interaction. Children were less likely to successfully repeat target sentences when the presentation order of the two clauses did not match the chronological order of events, and this effect was more pronounced for sequences linked by after. There were no effects of background knowledge: regardless of age, children performed comparably when the two clauses shared an arbitrary relation or one that was predictable. We also report the results from an error analysis and speech onset times, and the relation between these performance indicators and working memory.

Morphological awareness and reading comprehension: a developmental study

Cain, Kate., & James, Emma (Lancaster University).

Morphological awareness refers to children's awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure. Morphological awareness has a long period of acquisition with competence for different aspects evident at different points in childhood. Some have argued that morphological awareness is a key driver of reading comprehension growth from childhood through to adolescence, but previous research has typically used tasks with different processing demands to assess knowledge of different aspects of morphology and has not always controlled for key variables that might influence its relationship with reading comprehension, namely vocabulary and phonological processing skills, in addition to word reading. We conducted a large-scale cross-sectional study of 6-, 9-, and 12-year-olds to determine the strength of the relation between different aspects of morphological awareness and reading comprehension during the course of development. Word reading, vocabulary knowledge, phonological processing, and cognitive ability were also measured. We will report analyses to identify direct and indirect effects of morphological awareness on reading comprehension. Our analyses will address the following research questions: 1) Is there a direct relationship between morphological awareness and reading comprehension and does the strength of this relationship depend on age? 2) To what extent is the relationship between morphological awareness and reading comprehension mediated by their associations with word reading, vocabulary, and phonological processing? This work will add to our theoretical understanding of the relation between morphology and text comprehension across the period in which children become fluent readers.

If and how do irrelevant distractors influence object substitution masking?

Camp, Sarah., & Pilling, Michael (Oxford Brookes University).

Object substitution masking (OSM) is a phenomenon in which a target is rendered largely imperceptible by a surrounding mask which trails the target's offset. OSM has been traditionally assumed to be influenced by set-size: OSM strength increasing monotonically with the number of irrelevant distractors present in the stimulus array (Di Lollo et al., 2000). Argyropoulos et al. (2012), by contrast, reported that OSM occurs independently of set-size when ceiling effects are avoided and appropriate response-bias-independent measures applied. We further investigated this set-size question in a series of experiments using digits or Landolt squares as stimuli. The experiments required observers to make an identification, discrimination or detection of the target (defined in the stimulus array by being the item surrounded by the mask). In practically every case an interaction between set size and mask duration was observed: OSM magnitude increased with the

number of display items. Further work, however, indicated that this 'set-size effect' was actually driven by crowding of the target item (Levi, 2008): when set size was large the spatial proximity between target and distractor was smaller. Thus the presence of irrelevant distractors does seem to influence OSM, but not in the manner described by Di Lollo et al.

Fit to last: Exploring the longevity of the survival processing effect in location memory

Clark, Dan (Liverpool Hope University).

There is mounting evidence indicating that survival processing is a more effective encoding paradigm than a number of known memory-enhancing techniques (Nairne et al., 2007; Nairne & Pandeirada, 2010) and that this advantage is present in a single test 48 hours after encoding (Raymaekers et al., 2013). Despite this, few studies have explored the survival processing effect in location memory (e.g. Nairne et al., 2012) and no studies have explored the longevity of the effect in location memory. Thus, the aim of the current study was to explore further the survival processing effect in location memory and to investigate whether any observed advantage remained over time. Sixty-six participants rated 8 target objects with regards either their relevance to survival in an ancestral scenario or their relevance to win a scavenger hunt contest. Participants were then asked to complete a surprise recall task both immediately after the ratings and again 4 days later, indicating the recalled location of the target items via a mouse click. The results demonstrated significantly higher recall accuracy in the survival condition at both time intervals. This provides further evidence for the survival processing advantage in location memory and remains over a period of 4 days.

Reading sentences with words of the same length

Cutter, Michael., Drieghe, Denis., & Liversedge, Simon (University of Southampton).

We investigated the effect of removing word length variability within sentences on spatial and temporal characteristics of eye movements during reading. We hypothesised that removing word length variability might result in more efficient saccadic targeting, and consequently word identification. Participants read sentences comprised entirely of three-, four- or five-letter words, and sentences with a combination of these lengths. Our manipulation affected saccadic targeting. When participants read sentences comprised entirely of three-letter words they became more accurate at making short saccades, such that they no longer overshot the saccade target as often as when making a saccade from the same launch site in the non-uniform condition. When participants read uniform sentences of five-letter words they became more accurate at making long saccades, such that they undershot the saccade target less than in the non-uniform condition. This suggests that the range bias established by McConkie et al. (1988) rapidly adapts to current processing needs. Furthermore, our manipulation had significant effects on reading times, with words of three, four, or five letters receiving longer fixations when they appeared in a uniform rather than non-uniform sentence. Thus, our manipulation had an inhibitory effect on word recognition. Potential explanations for this effect will be discussed.

Improving unfamiliar face matching: Two heads are better than one

Dowsett, Andrew J., & Burton, Mike A (University of Aberdeen).

Although photo-ID is frequently used as a means for proving our own identity, research has consistently shown just how poor we are at such unfamiliar face matching tasks (Burton & Jenkins, 2011). Recently, Bahrami et al. (2010) have shown that when completing a low-level perceptual decision making task, pairs of participants performed significantly better than did individuals, provided they were able to communicate freely. Similar results are reported by Bruce et al (2001), whereby performance on a face matching task is improved when participants were previously able to discuss the stimuli. Based on these studies, we used a series of face matching tasks to demonstrate that when pairs of participants perform such a task, they are significantly better than their individual counterparts. We further demonstrate that this effect does not generalise on to subsequent "individual" face matching, and as with Bahrami et al and Bruce et al the ability to communicate freely was important. We consider the implications of this study for current procedures in identity checking.

Contributions of trait anxiety and situational stress on backward word span efficiency are moderated by mental effort

Edwards, Elizabeth., Edwards, Mark., & Lyvers, Michael (Bond University, Gold Coast, Australia).

Background and Aims: Elevated anxiety has been associated with performance deficits on a range of working memory tasks. According to attentional control theory (ACT), anxiety impairs processing efficiency to a greater extent than performance effectiveness and this effect is particularly evident on more demanding tasks. We investigated the relationship between trait anxiety, situational stress and mental effort using a forward (less demanding task) and backward (more demanding task) word span task. Methodology: Ninety undergraduate students participated in the study. Trait anxiety was operationalised using questionnaire scores, situational stress was manipulated through ego threat instructions, and perceived level of

invested mental effort was measured using a visual analogue scale. Dependent variables were performance effectiveness (accuracy) and processing efficiency (accuracy divided by response time). Results: For the forward word span task, there was a main effect of effort, such that greater effort was associated with better performance (effectiveness and efficiency). For the backward word span task, the effectiveness data revealed a main effect of effort, such that greater effort predicted better accuracy. In the processing efficiency data, we observed a significant three-way interaction. At higher mental effort, trait anxiety was not associated with processing efficiency at high or low situational stress. However at lower effort, higher trait anxiety was associated with lower efficiency but only for those under ego threat instructions; there was no relationship between trait anxiety and efficiency in the absence of ego threat. Conclusions: Results are interpreted within the framework of ACT and directions for future research are discussed.

Cognitive trait anxiety, situational stress and mental effort predict shifting efficiency: Implications for attentional control theory

Edwards, Mark., Edwards, Elizabeth., & Lyvers, Michael (Bond University, Gold Coast, Australia).

Background and Aims: Attentional control theory (ACT) predicts that trait anxiety and situational stress interact to impair performance on tasks involving the shifting function. The theory suggests that anxious individuals often recruit additional effort to prevent performance shortfalls, however this assumption has not been systematically tested. The relationship between cognitive trait anxiety, situational stress and mental effort in a shifting task (Wisconsin Card Sorting Task) was investigated. Methodology: Ninety undergraduate students participated in the study. Cognitive trait anxiety was operationalised using questionnaire scores, situational stress was manipulated through ego threat instructions, and perceived level of mental effort was measured using a visual analogue scale. Dependent variables were performance effectiveness (an inverse proportion of perseverative errors) and processing efficiency (an inverse proportion of perseverative errors divided by response time on perseverative error trials). Results: The predictors were not associated with performance effectiveness, however we observed a significant three-way interaction on processing efficiency. At higher mental effort (+ 1 SD), higher cognitive trait anxiety was associated with poorer efficiency in both the low and high situational stress conditions. At lower effort (- 1 SD), there was a non-significant trend for higher cognitive trait anxiety to be associated with poorer efficiency in the low stress condition, and this effect was more pronounced and highly significant in the high stress condition. Conclusions: Results are interpreted with respect to ACT and directions for future research are discussed.

Association between schizotypy, theory of mind and executive function

Emmison, Katie., & Qureshi, Adam (Edge Hill University).

Psychotic disorders such as schizophrenia can be presented on a continuum scale along with features including schizotypy (Claridge, 1985). Frith (1994) proposed a neurocognitive model of schizophrenia in which he attributed symptoms of schizophrenia to an impaired theory of mind. Research has shown that individuals from non-clinical samples who score highly on tests measuring schizotypal traits show similar results to schizophrenic patients on a number of tasks (Baruch, Hemsley & Gray, 1988), including tasks related to theory of mind (ToM) (Langdon & Coltheart, 1999) and executive functioning (Bora, Yucel & Pantelis, 2009). The current study aimed to examine the relationship between schizotypy, ToM, and executive functioning in a typical sample, using a series of ANOVAs. It was hypothesised that the individuals who scored highly on the schizotypy questionnaire would show impaired performance on the tasks of ToM and executive functioning. The results showed that lower inhibitory control was associated with higher scores in most schizotypal traits, but no association between any schizotypy traits and ToM performance was found.

Direct evidence that visual variation, not view variation, drives Face Recognition Unit formation from two face learning experiments

Etchells, David., & Johnston, Robert (University of Kent).

Many models of face recognition incorporate the idea of a face recognition unit (FRU): an abstracted representation formed from each experience of a face. However, little is known about what is necessary for this abstraction process to take place. Two unfamiliar face learning experiments sought to answer this question. In the first experiment, participants learned either of one mirrored profile views or both-views, and were tested on the same view, the other view, or a completely novel view. The second experiment used true profiles. Results suggest that view variation alone does not drive the abstraction process. When participants learned both mirrored profile views, recognition on a previously unseen novel test view was no better than performance on either of the single learned views. However, for true profiles, abstraction was evident as recognition performance was greater when both-views had been learned over either of the single-views. Results suggest that: (1) in the face matching learning phase, abstraction absence or presence was revealed by different patterns of matching accuracy for

each view type combination (i.e., single compared to both); and (2), that visual variance between two views of the same identity is necessary to drive the abstraction process.

The effects of normal cognitive ageing on the incidental binding of "what" to "where" in visual short term memory

Ferneyhough, Simon., Elsley, Jane., & Johnson, Andrew. (Bournemouth University).

Binding is an important determinant of working memory (WM) performance, yet the effects of cognitive ageing on binding are not yet well understood. While some research suggests older adults show impairments in binding objects to their positions in space (e.g. Cowan et al., 2006), these studies typically require the explicit committal of visual-spatial bindings to WM. Building on a recent demonstration of verbal-spatial binding asymmetry (incidental binding when participants are instructed to remember letter features, but not when instructed to remember location features: Campo et al., 2010), we investigated the incidental binding of 'what' (shape/letter) and 'where' (location) features in WM across younger and older adult samples. In two experiments using shapes (exp. 1) and letters (exp. 2); younger (aged 18-30 years) and older (aged >65 years) adults completed two probe recognition tasks, differing only in terms of task instructions (to memorise 'what' or 'where' features). Initial data suggest that younger adults replicate binding asymmetry with memory for shapes/letters encompassing the incidental binding of spatial information, while locations could be held independently of the features that occupied them. In contrast, older adults consistently failed to show incidental binding across 'what' memory tasks, suggesting an age related impairment in involuntary binding.

The association between event-related potentials evoked to emotional faces and callous-unemotional and aggressive traits

Fido, Dean., Sumich, Alexander., Bloxsom, Claire., & Gregson, Michael (Nottingham Trent University).

Callous-unemotional traits are considered a characteristic of several psychopathologies and are also associated with both instrumental and reactive aggressive behaviours. Although individuals exhibiting callous-unemotional traits show impairment in emotion processing, it is unclear at what temporal stage during face processing this impairment emerges. This study aimed to use electrophysiology to determine this mechanism. A cohort of 41 psychology students completed the Inventory of Callous-Unemotional Traits (ICU; Essau, Sasagawa, & Frick, 2006) and the Aggression Questionnaire (Buss & Warren, 2000) before undergoing a novel stop-go facial affect paradigm. Results suggest that the uncaring, but not callous or unemotional subscales of the ICU, or aggression, was associated with both the N170 and P200 event-related potentials indexing emotional face processing. Specific impairment is observed for direct threat-relevant emotions at the early structural stage of face processing with overall emotional-face impairment at later stages. These findings build on previous investigation into the underpinning mechanism of face processing and argue the need to tease apart distinct sub-traits of callous-unemotional personalities when investigating how individuals with certain psychopathologies process faces

Adaptation to familiar and unfamiliar faces

Hancock, Peter (University of Stirling).

Face identity aftereffects appear to offer a way to probe the representations of faces in human memory. For example, it is possible selectively to distort the memory of the appearance of a specific person. It seems likely that the effect can give insights into how we learn about and store new face memories, making it interesting to compare adaptation with familiar and unfamiliar faces. I report two studies where participants adapt to distorted versions of either familiar or unfamiliar faces and are then tested on faces of both the same and new identities. I was expecting an interaction, such that adapting to unfamiliar faces might affect the perception of familiar faces, but adapting to familiar ones would have little effect on unfamiliars. Both experiments show the same pattern of results: markedly more adaptation if shown the same identity at test, but exactly the same adaptation to new identities, whether familiar or unfamiliar. The implication seems to be that adaptation is happening at two levels, one specific to the seen image and one at the level of faces generally. There was no hint of the interaction that would be expected if adaptation was happening at a person-specific representation.

Revisiting a Social-Cognitive explanation of own-group biases in face recognition

Harrison, Virginia., Hole, Graham., & Habibi, Ruth (Open University, University of Sussex).

Previous research has found that participants are better at recognising faces of their own race compared to those of other races (see Meissner & Brigham, 2001). A similar own-group advantage can be seen with faces of different age groups (Anastasi & Rhodes, 2012). However, exactly why these own-group biases occur is unclear. Two competing theories have been put forward. While the first suggests it is due to differential experience with own- and other- group faces, and increased perceptual expertise for own-group faces; the second demands no experiential component. In this case the bias is

thought to be the bought about through the mere act of categorising a face as either an in- or out-group member (the social-cognitive account). Based on previous work by Bernstein et al (2007), two experiments explored whether own-group biases can be brought about by this categorisation process alone. In both cases, participants were shown 40 facial images and asked to group them as either in- or out-group members at encoding. Perceptual expertise for all faces was kept constant. Participants' recognition for those faces was then tested, and accuracy and reaction times recorded. Results are discussed in terms of the different theories of own-group biases.

Structured thinking techniques improve fluency and originality in a problem finding task

Hocking, Ian., & Vernon, David (Canterbury Christ Church University).

Problem finding can often be the first step in problem solving, and research has suggested that engaging in problem finding can facilitate creativity and potentially lead to a more beneficial outcome. Here we examine and compare two techniques that may be used to help scaffold problem finding ability: the six thinking hats (STH) and the six good men (SGM). These techniques can require the participant to either adopt multiple perspectives, incorporating a series of specific questions, or utilise a range of simple open ended questions. We had 100 participants take part in an on-line study, which involved presenting them with an ambiguous problem and requiring them to restate the problem in as many different ways as they could within a 3-mintue time frame. Participants were randomly allocated to the STM, the SGM or a no-intervention control group, and performance was measured in terms of the fluency, quality and originality of the responses. Results showed that both techniques produced greater fluency relative to controls, with a more robust effect for those using the SGM. In terms of originality, again both techniques proved beneficial relative to controls, with a more robust effect from those using the STH. Hence, both techniques benefited performance, though in slightly distinct ways. These results are discussed in terms of the potential benefits obtained by explicitly scaffolding thinking.

Order memory contributes to adult mathematicians' superior spatial working memory capacity

Hubber, Paula., Gilmore, Camilla., & Cragg, Lucy (University of Nottingham, Loughborough University, University of Nottingham).

Previous research has demonstrated the importance of the limited-capacity working memory system in performing maths and several studies with children have shown a relationship between performance on working memory tasks and basic maths ability. However, little is known about the relationship between working memory and more complex maths in adults. Experiment 1 used a working memory span task, with a neutral face-matching processing element, to discover whether adult mathematicians have superior working memory capacity to adult non-mathematicians in general, or whether they have superior capacity for the storage of verbal (words and numerical) or spatial information. The findings indicate that mathematicians have superior capacity for the storage of spatial information and support the separability of spatial and verbal resources within the multi-component model of working memory. Experiment 2 replicated these findings. Using a forced-choice recognition task, Experiment 3 investigated whether this superior spatial capacity was due to remembering whether a spatial location was present (item memory) or whether it was due to memory for the sequence of locations (order memory). Results indicate that order memory is an important element in the superior spatial working memory capacity of adult mathematicians.

Morphological awareness in poor comprehenders: an investigation of the source of difficulty

James, Emma., & Cain, Kate (Lancaster University).

Morphological awareness is the ability to reflect upon and manipulate the morphemic structure of words. Previous work has demonstrated a relationship between morphological awareness and text comprehension. Critically, children with poor reading comprehension in the presence of age-appropriate word reading skills perform poorly on orally presented measures of morphological awareness (Tong et al., 2011). To date, it is not clear the extent to which the strength of this relationship is influenced by the aspect of morphology tested (inflectional vs derivational), the task used to assess ability (analogy vs cloze task), or age (Tong et al., 2014). We investigated the factors that influence the relationship between morphological awareness and reading comprehension by comparing good and poor comprehenders aged 6 to 7, 9 to 10, and 12 to 13 years. All children were assessed on comprehension and production of novel compound words, inflections, and derivations, as well as measures of reading comprehension, word reading, vocabulary, phonological processing, and cognitive ability. We will report analyses to address the following research questions: 1) Are poor comprehenders' weaknesses on measures of morphological awareness constant across development or apparent only in older children? 2) Do poor comprehenders' weaknesses on measures of morphological awareness extend across different aspects of morphology or are only specific aspects of morphology affected? 3) Are weaknesses on measures of morphological awareness independent of vocabulary

knowledge and/or phonological processing ability? This work will add to our theoretical understanding of the relation between morphology and text comprehension and the reasons for comprehension failure.

Does the pattern of reinforcement associated with mobile app use lead to sustained gambling?

James, Richard., Tunney, Richard., & O'Malley, Claire (University of Nottingham).

Loss-chasing is a symptom of pathological gambling and is the characteristic tipping point from recreational to problem gambling. It has been previously hypothesized that people continue to chase losses due to the partial reinforcement extinction effect. It may also be that partial reinforcement interacts with how mobile gambling technologies are used, and that this may pose a particular risk of problem gambling. This is because app usage is punctuated with delays between gambling sessions. Research in associative learning has demonstrated that such delays should lead to better conditioning. We were also interested to test whether this transferred to measures of cognitive biases in gambling, specifically the illusion of control. We conducted a partial reinforcement task using a simulated slot machine, manipulating the frequency of wins and the delay between sessions. Participants played until they had won a certain amount of money, and were then exposed to 50 trials of extinction. Participants subsequently completed a contingency judgement task in which the base rate of the successful outcome was high, which has been demonstrated to elicit illusions of control. The results from the reinforcement task were clear; there was an effect of the frequency of reinforcement, and this appears to interact with the length of delay. The contingency judgement results were inconsistent; it appeared that the low reinforcement groups were more likely to administer the drug, but this did not correspond to higher judgements of contingency.

'Global' Hebb repetition effects for tactile sequences

Johnson, Andy., High, Callum., & Miles, Chris (Bournemouth University).

Three experiments examined the Hebb Repetition Effect (Hebb, 1961) for tactile sequences. In Experiment 1, blindfolded participants received tactile stimulations to five positions on the forearm and were required to reconstruct the order of presentation through re-touching those regions of the arm. Every third trial, the same sequence was surreptitiously repeated. Gradual improvement for the repeated sequence was reported and the gradient of learning was unaffected by articulatory suppression. Experiment 2 examined the extent to which learning was independent of the arm on which the sequence was learnt. In one condition sequences were presented on the same arm throughout and in the other condition the sequences were presented on alternate arms (sequences were recalled on the same arm throughout). Alternating learning arm did not affect the rate of learning, suggesting an amodal representation of the spatial sequence. Experiment 3 tested whether the Experiment 2 effects could be explained by the equivalent learning gradient occurring with a de facto interval of five unrepeated sequence. This alternative hypothesis was not supported. These findings further demonstrate cross-modal similarity with respect to the Hebb Repetition Effect. However, it is unclear how such tactile sequences are represented within the working memory model.

Gender differences in visual attention: The role of mental rotation in global-local processing

Judge, Jeannie., & Christopher, Thomas (University of Central Lancaster).

Gender differences have been observed in global-local processing and in mental rotation tasks. Women have shown a bias towards faster reaction times (RTs) for local than global hierarchical stimuli; however, men have not shown such differential processing. Mental rotation tasks often favour men. We investigated whether mental rotation modified global-local processing in men and women. Participants completed a global-local processing task in which they made a judgement about whether a hierarchical letter was presented normally or mirror reflected. Global and local letter stimuli were rotated either 60 or 180 degrees. The results demonstrated that men made faster RTs than women; however, men and women showed a similar pattern of performance with respect to global-local mental rotation. Faster RTs were observed for 60 than 180 degree rotations for both global and local letters; however, global letters were only responded to more quickly than local letters (i.e., a global precedence effect) for 180 degree rotations but not for 60 degree rotations. Thus, the increase in cognitive demands associated with the mental rotation of stimuli may modify the global precedence effect and eliminate the differential processing between global-local information in women.

Attentional profiles and intervention efficacy in adolescents across levels of academic achievement

Khng, Kiat Hui., & Lee, Kerry (Nanyang Technological University, Singapore).

The ability to maintain attentional focus, inhibit attention to distractors, and when distracted, shift attention back to the task at hand, may affect the quality of learning and performance in the classroom. We examined how academic achievement is related to visual and auditory attention in adolescents and tested two intervention approaches hypothesized to help

students improve focus—a doodling (secondary load) task and a perceptual (primary) load task. Secondary One students (N = 174) from high, mid and low academic ability streams were administered visual and auditory versions of sustained attention, attention shifting and inhibitory control of attention tasks, a self-rated scale of attentional behaviors (distractibility, boredom, & mind-wandering), an attentional load task (high and low perceptual loads), a listening comprehension task (with and without doodling), and a working memory (WM) task. Several attention skills and behaviors were found to differ significantly by academic stream. Low-ability students had poorer attention shifting and sustained attention, and reported greater boredom. Distractor interference was reduced by increasing perceptual load, and eliminated in lower-ability students—albeit at the price of accuracy. As suggested by their significantly greater WM and mind-wandering behaviors, high-ability students may have enough attentional and WM resources to process distractors despite increased perceptual load. Doodling showed limited benefits on listening comprehension and seemed to hurt performance in lower-ability students who seemed affected by the multi-tasking. Better performance correlated with lower distractibility and higher mind-wandering behaviors and WM. Doodling may help students prone to mind-wandering focus, but distract easily distractible students.

Sleep increases negative emotional false memories

Knott, Lauren., & Aslam, Aisha (City University London).

Sleep actively contributes to the retention of learned information and, in particular, for emotional material. Recent research has independently investigated the effect of sleep on false memory formation, and the production of false memories for emotionally charged stimuli, but has yet to bridge the gap between the two. Thus here, we explore the influence of sleep on the consolidation of negative emotional and neutral false memories. Participants completed a Deese/Roediger-McDermott (Deese 1959; Roediger & McDermott, 1995) false memory task for emotionally neutral and negative word lists, either at 9am or 9pm and faced a free recall and recognition task twelve hours later. A significant interaction between list type (neutral/negative) and condition (sleep/wake) was demonstrated for the false recognition of critical lures, whereby recognition was higher for negative compared to neutral words in the sleep group. No such effect was demonstrated in the wake group. Whilst sleep-dependent memory processing has previously been shown to enhance veridical recall of emotionally salient information, these findings are the first to demonstrate that sleep, compared to a similar period of wakefulness, can promote false memories for negative-emotional over neutral materials.

Visual processing of human body and non-body distractors in natural scenes

Kroll, Victoria R., Dunn, Andrew K., Howard, Christina., & Baguley, Thomas (Nottingham Trent University).

Several studies have shown that human bodies may preferentially attract attention over other objects (Ro et al., 2007; Downing et al., 2004). We have previously shown that participants took longer to decide that a natural scene contained a target when a distractor human body also appeared with the scene than when the body did not appear. However, this slowing was also demonstrated with other distractor objects (i.e. lamps; Kroll, Dunn, Howard & Baguley, 2013). Here we used an irrelevant singleton paradigm in which we manipulated the presence or absence of different target (grandfather clock or chair) and distractor (bodies: colour full-body/silhouette/colour headless body, lamp: colour/silhouette) combinations independently of one another. The task was to detect a target in either the presence or absence of a task irrelevant distractor. Human body distractors once again slowed search for targets, but only when they were maximally different from the target (i.e. non-analogous), and when contextual detail (i.e. non-silhouette and head present) was available. Non-body distractors also slowed search for the target. However, there was no difference between the distractor bodies and non-bodies in terms of their ability to slow target search. These results, therefore, provide no evidence for human bodies attracting attention over other objects, at least within natural scenes.

The effect of lexical stress on visual word recognition in Greek skilled reading

Kyparissiadis, Antonios., Ledgeway, Timothy., Pitchford, Nicola., & van Heuven, Walter (University of Nottingham).

In Greek lexical stress is consistently marked with orthographic diacritics. Hence, the reader can assign stress solely by utilizing sublexical information or they can rely on lexical resources. As reading skill develops diacritics become incorporated in an increasingly consistent manner in word decoding. This suggests that stress assignment becomes embedded in the reading process over the course of reading acquisition and may coincide with the automisation of different reading processes. This study examined how stress position affects visual word recognition when diacritics are present and when they are not (uppercase words). Twenty four native-Greek skilled readers performed a lexical decision task with bisyllabic four- and six-letter words and nonwords which were either stressed on the first or the second syllable (e.g. τάξη, ψιλή). The words were either of high or low frequency and were presented both in lower and upper case. Analysis of response times revealed that despite no main effect of stress position, stress interacted significantly with frequency and with case. Syllabic

frequency did not influence the interactions. Similar results were observed for nonwords and low-frequency words in contrast to high-frequency words. This suggests that diacritics influence the utilisation of sublexical and lexical reading strategies dependent on word familiarity and frequency, and thus act as orthographic units that should be incorporated into models of skilled reading in Greek.

Instructing to mimic improves facial expression recognition

Lewis, Michael., & Dunn, Emily (Cardiff University).

Embodied cognition suggests that muscular actions can affect perceptions. Research suggests that there is a link between one's facial action and one's emotion recognition. This has been shown in that facial mimicry assists an individual to recognise another's emotions from one's own action via the facial feedback mechanism. The present study sought to investigate the effect of promoting mimicry on facial emotion recognition particularly for people who are higher on the autism measures. Forty-six participants, with varying autism quotients, were presented with a facial emotion recognition task. In a controlled experiment, participants were randomly assigned to an instruction or no-instruction condition. In the instruction condition, they were asked to mimic the target face they saw prior to making a judgment as to the emotion being shown. Supporting initial predictions, promoting facial feedback via mimicry improved emotion recognition; however, this effect was carried almost entirely by those with high AQ scores. This implies that deficits in emotion recognition in people with high AQ scores could be ameliorated through active mimicry.

Effects of time pressure and maths anxiety on solving mental arithmetic problems

Lipka, Sigrid., & Clarke , Lauren (University of Derby).

Time pressure and anxiety are thought to affect working memory (e.g., Hill & Wigfield, 1984; Eysenck et al., 2007). Previously, mental arithmetic tasks have been utilised as a measure of working memory (Matthews & Campbell, 2010). Due to the rise in interest in maths anxiety, the aim of the current study was to investigate the impact of time pressure on working memory performance in a maths anxious sample. The Mathematics Anxiety Scale (MAS-UK; Hunt, Clark-Carter & Sheffield, 2011) was utilised to categorise 40 individuals into high or low maths anxious groups. Participants later completed a mental arithmetic task under two different time pressure conditions. Results showed that there was no overall effect of maths anxiety on performance in the mental arithmetic task. However, performance was worse under high as compared to low time pressure. This effect was more pronounced for high-anxious than low-anxious individuals. Possible mechanisms underlying this effect are considered in terms of the Attentional Control Theory (ACT; Eysenck et al., 2007) and it is concluded that task-irrelevant thoughts resulting from time pressure are most likely to impair the processing efficiency and performance effectiveness of highly maths anxious individuals.

Prototype and exemplar based systems in face processing

Longmore, Chris (University of Plymouth).

Exposure to a set of images of a previously unfamiliar face has been demonstrated to result in the facial prototype effect. In this effect, an unseen image corresponding to the central representation of the face is recognised better than previously seen or unseen exemplars that are different to the average. This result is important as it suggests that increased exposure to different images of an individual's face might result in a more generalizable representation of the face, yielding the more robust recognition seen for familiar faces. Typically, research in this area has relied upon a transformation of the features of the face in the vertical plane alone and it is not known whether other transformations, both manipulated and natural, produce similar prototype effects. Three experiments are reported that investigate these other transformations. Experiment 1 successfully replicated the prototype effect using the same vertical shift as employed in previous work. Experiment 2 did not find such a prototype effect when the features of the face were moved in two dimensions (horizontally and vertically) with recognition highest from seen exemplars. Finally, Experiment 3 used a more naturalistic transformation of age and again found an exemplar superiority effect. Overall, the results suggest that whilst a prototype effect can arises for faces, it only does so under certain circumstances.

The effect of responsibility attitude and stimulus valence on recognition and confidence in recognition

Manoussaki, Kallia (University of the West of Scotland).

Perceived responsibility has significant cognitive consequences for both clinical and nonclinical groups (Moritz, Wahl, Zurowski, Jelinek, Hand and Fricke, 2007). Under conditions of perceived responsibility, individuals show a positive memory (Radomsky, Rachman and Hammond 2000), but also a decline in metamemory for salient stimuli (Moritz, Wahl, Zurowski, Jelinek, Hand, and Fricke, 2007). Stimulus salience enhances retrieval by means of directive attention (Nothdurft, 2002) but

may actually impede metamemory, particularly among anxious populations. It has been suggested that for OCD patients and nonclinical participants with OCD symptoms, progressive exposure to emotionally salient stimuli worsens confidence in memory, while having no effect in memory accuracy (Tolin, Abramowitz, Brigidi, Amir, Street, & Foa, 2001). Perceived responsibility is associated with a positive memory bias for negative stimuli (Radomsky, Gilchrist & Dussault, 2004, and Dek, van den Hout, Giele & Engelhard, 2009) with reduced memory confidence (Boschen & Vuksanovic, 2007). The current study investigated the possible association in a healthy population, between responsibility, measured by the Responsibility Attitude Scale (RAS) (Salkovskis, Wroe, Gledhill, Morrison, Forrester, Richards, Reynolds &Thorpe, 2000), recognition and confidence in recognition of words that varied in valence. 85 healthy participants were administered the RAS prior to taking part in a word recognition task. Results indicated that responsibility attitude did not predict memory accuracy or memory confidence for negatively, positively or neutrally valenced words. Furthermore, word valence had no effect on memory confidence but did have a significant effect on memory accuracy. Implications for future research point towards the utilisation of responsibility-relevant stimuli.

Quick, dirty & all consuming: The prioritisation of angry faces across domains of attention and memory

Maratos, Frances (University of Derby).

According to cognitive and neural theories of emotion, when there is competition for limited resources, attentional processing of emotional stimuli is: i) prioritised over neutral stimuli; ii) more rapid than neutral stimuli; and iii) in some cases assumed to be 'automatic', or independent of top-down control. However, the effects of emotional, and especially threatening, stimuli on working memory are debated. In this talk results will be presented from a number of studies in both adult and child populations, in which angry, happy and neutral schematic faces were used to investigate the effects of emotional stimuli on processes of attention and memory respectively. This was achieved using rapid serial visual presentation (i.e. attentional blink) methodology to investigate attentional capture, and visual spatial task methodologies (probe report and corsi block) to investigate working memory. It will be demonstrated that threat prioritisation occurs across both the domains of attention and working memory, with a failure to demonstrate such effects on working memory previously possibly a result of the specific paradigm parameters employed and/or the neglect of important individual differences such as trait anxiety.

Do strategies aid children's short-term temporal memory?

Marshall, Zoe., Allen, Richard., Brown, Charity., Mon-Williams, Mark., & Waterman, Amanda (University of Leeds).

Temporal memory is our memory for time. Age increases in performance have been shown during childhood; a possible reason may be that older children show an increased use of spontaneous strategies to aid performance. The current research therefore examined whether teaching children strategies to aid their temporal memory, or suppressing the use of such strategies, would attenuate age effects. One hundred and seven children between six and eleven years of age completed two short-term computer tasks: reproducing short durations, and sequencing coloured circles. All children completed a baseline trial, before being split into two groups. Half were taught strategies to improve performance. For duration this involved counting using the word 'elephant' to mark the passage of time, whilst for sequencing this involved rehearsing the order of the circles. The other half were instructed to use an articulatory suppression technique to prevent strategy use. Older children were found to perform better on both baseline tasks, as well as in the suppression and strategy conditions. However, these age differences were reduced in the two intervention conditions. Younger children gained more benefit than older children by implementing counting and rehearsal strategies, whilst older children's performance was hindered more when using a suppression technique compared to younger children. The findings are discussed in relation to their educational impact.

Proactive interference in short term olfactory memory

Moss, Andrew., Johnson, Andrew., Elsley, Jane., & Miles, Christopher (Bournemouth University, Bournemouth University, Bournemouth University, Cardiff University/Bournemouth University).

The modularity of olfactory working memory is supported by the effects of cross-modal dual-tasking (Andrade & Donaldson, 2007) and divergent serial position effects (Johnson & Miles, 2009). Another unique characteristic of olfactory memory is the apparent susceptibility to proactive interference (PI) (Lawless & Engen, 1977) despite resilience to retroactive interference (RI) (Zucco, 2003). However, these effects are not consistently found and this unreliability may be due to stimulus characteristics such as verbalisability mediating the code with which these odours are represented (Jönsson, Møller, & Olsson, 2011). Additionally, these effects typically concern long-term memory and there is limited investigation of short-term interference effects in olfactory memory. The present study uses a recent probes task (modelled upon Craig, Berman, Jonides & Lustig, 2013) to examine the susceptibility of olfactory STM to PI. Participants are presented a sequence of 4-odours

followed by a single yes/no recognition probe. However, in negative probe trials participants receive a probe taken from the preceding or a non-recent trial. Results are predicted to demonstrate a strong PI effect, which is reduced for odours previously categorised as 'verbalisable' due to verbal coding of odours bringing performance more in line with PI observed for verbal stimuli.

Pathogen priming affects preferences for male and female body weight

Mutale, Gabriella., Dunn, Andrew K., Stiller, James., & Larkin, Rebecca (Nottingham Trent University).

Research suggests that implicit cues regarding environmental factors such as resource availability can influence preferences for body weight. This research has shown that individual levels of hunger effect preferences for female body weight. It is therefore possible that the way we perceive bodies could also be affected by other environmental factors such as levels of disease and the potential existence of pathogens. Indeed research with faces has shown effects of pathogen priming on face preferences. However, as far as we know, pathogen priming studies have only used face stimuli with no research looking at the effects of pathogen priming on body weight preferences. Here participants had their body preferences measured before and after experiencing either pathogen primes, neutral primes or no primes at all. The findings indicate that pathogen priming (exposing participants to information regarding pathogens) causes participants to shift their preferences for male and female body weight, rating heavier bodies to be more attractive and healthy after being primed. Since body weight is a good visual cue to better health heavier bodies have the direct benefits of being free from infectious disease and in mate choice would result in an increase likelihood of healthy offspring. Therefore this suggests we have an evolved set of cognitive mechanisms that aid us with the detection of cues signalling environmental threat which consequently leads us to become more aware of visual health cues in environments where we perceive there is a greater risk of disease.

The illusion of space: Vision selects objects, not locations

Nikolova, Atanaska., & Macken, Bill (Cardiff University).

Participants were required to indicate the direction of a luminance change at one of six locations following a cue presented at either the same or a different location. In the single object condition, the six locations were the apices of a single six-pointed star shape, while in the two objects condition, the six locations were the apices of two, oppositely oriented, superimposed equilateral triangles. Thus, while the spatial distribution of the target locations was identical in each condition, in one (single object) all locations were features of the same object, while in the other (two objects), each pair of spatially adjacent locations belonged to different objects. In both conditions, responses were fastest for targets appearing at the cued location compared to uncued locations. However, in the one object condition there was no variation in reaction times for uncued targets. In the two objects condition responses were slower for targets immediately adjacent to the cued location than responses for more spatially distant targets that belonged to the same object on which the cue had appeared. At a later SOA, reaction times for all uncued targets varied only as a function of object grouping, regardless of cue-target distance. The results suggest that visual selection is object rather than space based, and findings typically attributed to a spatial gradient of selection can be accounted for by a purely object-centred explanation.

Crime, hoodies and the video identification process: An applied investigation

Noon, Elizabeth., Hill, Lisa., Scase, Mark., & Wildbur, Diane (De Montford University).

In recent years, the number of offenders wearing hoodies has increased. Eyewitness identification is already a contentious issue, with concerns about the accuracy and confidence of witnesses exacerbated by the increasing number of DNA exonerations of individuals convicted on the basis of erroneous eyewitness identifications. Following their exposure to a filmed crime scenario, participants viewed video identity parades produced by police officers in accordance with Police practice guidelines to examine the effect of an offender wearing a hoodie on subsequent witness identification accuracy and identification confidence. A police officer was involved at every stage of the research. The findings confirmed that offenders seen wearing a hoodie whilst committing an offence were less likely to be identified by witnesses. However, it was also found that wearing a hoodie did not make it more likely that witnesses would make false identifications. In addition, a congruence effect was found with witnesses better able to identify the target offender from an identity parade if they were seen in a congruent state (i.e. if the target had no hoodie in both the scenario and on the parade, or wore a hoodie in both the scenario and the parade). If replicated, the findings have significant implications for police practice.

Framing effects in moral judgments about risk

Parkinson, Mary., & Byrne, Ruth M J (Trinity College Dublin).

We report the results of two experiments that test the effects of framing outcomes as gains or losses on moral judgements of risky and non-risk choices. The framing effect refers to the tendency for people to choose a sure option (e.g., 400 out of 600 people will be saved) rather than a risky option (e.g., a two-thirds probability that everyone will be saved and a one-thirds probability that no-one will be saved) when the outcomes are framed as gains, but for the preference to reverse when the outcomes are framed as losses (e.g., 200 out of 600 people will die). We examined participants judgments about the moral acceptability of another person's choices of the risky or sure options, as well as their judgments of moral responsibility and blame. Experiment 1 showed that participants judge another person to be morally responsible for the outcome whether they make the typical choice or not. Experiment 2 showed that participants judge another person to be morally responsible for good outcomes more than bad outcomes, particularly when they are framed as gains. The implications of the results for alternative views of the cognitive processes underlying moral responsibility judgments are discussed.

To do or not to do… Enhancing prospective memory in mild cognitive impairment

Pereira, Antonina., de Mendonça, Alexandre., Freeman, Jayne., & Ellis, Judi (University of Chichester, University of Lisbon, University of Reading, University of Reading).

The fulfillment of delayed intended actions (e.g. taking medication or attending an appointment) is described in the literature as prospective memory (PM) constituting a fundamental requirement for independent living across the lifespan. PM may be compromised in the course of healthy aging and particularly disrupted very early in the neurodegenerative process, namely at the stage of Mild Cognitive Impairment (MCI), a typical prodromal Alzheimer's disease (AD) phase, severely affecting a self-sufficient life-style and causing immense apprehension to caregivers. Most encoding manipulations which typically enhance learning in healthy adults are of minimal benefit to AD patients. However, there is some indication that these can display a recall advantage when encoding is accompanied by the physical enactment of the material. We report findings from a series of experiments exploring the potential benefits of enactment at encoding for PM performance in healthy young and older adults as well as MCI patients using a behavioral PM testing paradigm with a factorial design. PM performance was consistently superior when physical enactment was used at encoding and when target-action pairs were strongly associated. Importantly, these beneficial effects were cumulative, observable across both a healthy and a cognitively impaired lifespan, and even maintained under high attentional demands. We discuss our findings with respect to their potential impact on developing strategies to improve PM in AD sufferers emphasizing preliminary fMRI results regarding differential activation of brain areas known to be involved in integrative processes for movement planning in executing intended actions encoded though enactment.

Contribution of working memory to perspective calculation and selection

Qureshi, Adam (Edge Hill University).

Executive function has been suggested to play a role in the development of theory of mind (Carlson, Moses & Breton, 2002). Adult studies have also shown a relationship between inhibition, working memory and theory of mind (Bull, Phillips & Conway, 2008; McKinnon & Moscovitch, 2007). Prior dual-task studies have found that inhibition is required for perspective selection but not perspective calculation (Qureshi, Apperly & Samson, 2010). The current study uses a dual-task approach to examine the contribution of working memory to a level-one perspective taking task. Preliminary results suggest that working memory may play a role in perspective calculation but not perspective selection. Results will be discussed with respect to a possible two-system model of theory of mind: a minimal theory of mind that could explain perspective taking abilities in infants and animals, and a 'full-blown' theory of mind cognition ability that is more analogous to the ability shown in passing standard false belief tasks and in adults (Butterfill & Apperly, 2013).

Jumping to conclusions in delusional thinking

Rhodes, Stephanie., Galbraith, Niall., & Manktelow, Kenneth (University of Wolverhampton).

Delusions are commonly understood as 'beliefs based upon incorrect inference' (American Psychiatric Association, 1994, p 765) and have been associated with a tendency to jump to conclusions. In simpler terms, those with delusions will reach final decisions earlier upon the basis of little evidence (Huq, Garety and Hemsley, 1988). It has been hypothesised that the potential demands of the decision making task presented to participants could encourage hasty decision making amongst individuals prone to delusional thinking (Rhodes, 2012). The aim of the current study was to test the potential situation-specificity of the jump to conclusions bias. An opportunity sample of 81 undergraduate Psychology students from the University of Wolverhampton were presented with either an abstract vs self- referent task either face to face or via computer. Moderator analyses found that belief preoccupation and task method significantly predicted subjective task stress, and subsequent data gathering. In other words, those that engaged in delusional thinking were more likely to experience stress when completing the task face to face and consequently gathered less information prior to finalising a

decision. It was concluded that data gathering may be influenced by specific situational variables amongst individuals prone to delusional thinking.

Individual differences in the development of semantic short-term memory and its relation to reading comprehension

Roome, Hannah., & Towse, John (Lancaster University).

It is well established that working memory plays an important role in language processing. Haarmann, Davelaar and Usher (2003) proposed that semantic short-term memory (SSTM), a component of working memory (WM), acts as a predictor of reading comprehension. SSTM, measured with a conceptual span task, stores and actively maintains item representations, integrating them with other sentence words. We investigated conceptual span performance in children aged 7-10 years and its relation to WM and reading comprehension. Further, we assessed memory items' accessibility and its relation to secondary memory as part of Unsworth and Engle's (2007) account of working memory capacity. Taking measures of reading comprehension, vocabulary, WM and SSTM, we found age-related increases in SSTM capacity. This measure was positively correlated with reading comprehension and WM, even after controlling for age and vocabulary. Hierarchical regressions showed vocabulary, WM and SSTM each act as unique predictors of reading comprehension. This extends current knowledge by providing a developmental perspective of SSTM, its role in online meaning integration and it's relationships with indices of memory. Further, it shows how measures such as conceptual span can help determine the role of cognitive components of WM in higher-order cognition.

Information reduction – all or nothing?

Rowell, Nancy., Green, Alison., Kaye, Helen., & Naish, Peter (The Open University).

How is it that expert radiographers can rapidly home in on relevant information, ignoring what is not relevant? This strategic skill, referred to as Information Reduction (IR), develops over hours of practice. Haider and Frensch (1996, 1999) used an Alphabet Verification Task to experimentally investigate IR, concluding that this strategy is implicitly learned but passes into conscious awareness and is then abruptly and consistently adopted. However, one observation made was that not everyone adopts the strategy, although this was not explored further. We tested for IR in other analogous tasks under various practice conditions and investigated conscious awareness of strategy use with post-testing questionnaires. Results from statistical analyses with linear regression and ANOVA indicated that IR had taken place to varying degrees in all tasks, showing that it is not task-specific. Results were also indicative of IR being affected by changes to practice conditions, frequently being unused even when this did not appear advantageous. The questionnaire results combined with the empirical data suggested that some individuals discovered and used the strategy and could verbally express this; others chose not to use it; and some appeared to use it without awareness of doing so. Additionally, it was noted that IR was often not consistently applied. Overall it appears that IR seen in these laboratory tasks is more complex than the all-or-nothing phenomenon previously proposed.

The effect of mindfulness at study and test on false memories

Sherman, Susan., & Tudor, Lucy (Keele University).

The Deese-Roediger-McDermott (DRM) paradigm (Deese, 1959; Roediger & McDermott, 1995) enables the creation of false memories for non-presented stimuli in a laboratory setting. Participants are presented with word lists such as bed, rest, awake, tired, dream etc. which give rise to memories for the non-presented but related word sleep. Previous research has found that item-specific processing can reduce the creation of false memories. This has been done by giving precise instructions about how to process the list items. The current research explored the effect of mindfulness on both true and false memories. 44 participants either received a mindfulness intervention or not prior to studying 8 DRM lists. They then either received a mindfulness intervention or not prior to completing an RKG recognition task. Mindfulness prior to study had no impact on the number of list items correctly recognised, but it did reduce the number of lures falsely recognised. Furthermore, it increased R responses for list items and reduced them for lure items. Mindfulness prior to testing had an impact on overall R responses but only when there was no mindfulness intervention at study. Implications for theory are considered.

Gender differences in the Stroop Colour-Word Test: a meta-analysis

Sjoberg, Espen., & Cole, Geoff (University of Essex).

This study aimed to determine any gender effects on the Colour-Word subtask of the Stroop test, where participants are asked to name the ink colour of incongruous colour-words. Despite over 80 years of research on this topic, a systematic analysis of gender effects has never been conducted and previous reviews were based on subjective conclusions. Using the

meta-analysis procedure, an attempt was made to identify any systematic gender difference in the Stroop Colour-Word subtask. A total of 126 effect sizes were identified from 60 studies. Results found a significant overall female advantage, but with a very small effect size, d = 0.12. The advantage was significant across all ages and cultures. However, the female advantage depended largely on which Stroop version was employed: versions that used reaction time measurements had a small effect size (d = 0.22), while single-item reaction time versions showed a moderate advantage (d = 0.47), and versions that counted the number of colours named within a timeframe showed no difference (d = 0.04). The results suggest that a small female advantage exists on the Stroop task, but that the strength of this difference depends largely on differences in measurement between different versions of the task.

Thinking with your tongue: Evidence for performative manifestations in inner speech from memory and reading tasks

St John, Alexander (Cardiff University).

Inner speech is an internal mental phenomenon thought to play an important role in memory, language, self-awareness, and other functions besides. Despite this importance, its representational nature remains controversial; investigation is complicated by the difficulty of accessing the internal phenomenon directly. It is proposed here that inner speech is a form of motor imagery, subject to the same performative constraints as overt speech. These are assimilated by an articulatory control system to support overt speech production and are also used to generate inner speech. Support for this hypothesis is provided in two experiments. In one, coarticulatory fluency is manipulated to impact verbal short-term memory, a function dependent on inner speech representations. In a second experiment, this manipulation of articulatory mechanics exerts comparable constraints on reading times in overt and inner speech. A motor control framework readily accounts for the present findings, and offers a mechanistic explanation for performative manifestations in cognition more generally.

Searching for pitch invariant representations in auditory cortex

Susi, Karima., Hall, Deb., Dunn, Andrew K., & Premkumar, Preethi (Nottingham Trent University, Nottingham Hearing Biomedical Research Unit-University of Nottingham, Nottingham Trent University, Nottingham Trent University).

Pitch constancy relates to perceiving the same pitch from tones with differing spectral shapes and is one key criteria for identifying a pitch selective neural representation in auditory cortex. Here we used an event-related potential (ERP) adaptation study and a behavioural task (target same/different) to investigate whether pitch coding is invariant to changes in timbre. Adaptation is observed as a decrease in N100-P200 when the same stimulus is repeated because overlapping neuronal populations encode the stimulus. Reduced adaptation indicates that new neuronal populations are recruited to encode a change in an acoustic feature of interest (i.e. pitch, timbre or both). If neurons are selective to pitch (invariant to timbre), reduced adaptation should occur for pitch changes only. If selective to both (non-invariant to timbre), reduced adaptation should occur for pitch and timbre changes. Similarly, stimulus discrimination during the behavioural task should not require any additional processing resources if neurons are selective to pitch only, and hence reaction times and accuracy should be equivalent across conditions. If neurons are selective to both pitch and timbre, longer reaction times and poorer accuracy should be observed for timbre changes. We found reduced adaptation in the N100-P200 and increased reaction times and poorer accuracy for timbre changes. This suggests that neurons in auditory cortex are selective to both pitch and timbre, i.e. pitch coding is non-invariant to timbre. This supports recent evidence suggesting interdependence between pitch and other acoustic features (i.e. timbre and spatial location), and is contrary to a purportedly selective pitch centre.

The eye dominance effect: Findings from an eye tracking study

Thompson, Sarah., Foulsham, Tom., & Jones, Catherine (Cardiff University, University of Essex, Cardiff University).

It has been widely established that people look to the eyes more than the mouth. However, whether this bias can be manipulated has not been previously investigated. The current study used an eye tracker to monitor the gaze of 41 healthy adults to a series of naturalistic faces during a forced recognition paradigm. The participant had to distinguish the previously seen target face, from an alternative foil image, where either the eye or mouth region was digitally altered. This was first conducted with no instructions (unprompted condition) and then with instructions to look to the changed region (prompted condition). As expected, participants looked more to the eyes than mouth in the unprompted condition, and were also more accurate and faster at responding to this region. However, when participants were prompted to look at the mouth, there was still a significantly greater proportion of first fixations to the eyes than mouth. Further, participants spent less time looking at the mouth compared to their eye-looking in the eye prompt condition. This suggests people have a dominant and difficult to inhibit instinct to look to the eyes, an eye dominance effect. This could have important implications in neurodevelopmental disorders, such as autism, where individuals have difficulty processing the eyes. Therefore, we are currently undertaking research to investigate this in an autism population, to produce a greater understanding of this population's instinctive looking patterns and their ability to alter this pattern.

Heterogeneity in Developmental Prosopagnosia

Ulrich, Philip I N., Wilkinson, David T., Ferguson, Heather J., Bindemann, Markus., & Johnston, Robert A (University of Kent).

Developmental prosopagnosia, or face-blindness, is an isolable condition that impairs successful recognition of faces and is present from birth with no evidence of brain trauma. Despite the high suspected prevalence of developmental prosopagnosia, diagnostic criteria are informal, current treatment approaches lack trials validation, and, given the relatively small number of group studies, the relative integrity of underlying perceptual and memory processes remains unclear. To begin to address these shortcomings, we administered a large battery of behavioural tests to twenty one individuals with self-reported face recognition difficulties. Nine separate patterns of impairments emerged. Ten of these individuals were subsequently classified as developmentally prosopagnosic based on the most widely used assessment - the Cambridge Face Memory Test. Relative to a control sample (n=102), the majority of these individuals performed poorly on tests of memory but not perception. These results help clarify the nature of impairment in developmental prosopagnosia, and also guide the development of novel therapies such as caloric vestibular stimulation, a technique that we have begun to apply to this population and which, as will be described, may hold promise.

Computerized attention training – an intervention with older adults

West, Melanie., Mevorach, Carmel., & Humphreys, Glyn (University of Birmingham, University of Birmingham, University of Oxford).

Ageing may have an impact on a variety of physical and health related aspects. In particular cognitive ageing may reflect decline in executive functioning, memory and speed of information processing (Glisky, 2007) as well as fluid intelligence (Salthouse, 2004). The present study assessed whether cognitive training aimed to improve attention in children - Computerised Progressive Attention Training (CPAT; Shalev et al., 2007), can be used to improve symptoms of cognitive ageing (as well as motor control) in older adults. Participants were randomly assigned to either the control or experimental group. For the experimental group CPAT was used during 3 consecutive weeks for three 1-hour sessions each week. For the control group widely available computer games were used for the same duration and frequency. Both groups were assessed before and immediately after the 3-week intervention on motor and visual attention related tasks. Contrasting the two groups' performance on these tasks revealed substantial differences following training. Participants in the experimental group were faster and less erratic and showed improved performance in untrained tasks including a general improvement in speed of processing. Increased measures of wellbeing were also apparent. Results provide initial evidence to support the efficacy of attention training in older adults.

Poster Abstracts A-Z by first author surname

Language-specific lexical representations for speech production in Arabic-English bilinguals

Alasmari, Abdullah., & Barry, Christopher (University of Essex/Imam University (KSA), University of Essex).

Meuter and Allport (1999) asked bilinguals to name digits in either their L1 or L2 (as cued by the background screen color). They found a larger "language switch cost" for L2-to-L1 than L1-to-L2 switching. These results suggest that the non-target language is actively inhibited, and that L1 is inhibited more when naming in L2 than L2 inhibited when naming in L1. Two experiments of Arabic-English bilinguals were tested. Those experiments used different stimulus (i.e., digits and words) to switch between two languages, while, the target trial will be switch by translating to another or non-switch by non-translating). Language-switching experiments with 30 Arabic-English bilingual participants were reported. (1) When translating aloud Arabic and English words, switch cost was larger for L2-to-L1 than L1-to-L2 switching. (2) When translating Arabic digits (e.g., ٣, ٨) and English digits (e.g., 3, 8), switch costs were similar for L2-to-L1 and L1-to-L2 switching. The results are interpreted in terms of how readily stimuli activate language-specific lexical representations for speech production.

Intraindividual differences in executive and memory processing in young and old adults

Ames, Michelle., McKeown, Denis., & Bunce, David (University of Leeds).

Memory loss and cognitive decline in older age are current hot topic issues in many medical fields. As the average life expectancy continues to grow in the UK, it becomes more important for research to direct a focus on healthy ageing and how to successfully achieve it. This study adopts a multivariate approach to investigating cognitive domains most susceptible to fluctuations in increasing age (e.g. executive control and memory performance). Young (ages 20-39) and old (ages 70+) adults matched in intelligence, education and neurological health participated in a series of four reaction time (RT) tasks and an incidental episodic memory task across two sessions spaced 14 days apart. Within-person, or intraindividual variability (IV), was calculated for the RT tasks which increased in difficulty as more executive demands were made on participants. IV was also calculated for responses to immediate and delayed recognition and compared across age groups. Results reported include performance on a picture recognition task which is designed to differentiate between pattern separation (the laying down of distinct representations for items recently experienced) and pattern completion (the retrieval of items based on partial information) in immediate memory, phenomena which appear to differentially change with normal ageing and cognitive decline.

Risk perception and physiological differences between fear and anxiety during a driving-based task

Barnard, Megan., & Chapman, Peter (University of Nottingham).

Recently research has increased its focus on how the internal cognitions of the driver affect driving behaviour, particularly within the context of negative emotions such as anxiety. To demonstrate, phobic participants show an increase in driver error and cognitive tunnelling when discussing their phobia (Briggs, Hole & Land, 2011). However, research into the emotion and mental workload relationship has been confounded by both theoretical and methodological limitations (Trick, Brandigapola & Enns, 2012), and within the context of anxiety this could be due to its confusion with another emotion, fear. Whilst both are signals that require the individual to be alert (Taylor, 2008), fear has been hypothesised to come from an external environment as a definite, immediate threat (Fuller, McHugh & Pender, 2008), anxiety is an internally induced emotion related to internal thought processes (Beck & Clark, 1997). Essentially, fear is said to be a bottom-up process whilst anxiety is top-down. However, the few studies conducted to establish this distinction have been of a low fidelity and has not used genuine driving material to carry out its research (Schmidt-Daffy, 2012; Schmidt-Daffy, 2013). Therefore, the aim of this research is to look at behavioural and physiological indicators of negative emotion, using a combination of driving clips that aim to manipulate levels of fear and the State-Trait Anxiety Questionnaire (Spielberger, 1983), to see if the fear and anxiety distinction can be maintained during a more realistic driving task. Results and implications from the current study will be discussed in relation to future research.

Subjective age-of-acquisition ratings for over 3,200 German words

Birchenough, Julia., Davies, Robert., & Connelly, Vincent (Oxford Brookes University, Lancaster University, Oxford Brookes University).

The age of first learning a word has been shown to influence word reading (Juhasz, 2005). Reading research typically uses subjective age-of-acquisition (AoA) estimates as a measure to capture whether words are early or late acquired. The aim of the present study was to establish German AoA ratings which are comparable to norms available for English in order to pave the way for including AoA in cross-language reading research. Following Kuperman, Stadthagen-Gonzalez, & Brysbaert's

(2012) methodology of ratings collection, age-of-acquisition estimations were collected in an online questionnaire for over 3,200 German words. These included 2,363 nouns, 473 verbs and the remainder belonged to other word classes. We employed the instructions used by Stadthagen-Gonzalez & Davis (2006). Words were presented in lists of 140 words and participants rated the age in years of when they first learned each word. A split-half correlation testified to a high internal reliability. High correlations were found with studies which used the same instructions across languages. Where different instructions had been given to participants, ratings showed weaker relationships. These results highlight the importance of establishing comparable norms in different languages to facilitate cross-linguistic research. These new ratings will extend current existent norms available for language and reading research across languages and will provide researchers with a wider choice of word stimuli.

Emotional stimuli modulate spatial memory in high anxious participants

Birkinshaw, Hollie., & Maratos, Frances (University of Derby).

A plethora of research demonstrates that the processing of emotional stimuli is prioritised over non-emotive stimuli when cognitive resources are limited. In addition there is evidence that such effects are heightened in high anxious individuals, especially for threat-related stimuli. However, there is debate as to whether such emotional superiority effects extend to spatial memory (see for example Bannerman et al., 2012). To assess this, in the present study we used a modified version of the Corsi Blocks Task (CBT), in which a critical stimulus location in the 'to-be-remembered' spatial stream was either an angry face or a happy face. We also took measures of both trait and state anxiety. Results were analysed using a three (control CBT, Angry CBT, Happy CBT) by two (high anxiety, low anxiety) mixed measures ANOVA and revealed a significant CBT task type by trait anxiety interaction. Post-hoc analyses revealed this interaction to reflect high anxious participants performing significantly better on the angry CBT compared with low anxious participants. Further analyses also revealed that high anxious individuals performed significantly better on the angry CBT compared with the neutral CBT, whereas for low anxious participants no differences emerged. Contrary to previous research findings do not suggest a dissociation between stimulus capture and spatial memory, but highlight the importance of accounting for individual differences in studies of cognitive processing. Findings can further be explained by theories of hypervigilance; plausibly heightened threat processing triggers enhanced memory consolidation for items associated (or surrounding) the threat.

Number words as mental shortcuts: "万 wàn" in Chinese & "Million" in English

Chan, Clara Gek-Hoon (Nanyang Technological University).

Research on speakers of languages with limited number vocabulary show support for number words being cues in which people use to remember and retrieve information on quantity. Building on this, the present study compared, between languages of the English-Chinese bilingual, the speed of recognition of Arabic numerals when presented with the full written name of the number (e.g. correctly selecting 10 003 among distractors when given "Ten Thousand and Three"). Variations of two quantities were used as separate dependent variables: Million/百万 bǎi wàn and 万 wàn/Ten thousand. These numbers were chosen as each number contains a particular single word representation for that quantity in one language (e.g. "Million" as one word), while using a combination of words in the other language ("百万 bǎi wàn" as two words). It was hypothesized that the language with one word for the quantity would allow for faster performance of the recognition task than the other language with combination of words, due to the singular word serving as a mental shortcut. Results showed that this was indeed the case, and there was an interaction with the participants' language preference such that when the test language with the singular word representation happened to be the participants' preferred counting language, performance was the fastest. The findings illustrate that language can help serve as a mental shortcut to numerical concepts in the mind, and different languages create different shortcuts depending on what is present in the lexicon.

Visual cues influence dot comparison task reliability

Clayton, Sarah., Gilmore, Camilla., & Inglis, Matthew (Loughborough University).

The cognitive skills involved in completing non-symbolic tasks used to measure the Approximate Number System (ANS) are poorly understood. Recent evidence suggests that performance on dot comparison tasks is not only influenced by ANS acuity but also by the visual characteristics of the stimuli, and the inhibitory control processes used to account for visual cues that are incongruous with numerosity information (Gebuis & Reynvoet, 2012; Gilmore et al., 2013). This study investigated the reliability of two dot comparison protocols that each controlled for visual characteristics differently (Gebuis & Reynvoet, 2011l; Libertus et al., 2012). Fifty-one adult participants completed 312 dot comparison trials created using the two protocols. Participants completed each trial twice to obtain an immediate test-retest reliability score. We found that trials created to explicitly control for the average dot size and convex hull of the array had higher test-retest reliabilities than trials created to control for the total surface area of the dots. Furthermore, participants performed more reliably on trials that

required them to inhibit misleading convex hull information, providing support for the view that inhibition is a key feature of dot comparison tasks, and highlighting the salient nature of convex hull information. Critically, no significant correlation was found between participants' performance on the two protocols. This implies that the two dot comparison methods do not measure the same cognitive constructs. Results have important implications for researchers who wish to compare and contrast findings from studies that use different dot comparison task protocols.

Emotion Perception Ability in Older Adults is Dependent upon the Mode of Presentation and not General Processing Ability

Dimelow, Nicola., Morgan, Jane., Reidy, Lisa., & Verrier, Diarmuid (Sheffield Hallam University).

Age–related research into emotion perception portrays a complex developmental pattern in older-age adults. In general older adults display an emotion perception deficit for negative emotions. However, previous research has not compared within participant performance across multiple modalities using matched non-emotion control tasks. The current study used forced choice categorisation tasks to investigate age-related differences (age range: 18-29 years and 59-84 years) in emotion perception of five basic emotions (happy, sad, fear, anger, disgust and neutral) across three modes of presentation (facial expressions, non-linguistic sounds, and single words). It was found that on the faces task older adults were less accurate on anger expressions and had longer reaction times for happy, angry and neutral expressions compared to younger adults. On the sound task older adults were slower for anger and fear. There was no age-related difference in emotion perception from words. Furthermore, older adults were faster and more accurate on all non-emotion tasks compared to the emotion tasks indicating that age-related emotion processing deficits cannot be explained by a reduction in general processing ability.

Smartphones as external memory: How we learn with and without the internet for backup

Dunstan, Ryan., & Galpin, Adam (University of Salford).

Several authors have expressed concern regarding the possible impacts of the internet on the way we learn (e.g. Carr, 2010), and recent evidence suggests that encoding of information is affected by the belief that we will have later access to that content on an external device (Sparrow et al., 2011). The aim of the current experiment was to discover whether access to a smartphone influences encoding strategy on a learning task. Twenty participants were told to read a complex passage of text for a later memory test, and half were told they would have access to their phones during the test ('mobile' group) whilst the others were given no additional instruction ('no mobile' group). Eye-movements were measured to assess encoding strategy. Whilst participants in both groups demonstrated effortful encoding of the text as shown through dense scan-paths, significant differences were found in the number of fixations (mobile group mean: 281; no mobile: 451). The results suggest that belief about later mobile internet access encourages users to rely less on their own memory and more on an 'external memory' source. Implications of these findings are discussed in relation to the concept of technological determinism.

Effects of action observation on the perception of musical groove

Eaves, Daniel., Burridge, Emily., Griffiths, Noola., McBain, Tom., & Butcher, Natalie (Teesside University, York St John University, Teesside University, Teesside University, York St John University/Teesside University).

Listening to music often provokes spontaneous rhythmical movements in the perceiver. One musical quality in particular that can enhance this effect is called 'groove'. At the same time a substantial body of research shows that seeing another person's actions primes similar actions in the observer (visuomotor priming). Here we investigate the effect of action observation (i.e., a point-light display (PLD) of a drumming action) on the groove rating for a concurrent audio drum track. We presented high and low-groove audio drum beats in four different visual conditions: static PLD; compatible synchronised PLD; compatible asynchronised PLD; and incompatible PLD (e.g., low groove audio with high groove PLD). Participants rated the extent to which they felt the audio (a) grooved; and (b) made them want to move. We discuss the results in relation to the use of combined visuo-auditory cues in both musical training and motor rehabilitation programmes. Our paradigm also sheds light on multimodal interactions, wherein we discuss the implications of a possible dominance of one modality over the other in modulating groove ratings and the desire to move.

The influence of glucose ingestion on memory for emotional stimuli during a cognitively demanding dual-tasking paradigm

Elliott, Jade M., & Bonner, Angela (Staffordshire University).

The ingestion of a glucose drink has been shown to reliably facilitate declarative memory. However, it remains unclear as to how circulatory levels of glucose influences memory for emotional material, with contradictory findings. Emotional material evokes a natural memory advantage, with measurable increases in circulatory glucose levels being observed in response to emotional words (in the absence of glucose administration). Increased glucose levels (naturally occurring or through an

intervention) however, have not been shown to reliably facilitate emotional material. This randomised, blind, placebo-controlled, crossover design, was employed to further investigate the influence of glucose ingestion on memory for emotional words in healthy adults (N=22; Mean age: 24 years). This population have been shown to be most susceptible to glucose facilitation during more cognitively demanding tasks. As such a dual task manipulation (alternating hand movement sequences) was introduced during the encoding phase. Glucose was found to enhance declarative recall for both emotional and neutral stimuli in the absence of the dual task. The dual tasking manipulation induced a decline in memory performance for both neutral and positive stimuli following glucose. However, recall performance of negative stimuli was preferentially maintained at a similar level to that evoked in the absence of the dual task. This suggests the glucose facilitation effect is not consistent across all stimuli types, but rather can be directed at subsets of particularly salient information. Such a targeted (as opposed to uniform) memory facilitation, may go someway to explaining the somewhat contradictory findings reported in the literature.

The influences of age, experience and gender on driving behaviour and dorsolateral prefrontal cortex (DLPFC) activity

Foy, Hannah., Chapman, Peter., & Runham, Patrick (University of Nottingham).

Statistics from road traffic accidents consistently show a significant over-representation for young, novice and predominantly male drivers. This trend may be explained by a lack of dorsolateral prefrontal cortex (DLPFC) maturation, a process which continues until age 25. In particular the common crash types of these at risk drivers has been linked to excess risk and a lack of impulse control, a factor which has been associated with DLPFC activity. Other important factors linked to crash risk and DLPFC activity include workload and expertise. This experiment used functional near-infrared spectroscopy (fNIRS) to measure blood oxygenation in the DLPFC during five simulated driving tasks; four overtaking tasks at varying traffic densities and one following task. These tasks were chosen to manipulate driver workload and inhibitory control while age, driving experience and gender were systematically manipulated across eight groups of relatively young and inexperienced drivers. The results showed that when both workload and inhibitory control increased, as measured by a revised NASA TLX workload questionnaire, blood oxygenation in the DLPFC increased. The driver's age did not predict DLPFC activity or the number of overtakes they made during the overtaking tasks however, this may be due to relatively limited age ranges in the current study. No relationship was found between experience and the number of overtakes, however, males overtook significantly more often than females, this evidence for increased risk in males may relate to the increased crash rates seen in these drivers.

Eliminating dual-task interference in skilled typewriting: Automaticity or optimal scheduling

Garner, Lauren., & Yamaguchi, Motonori (Edge Hill University , Edge Hill University).

Task performance suffers interference when multiple tasks need to be performed concurrently. Although this dual-task interference is difficult to eliminate, some studies have reported that interference can be eliminated when participants are highly trained in performing the tasks. We examined whether such results are due to task performance being automatic and bypassing attention-demanding processes. In the present study, skilled typists performed a continuous typing task alone (single-task condition) or while monitoring a series of auditory tones for a specific target pitch (dual-task condition). To examine the contribution of automaticity, we manipulated typing materials: typists typed normal sentences in one condition and scrambled sentences in the other condition. Typing performance was slower and less accurate, and tone monitoring involved more errors, when typists typed scrambled sentences than when they typed normal sentences. The outcomes imply that typing scrambled sentences are less skilled and deautomatized performance. However, there was no dual-task interference in typing regardless of whether they typed normal or scrambled sentences. We conclude that the elimination of dual-task interference is not due to skilled performance being automatic or bypassing attention-demanding processes. Instead, the results are consistent with accounts that perfect time-sharing between concurrent tasks is achieved by optimally scheduling cognitive processes required to complete the tasks.

Operator and authority effects on facial composite effectiveness

Gentry, Natalie., & Johnston, Robert (University of Kent).

Constructing composites is a complex tasks hence witnesses are typically aided by a trained police officer. Social inhibition research suggests that the presence of the officer may impair task performance. We examined whether the additional resources offered presence of an active operator would offset any disadvantage caused by social inhibition. Facial composites were constructed with either the active or passive help of an operator. On half the occasions the operator was a university professor while on the remaining occasions the operator was an undergraduate student. The resulting composites were judged by an independent set of raters who had not taken part in the composite construction process. Raters estimated how closely a composite resembled the target face it had been derived from. Composites were rated as being more similar when

they had been prepared with the help of an active rather than passive operator. In addition, composites were judged as being more similar to the target when completed under the high authority condition, but only when the operator played a passive role. The implications of these findings are discussed in relation to the usefulness of allocating police resources during the composite production process.

Lying through the eyes: How a combination of ocular measurements may elicit cues to improve deception detection and how psychopathy, machiavellianism and narcissism affect such ocular cues

Gibbons, Luke., & Teicher, Sebastian (Nottingham Trent University).

Literature highlights that trained lie catchers are not sufficiently more accurate in detecting deception than laypersons. Research has focused on cues that maybe elicited when individuals are deceiving, including ocular measurements such as pupil diameter and blink frequency. In addition, Psychopathy, Machiavellianism and Narcissism have been shown to affect alternate cues to deception, yet such effects are under-researched in regards to ocular cues: The present investigation aims to address this. An opportunity sample of 14 male and 10 female participants were recruited from the general public. Age ranged from 18 to 26 years (M=22, SD=2.28). A mock crime experiment was used: 12 participants stole £20 or a watch from a drawer whereas 12 did not steal anything. Participants were then exposed to a live interview streamed through Skype™ and stationary eye-tracking equipment recorded ocular behaviours. The 'Dirty Dozen' dark triad measurement was used to define personality traits. The combining of pupil diameter cues produced a statistically significant logistic regression that could classify group membership (guilty/innocent) with 83.3% accuracy. Crime irrelevant and crime relevant questions significantly effected pupil diameter and blink rate. In addition, it seemed that psychopathy; Machiavellianism and Narcissm did not affect ocular cues to deception. A combination of pupil diameter cues therefore seem useful in diagnosing a guilty or innocent participant although no single cue could significantly determine guilt or innocence. Personality type did not affect ocular cues to deception in the present study.

Earwitness memory: Factors that influence voice recognition accuracy across the lifespan

Gous, Georgina., Dunn, Andrew K., Baguley, Thomas., & Stacey, Paula (Nottingham Trent University).

We aimed to explore the effect of change in frequency (F0 in Hz) and speech rate (syllables per second - SPS) on voice recognition accuracy. In part one of our experiment, participants (M= 36; F=36; aged 18-30 years) were given a 2AFC voice matching task which involved hearing (binaural headphone presentation) synthesised (using NaturalReader 12) voices (uttering the phrase "spring is the season where flowers appear, summer is the warmest season of the year"). Participants had to identify whether the two voices were the 'same' or 'different' (using a key press, left/right). There were six target voices (six different identities, three male and three female) in total. In each trial the to be matched voices comprised the original voice or a modulated version (increased/decreased F0 or increased/decreased SPS) of the original voice presented in a random order. In part two of our experiment, the same participants heard the original voice and the modulated versions in a random order. After presenting each voice, participants had to decide whether the voice they heard was 'male' or 'female' (using a key press, left/right). Results from part one indicated that participants could discriminate a more subtle pitch shift than they could for speech rate. Results from part two indicated that participants correctly identified the sex of the speaker when SPS was modulated for both male and female voices, and when F0 was modulated for male voices. However, participants incorrectly identified a female voice as 'male' when F0 decreased. This suggests that both pitch and speech rate variations are important for accurate speaker identification and voice discrimination.

The time course of eye movements in visual search

Guest, Duncan., Scott, Craig., & Torrance, Mark (Nottingham Trent University).

In everyday life visual cognition tasks are often completed under considerable time pressure because we have multiple behavioural goals and constantly move through an ever changing visual world. Feature sampling models of visual cognition therefore propose that one of the central influences on task performance is the time required for perceptual processing of objects and their features, because often decisions are made with limited or incomplete perceptual information. Based on this principle, Guest and Lamberts (2011) proposed a model of the time course of visual search performance (the EGCM-VS). The model assumes that information from the scene is processed in parallel but that the rate at which different object features are processed can differ. A consequence of this is that similarity relationships between display objects and target representations in memory change as perceptual information about objects and their features is processed over time. To date, this model has only been applied to data on the time course of search performance (search accuracy after different display durations) albeit in a range of search tasks. In this experiment, we monitored eye movement during a visual search task using displays with 8 homogenous or heterogeneous distractors, arranged so as to be equidistant from a central fixation

point. We explored the extent to which the EGCM-VS predicted saccades towards, and fixations on target and distractors. The findings have clear implications for the nature of search and whether it is based on a serial or parallel process.

The effect of presentation time on the own-race bias in a face matching task

Harris, Kathryn., & Johnston, Robert (University of Kent).

This study investigated how short presentation times of own- and other-race face stimuli affect the strength of the own-race bias (ORB). The ORB is a well-documented effect where people are better at recognising unfamiliar faces from their own-race than from another race. Very little research has been done on how short presentation times affect the encoding of own- and other-race face stimuli, which has important theoretical implications for understanding when the ORB starts taking effect as well as practical implications such as for security systems that rely on personnel accurately matching photographic IDs to the people before them. This experiment used a sequential face matching task with Asian and Caucasian faces and presentation times of the study face as either 250ms or 3000ms. It was predicted that there would be an own-race bias with participants being more accurate for faces of their own-race, that there would be an effect of presentation time with higher accuracy in the 3000ms condition for both races of face, and there would be an interaction between race and presentation time with the difference in hits and false positives for own- and other-race faces being smaller in the 3000ms condition. Results showed that participants were significantly more accurate in the 3000ms condition for both races of face as predicted, but there was no significant ORB effect in either time condition and no interaction. A number of possible reasons for these partly unexpected results and potential future research ideas are discussed.

Linguistic processing effects in reading dynamic horizontally scrolling text

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Horizontally scrolling text is a relatively common presentation format in digital media (e.g. for news tickers and LED announcement boards) but little is known about how reading of dynamic text differs from that of normal reading. The scrolling of the text presents a conflict to the attentional and oculomotor systems, as it not only involves shifts attention and gaze from left-to-right along the sentence, but also tracking each word from right-to-left in order to follow the movement of the text across the screen. Two eye-movement experiments were carried out to investigate three linguistic factors known to modulate processing time (measured as fixation durations) in normal reading: word length and frequency were examined in Experiment 1, and predictability was examined in Experiment 2. The effects of these manipulations were replicated with dynamic scrolling text, indicating that the additional demands placed on the oculomotor and attentional system by the movement of the text do not impact on linguistic processing.

Learning to listen: Auditory and cognitive training for people with hearing loss

Henshaw, Helen., & Ferguson, Melanie (NIHR Nottingham Hearing Biomedical Research Unit, University of Nottingham, NIHR Nottingham Hearing Biomedical Research Unit, University of Nottingham/Nottingham University Hospitals NHS Trust).

One in ten older adults (55-74 years) has a significant hearing impairment, but just one in three who would benefit from hearing aids owns them. Auditory training (AT) is an intervention designed to help listeners compensate for degradation in the auditory signal. AT is hypothesised to aid listening in two ways; bottom up refinement of sensory perception and development of top-down cognitive control. For training interventions to benefit people with hearing loss (PHL), any task-specific learning needs to transfer to functional benefits in real-world listening. Results from our lab suggest that the real-world benefits of AT (phonemic-discrimination training) are influenced by the development of top-down cognitive control. Findings from two studies of phoneme-discrimination training (in quiet and in noise) show significant on-task learning ($p<.001$), and generalisation to improvements in self-reported hearing ($p<.05$), working memory ($p<.05$), divided attention ($p<.01$), competing-speech ($p<.05$) and a dual-task of listening and memory ($p<.01$), with the greatest improvements for challenging task conditions. A third study assessed whether training cognition directly could offer increased benefit for adults with hearing loss. HA users trained online for 5-weeks using Cogmed working memory training. Significant on-task learning ($p>.001$) generalised to improvements in untrained working memory tasks. No improvements were shown for speech perception. It is argued that training is most effective when it targets core deficits rather than secondary issues or consequences. Thus, training interventions that target cognitive skills embedded within auditory tasks are most likely to offer generalised benefits to the real-world listening abilities of people with hearing loss.

Spoken English discrimination training with bilingual speakers: A novel individualized adaptive training regime

Leong, Christine Xiang Ru., Price, Jess., Pitchford, Nicola., & van Heuven, Walter (University of Nottingham Malaysia Campus, Nottingham Malaysia Campus, University of Nottingham, University of Nottingham).

Technology can aid English language learning through interactive features that can be individualized to learners. Two experiments with Malaysian adult bilinguals explored if an individualized adaptive procedure of implementing background noise enhanced the effectiveness, longevity, and generalisability of perceptual phonemic discrimination training compared to a fixed level of background noise. In each experiment, participants received three, 20-minute, training sessions, over consecutive days. Multi-talker babble was implemented at either an individual level using a novel adaptive staircase procedure (Exp 1) or a fixed level (Exp 2). Participants heard two spoken English words that differed in one phoneme (minimal pairs) and decided whether they were the same or different (e.g. HEAD and HEAT).Phonemic discrimination ability was assessed the day before and after the three training sessions and after 6 months, using a two-alternative-forced-choice spoken-word-to-written-word identification task. Generalisation of training was investigated using minimal pairs constructed with either trained or untrained phonemes. Significant gains in perceptual discrimination ability were found immediately after training (5.3%, 2.1%, Exp 1 & 2 respectively), which were maintained after 6 months (5.2%, 2.4%, Exp 1 & 2 respectively). Training effects generalized from trained to untrained phonemes (11.4% to 9.4% Exp 1; 4.5% to 3.8% Exp 2). Importantly, training benefits were significantly greater when the level of background noise was implemented using the adaptive staircase procedure (5.3%) than when it was fixed (2.1%). These results indicate that interactive technology incorporating individualized training regimes can be highly effective at enhancing spoken English discrimination skills in adult bilingual speakers.

Does positive experience affect syllogistic reasoning when reasoning about related material?

Lucas, Erica., & Banks, Sarah (Staffordshire University).

This study was based on the work of Blanchette and Campbell (2012) who found that war veterans reasoned more accurately about combat related syllogisms than generally emotional and neutral syllogisms. This is contrary to findings of previous research that has shown reduced accuracy when reasoning about emotional content compared to neutral content. In this study, we explored whether the same advantage in reasoning could be seen when the experience of the participants and the content of the tasks were matched positively. Participants were 70 females all member of a choir, who completed syllogisms relating to: their positive emotional content (their choir experience), negative emotional content and neutral content. Results showed that the singers provided more logically correct answers on neutral syllogisms compared to the positive emotional content or the negative emotional content. Explanations for the findings are discussed in relation to intensity of the experience, along with explanations about the effect that emotion has on working-memory load.

Attentional biases towards ambiguous expressions as a function of individual differences

Morgan, Alannah Jodie., & Maratos, Frances (University of Derby).

Depression and anxiety are often associated with attention control deficits, but according to Bredemeier et al. (2012) neuroticism can account for these links. In expansion of their research, we replicated the attentional blink paradigm utilised by Bredemeier et al., but with the extension of manipulating the emotional valence of the T1 target. In the present study, undergraduate students (n=36) completed: i) self-report measures of neuroticism, anxiety and depression; and ii) an attentional blink task in which they were required to identify two targets embedded within a rapid sequence of distractor items. Crucially, the emotional valence of the first target was manipulated. That is, this target could be Sad, Angry or Neutral. The second target (a neutral face) was presented at lags 2, 3 and 7. Within the typical attentional blink period (i.e. lag's 2 & 3), a neuroticism x face type x lag interaction was revealed. Post-hoc analyses revealed this interaction effect to reflect faster recovery from the attentional blink for the neurotic individuals following the neutral face stimuli. Specifically, these stimuli produced a shorter attentional blink in individuals with elevated levels of neuroticism. In contrast anxiety and depression did not influence performance. In accordance with Bredemeier et al. (2012) therefore, neuroticism may underlie attentional biases often attributed to depression and/or anxiety, particular where there is ambiguity (e.g. neutral faces).

Categorisation of olfactory perception: normative data for a large set of odours

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Memory for olfactory stimuli is argued to be affected by a range of stimulus characteristics including name-ability (e.g. Zelano, Khan, Sobel, & Montag, 2009) and pleasantness (e.g. Rolls, Kringelbach, & De Araujo, 2003). Since olfactory memory has been shown to operate both independently (Andrade & Donaldson, 2007) and diversely (Johnson & Miles, 2009) to that of other modules within working memory, we plan a series of studies to explore cross-modal differences in the effects of stimulus characteristics on memory. The first stage of this process is to explore the categorisation process of odours. The current study produced normative data for 200 food-related and non-food-related odours. Using methods developed by Sulmont, Issanchou, and Köster (2002) for odour categorisation, 100 participants evaluated odours across ten dimensions

(e.g. verbalisability, familiarity, age-of-first-exposure, pleasantness, distinctiveness etc.). These dimensions are reduced using Principal Component Analysis. Future studies will use this data to compare different groups of odours on a range of memory tests and assess whether such characteristics analogously affect memory across other sensory modalities

Recognition of universal, subtle and neutral facial expressions in learning disabled adults

Owen, Sara., & Maratos, Frances (University of Derby).

The ability to recognise the facial expressions of others is a fundamental component of social functioning. However, research suggests that adults with mild-to-moderate learning disabilities may be impaired when it comes to categorising facial expressions and determining emotion dimensions (e.g. arousal). To explore this further, we investigated facial emotion recognition in learning disabled adults with that of age-matched controls using universal (happy, angry) as well as more subtle (critical, kind) facial expressions; and the face in a relaxed muscle (or neutral) state. We used both the validated NIMSTIM and McEwan facial stimulus sets and compared performance across participants on tasks of facial categorisation, arousal and valence rating. Results revealed that individuals found it more difficult to categorise the subtle facial emotions, but that learning disabled adults demonstrated impaired performance when determining the valence of the emotional faces. This was irrespective of facial expression set (i.e. universal or subtle). In addition, learning disabled adults performed significantly worse when categorising neutral expressions and they were significantly impaired when determining the arousal dimension of this stimulus type. Given the increasing focus on personalisation within the UK, the current findings have implications for the social integration of learning disabled adults into the community, especially as the learning disabled adults in our study were significantly impaired across a range of recognition tasks and facial expressions, including the face in a 'default' relaxed (or neutral) pose.

Evidence for both retinocentric and headcentric maps, but not body or world-centric maps in visual perception

Parwaga, Sandeep., & Duke, Philip A (University of Leicester).

Despite movements of the eyes, head and body, our perception of the world is stable and allows us to interact successfully with the environment. How are such perceptions formed? One possibility is that retino-centric image features are transformed into maps at higher levels, such as head-, body- , or maybe even world-centred maps. The present study investigated this hypothesis using a contingent tilt aftereffect (TAE) paradigm designed to reveal adaptive maps beyond the retino-centric level. We found TAEs contingent on eye-gaze direction, but not head- or body-direction. This demonstrates that visual features are represented in a head-centric map and suggests no higher levels of perceptual maps. Having found evidence for an adaptive head-centric map, we examined its contribution to the classical TAE using a method designed to isolate retino-centric and head-centric components and examine their temporal characteristics. We found evidence that tilt representation involves 1) a retino-centric tilt encoding mechanism, which is sensitive to test stimulus duration, and 2) an eye-gaze direction encoding mechanism, which is not. Our results suggest that retino-centric visual feature orientation is jointly encoded with eye-gaze direction to produce head-centric - but not body- or world-centric - maps in the visual cortex.

Determining the relative contributions of the visuospatial sketchpad and the articulatory loop when solving Sudoku and Wordoku puzzles

Petersen, Johanna Maria., & Fine, Philip (University of Buckingham).

We examined the relative contributions of the visuospatial sketchpad (VSSP) and phonological loop (PL) when solving Sudoku and Wordoku puzzles using dual-task performance. 48 participants completed four puzzles while simultaneously performing one of the following four secondary tasks: 1) a spatial task (pressing keys on a numeric keypad) that suppressed the VSSP, 2) an articulatory suppression task using the numbers 1 to 4 that suppressed the PL, 3) an articulatory suppression task using the letters A to D that similarly suppressed the PL, and 4) a control condition (i.e. pressing the spacebar on a keyboard). Half the participants solved Sudokus, and half solved Wordokus. First, it was hypothesized that VSSP suppression would interfere more with Sudoku and Wordoku performance than PL suppression because Sudoku is primarily a spatial reasoning game. Second, it was hypothesized that articulatory suppression using numbers would interfere more with Sudoku performance than articulatory suppression using letters because Sudokus consist of numbers, and vice versa with Wordoku performance. Both hypotheses were supported, demonstrating that problem solving in Sudoku and Wordoku puzzles utilizes to varying degrees both the VSSP and the PL in working memory, and that the type of interference has an impact on puzzle performance.

Internet Gaming Disorder: Cognitive components and implications for treatment

Pontes, Halley M., & Griffiths, Mark D (Nottingham Trent University).

Aims: The American Psychiatric Association (APA) has recently officially recognised Internet Gaming Disorder (IGD) as a behavioural addiction that merits future research before being fully recognised as a new psychiatric condition. Despite growing research in this relatively new field, a full understanding of the cognitive mechanisms and behavioural patterns associated with IGD still remains unclear. The present study aimed to summarise and clarify the current literature on the cognitive factors underlying IGD. Method: A systematic literature review using the main psychological databases was conducted in order to identify the relevant studies. Criteria adopted for including studies included: i) empirical and/or literature review studies; ii) published in refereed journals; iii) in English, Portuguese or Spanish iv) between 1996 and 2014. Results: Several empirical and theoretical studies analysing the associated cognitive factors of IGD were identified. Additionally, the existing literature seems to systematically view the phenomenon of IGD and its treatment from a cognitive-behavioural perspective. Conclusions: IGD represents an issue of increasing attention and importance, the cognitive-behavioural model seems to be the model of choice adopted for explaining and treating IGD in different settings. Consequently, increasing the understanding of the cognitive psychology underlying IGD represents an important task for advancing the field and adding to the ever-increasing literature of behavioural addictions.

Effects of dyslexia on problem solving: Strategies and interventions for syllogistic reasoning

Rawlins, Kay., & Monaghan, Padraic (Lancaster University).

Background: People with dyslexia tend to perform slightly worse on verbal reasoning problems, such as syllogisms (Bacon, Handley & McDonald, 2007). This study examines whether performance varies for different types of syllogistic problem, and whether visual strategy training improves performance of people with dyslexia. Participants were university students with and without dyslexia. They were each given a set of syllogisms that varied in terms of whether they were easier to solve using visual or verbal strategies (Ford, 1995): EV (easiest for verbal reasoners), ES (easiest for spatial reasoners), ESV (easiest for both types of reasoners). After training on a visual strategy based on Euler's Circles for solving the problems, they were retested. An ANOVA was performed on number of correctly solved problems with problem type, dyslexia group, and first/second test as factors. For problem type, scores were significantly higher for EV and ES problems. For dyslexia group, non-dyslexics solved marginally more problems overall than dyslexics. There were two significant interactions: a) problem type x dyslexia - dyslexic participants scored lower than non-dyslexics on ESV and EV problems; and b) problem type x training – the overall score for ESV problems improved after training, while the score for EV declined after training. ES problems scores were almost identical in all conditions. People with dyslexia performed worse only on certain types of syllogistic problem: counterintuitively, those most conducive to visual strategies. The results also show that reasoning strategies can be adapted, but this did not differentially affect dyslexic versus non-dyslexic participants.

Development of positivity bias in children's intention judgment and its adaptive role in social development

Sato, Tomomi., & Wakebe, Toshihiro (Chubu University, The University of Tokyo).

Previous studies have shown that young children interpret intention of an agent favorably (i.e., positivity bias). This study examined the relationship between social skills and positivity bias in intention judgment to reveal the role of positivity bias in social development. Using an interactive (e.g., an agent pushed and broke a block-castle of a patient) and a non-interactive situations (e.g., the patient pushed and broke his or her own block castle), we asked children (n = 21, Mage = 6 years 7 months - 9 years 8 months) to judge the intention of the agent's actions and the intention of the patient's actions. The results showed that children at all ages judged the agent's intention favorably in both situations (e.g., the agent was not intended to push the block-castle); this suggests robustness of positivity bias in intention judgment. Moreover, positivity bias in the interactive situation positively correlated with children's self-assessed social skills, and this was not the case for positivity bias in the non-interactive situation. These results suggested that positivity bias in judging intention of an agent who affects a patient contributes to social development of children.

Looking at hands, objects or words? Tracking eye movements on an action-based categorisation task.

Shipp, Nicholas., Vallée-Tourangeau, Frédéric., & Anthony, Susan (University of Hertfordshire, Kingston University, University of Hertfordshire).

Previous research using forced-choice triad tasks have shown that participants are more likely to group items together based on shared thematic information (Lin & Murphy, 2001; Murphy, 2001) or shared actions (Shipp, Vallée-Tourangeau & Anthony, in press), particularly when shown within a functional context. The aim of the following research was to determine which aspect of the context drives the shared action associations between the items; whether participants spend more time looking at the objects themselves or the hand position and 'grip' of how we interact with them. In an eye-tracking experiment measuring time spent looking at the objects, hands or the word depicting the objects name, the results showed that participants were more likely to look at the words than they were the hands or the objects. Despite this they were still

more likely to match items within the triads based on shared action knowledge of how we interact with the objects. This indicates that action knowledge is recruited in a passive task in which such knowledge is not necessary and that the triad task can be completed with minimal viewing of the direct actions involved.

Gender differences in a negative priming Stroop Task

Sjoberg, Espen., & Cole, Geoff (University of Essex).

The evolved inhibition hypothesis proposes that women should outperform men on inhibition tasks due to sex differences in mating strategies. Specifically, females of any given species inhibit their mate choice more often than males, ensuring that the father of her offspring has the best possible genes. One measure to investigate inhibition is the Stroop Colour-Word task, where previous research has found a small female advantage. However, it is unclear whether this advantage reflects superior inhibition or verbal abilities in females. We propose a comparison of performance between a standard Stroop task and a negative priming Stroop task. In the negative priming version, the colour to-be-named on one trial is identical to the colour ignored in the previous trial. The difference in performance between the tasks gives an insight into inhibition abilities. Results showed a significant female advantage on both tasks, and performance for both sexes was lower in the negative priming task. No significant interaction between gender and Stroop task type was found. These results suggest that the female advantage on the Stroop task is not due to women expressing superior inhibition abilities compared to men. Instead, it is likely that women possess better verbal abilities and can name the ink colours faster.

Visual continuous recognition memory

Smith, Amy., & McKeown, Denis (University of Leeds).

Recently, an indicator of amnesic mild cognitive impairment (aMCI) has been identified as a failure in pattern separation, a process that is believed to occur in the hippocampal dentate gyrus/ region CA3 which reduces the overlap between two similar stimulus representations during memory encoding. Crucially, a relatively simple visual continuous recognition task serves to differentiate between pattern completion in immediate memory (the recall of a memory for an item based on a partial cue) and pattern separation. In the task pictures of everyday items are presented in sequence and observers report for each whether it is novel (new), previously viewed (old), or whether it shares features with a previously viewed item (similar). Research has found that in comparison to healthy older adults, patients with aMCI show decreased pattern separation when the time lag of intervening items between "old" and "similar" items is increased in the task. The new findings reported here question whether this failure in pattern separation deficits results from the interference caused by the encoding of intervening items or from the degrading of a memory representation over an extended time delay. Notably our stimulus items cannot be verbally encoded so that any simple verbal rehearsal strategy is prevented. The findings extend our knowledge of pattern separation deficits as a behavioural marker, capable of distinguishing neurological conditions, such as aMCI from the normal aging process.

Spatial orientation in MCI patients and normal elderly

Tagarelli, Maria Luana., Caffò, Alessandro., Spano, Giuseppina., Calia, Clara., DeCaro, MariaFara., & Bosco, Andrea (University of Bari. University of Bari. University of Bari. Queen Margaret University, University of Bari, University of Bari).

Background: Spatial orientation is important detecting early cognitive impairments. An effective method to investigate spatial awareness is the comparison between different environments. One explanation about how an implicit information can drive people into memory tasks comes from studies on priming which appears to be preserved in amnesic patients. Objective: Investigate whether the mechanisms of priming can reduce errors in two different types of spatial task. Materials and Methods: 45 patients entered the study: N= 31 normal adults, N= 14 subjects with mild cognitive impairment (MCI) (mean age: 73,6, SD = 5,9, range: 65 to 84; 33 women). Both groups were randomly receiving or not the priming. A neuropsychological battery of tests were administered with two tasks for navigation in virtual environments: bird-eye view (Flag and Frame) and egocentric view (Paradigm shift). Results: It can be observed a significant effect of priming ($F (1, 41) = 6.55$, $p <0.05$, partial eta square = 0.14). The group with a comparison between environments shows a better performance than the other. The effect of the Task is significant ($F (1, 41) = 10:41$, $p <0.01$, partial eta square = 0:20). The task of egocentric view is easier in comparison with the bird-eye view. Only in the group of normal elderly priming improves the performance when the environment is bird-eye view. Conclusions: Our results confirm that a conceptual priming based on the comparison between rooms of different shape reduce errors and increase the spatial awareness compared to a similar condition in which this comparison is not possible.

Attention restoration reduces change blindness (except for those who feel sad)

Thompson, Catherine., & Bendall, Robert (University of Salford).

Attention Restoration Theory (Kaplan, 1995; Kaplan & Berman, 2010) proposes that natural surroundings "restore" attentional resources, in comparison to urban surroundings. This is due to increased bottom-up processing in natural environments (relative to urban environments) that allows top-down processes to recuperate. The predicted performance benefits of interacting with nature can occur when individuals simply view static scenes of natural environments and this was investigated using the change blindness paradigm. Across two blocks participants viewed twenty natural or twenty urban scenes and then completed a change detection task (the order of blocks was counterbalanced). To ensure any difference in change detection was due to attention restoration and not from any improvement in mood, participants were asked to complete a mood questionnaire after each block. The results showed that change blindness did not vary according to the scenes participants viewed prior to the task, and also that mood did not change across the experiment. However, when accounting for responses to the mood questionnaire, nature scenes reduced change blindness (therefore restoring attentional resources), but only when participants reported low negative affect. Attention restoration may therefore be influenced by an individual's internal emotional state.

Improving the design of passport photographic identity information

Tummon, Hannah., & Johnston, Robert (University of Kent).

The photographic information stored in modern passports is a legacy from when photography was much more expensive and considerably less convenient. In current times it would be easily possible to incorporate a much larger image to facilitate matching by passport officers. Two experiments compare the utility of the existing size of passport image (45 x 35 mm) with one which is larger but still able to be accommodated on a single passport page (70 x 50 mm). Participants attempted a lengthy matching task where most trials presented genuine pairings intermingled with a small number of impostor trials. In Experiment 1 participants were not told anything about the likely frequency of impostors while in Experiment 2 the low frequency was revealed in advance of the task. On each trial participants were shown a short video clip while examining a dummy identity document incorporating a static image taken with a different camera. Participants were asked to decide whether the two images belonged to the same person or two different individuals. After making each judgement they were required to evaluate their confidence in their decision on a 7 point scale. The larger image was shown to be more beneficial in making correct judgements about identity but only when the participants were unaware of the contingency of impostors. In both experiments, however, processing the larger image was accompanied by an increased confidence in decisions that were taken. The implications of these findings for redesigning passport photographic identity information are discussed.

Examination of N-gram frequencies effects on orthographic processing in keystroke production

Vernon, Michael., & Torrance, Mark (Nottingham Trent University).

It has been well documented and previously supported that syllables are processed as distinct chinking units in speech production to assist the pronunciation of the spoken word(s). In speech, the syllable is thought to be manipulated at the phonological and phonetic encoding stages in such models as that of Levelt, Roelofs, & Meyer (1999), with the syllable being retrieved from the Mental syllabary or computed on-line. This keystroke based study employed a series of experiments using a symbol-position association learning task similar to that used in Cholin, Levelt, & Schiller's (2006) study which aimed to examine (1) whether orthographic processing is dependent upon prior phonological processing, (2) whether trigrams or bigrams are used as planning units in typed CCC and CVC letter strings, and (3) if there is evidence supporting the use of a motor-code repository such as the mental syllabary for orthographic motor programs, or if such motor programs are computed online. Participants were required to associate separate letter strings with location on a screen (left or right). Once the association was learned correctly the participants were prompted with one of the locations and were required to type the corresponding letter string as quickly and as accurately as possible. Trigram and Bigram frequencies were manipulated throughout the series of experiments with Interletter intervals (ILI's) and initial keystroke presses recorded throughout. Each of the 3 experiments used 24 participants in a within-participants design. The results support evidence for a mental repository of orthographic motor codes

Development of context-specific and context-general memory traces: Is their consolidation process interactive or independent?

Wakebe, Toshihiro., & Sato, Tomomi (Chubu University).

Sleep has been reported to produce improvement of function in acquired skill and knowledge; taking sleep, for example, people perform a sequential hand-movement more rapidly than immediately after training. This phenomenon, called memory consolidation, was proposed about one hundred year ago and has been a central issue in cognitive and neurosciences for more than ten years. However, there would be two types of skill and knowledge, or context-specific and context-general memories, and it still remain to be elucidated how these memories are consolidated (i.e., whether they are

developed competitively, cooperatively, or independently during sleep). To address this issue, we required subjects to learn three different sequences of hand movement (using Serial Reaction Time Task) in a within-subject design, manipulating training context and test one. We then compared performance improvement from immediately after training to after sleep (i.e., on next day) among the three sequences. The results and their suggestions are discussed on poster presentation.

Eye movements demonstrate top-down control in singleton search

West, Melanie., & Humphreys, Glyn (University of Birmingham, University of Oxford).

The allocation of attention and eye movements was examined under singleton search conditions. In experiment 1 we assessed whether an irrelevant colour salient singleton would distract from search for a feature target. The singleton distractor effect disrupted trials but only on target absent data. In addition first fixations were reduced to singletons compared to targets and the time to fixate was reduced for targets compared with singletons even when the other items were all homogeneous distractors. In experiment 2 the target was sometimes a singleton. In this case RTs were faster when the target was a colour singleton but there was again no effect of the singleton distractor when the target was present. On eye movements there was again evidence for targets engaging attention faster than singleton distractors, and there was no additional gain from the target being a singleton. The data provide evidence for top-down control of the initial allocation of attention to search displays, even under conditions where singleton distractors are present