A scientific meeting will be held at Elvet Riverside 1, Durham University, New Elvet, Durham, DH1 3JT. The local organiser is Anthony McGregor.

**Sixth EPS Frith Prize Lecture - Thursday 7th April, 6:00pm**

- Exploring the temporal and spatial dynamics of the semantic network using TMS and fMRI
  - Dr Rebecca Jackson, University of Manchester

**EPS/BSA Undergraduate Project Prize lecture – Thursday 7th April, 5:00pm**

- Applying the distractor devaluation effect to online impulse buying
  - Amy Isham, University of Warwick

**Symposium – Thursday 7th April, 9:00am**

- Spatial and temporal foundations of human foraging behavior
  - Co-organisers: Carlo de Lillo, University of Leicester, Alastair D Smith, University of Nottingham and Anthony McGregor, Durham University

**Symposium – Thursday 7th April, 2:00pm**

- The role of temporal information and temporal processes in learning
  - Organiser: David Sanderson, Durham University

**Poster Session**

This will be held in conjunction with the drinks reception on Wednesday evening at 6:00pm in ER144. Delegates may put up posters from 2:00pm and should take them down by the end of the session.

**Platform Presentations**

Sessions will be held in Lecture Theatres ER140 and ER145. Both theatres have data projectors available for PowerPoint presentations. Presenters may provide their own laptops (if using a Mac please bring your own connector), or bring USB keys for the on-site computers. Any queries about facilities in the theatres should be sent to Anthony McGregor (anthony.mcgregor@durham.ac.uk)

The conference dinner will be held on Thursday 7th April at 8:00pm in Hatfield College, Durham University, North Bailey, DH1 3RQ. A booking form is enclosed.
START OF PARALLEL SESSIONS

Session A
Lecture Theatre ER140

1:30  Mark Haselgrove, Alastair D Smith and Matthew G Buckley* (University of Nottingham)
Transfer of shape-based spatial navigation across the boundary of an arena

2:00  Michael J Morgan and Katharine Hauperich* (City University London and University of Oxford)
Effects of attentional distraction on motion adaptation measured with a bias-free method of visual search

2:30  Rob Udale*, Simon Farrell and Chris Kent (University of Bristol and University of Western Australia).
Does spatial cueing affect location retrieval from visual short-term memory?

3:00  James Negen*, Hannah Roome* and Marko Nardini (Durham University)
Beyond egocentric and allocentric: Tracing developmental changes in landmark use with virtual reality

3:30  Tea

4:00  Paul M Jenkinson*, Sahba Besharati*, Stephanie J Forkel*, Michael Kopelman, Mark Solms* and Aikaterini Fotopoulou* (University of Hertfordshire, King's College London, University of Cape Town, SA and University College London)
Mentalising the body: Spatial and social cognition in anosognosia for hemiplegia

4:30  Stergios Makris* and Valentina Cazzato (Edge Hill University and University of Bradford)
Perceived body weight similarity and weight stigma modulate the understanding of observed familiar actions

5:00  Valentina Cazzato and Cosimo Urgesi* (University of Bradford, University of Udine, Italy and Bangor University)
Appreciation of body shape and motion in adolescent athletes practicing aesthetic and non-aesthetic sports

6:00  POSTERS AND DRINKS RECEPTION – Posters will be displayed and drinks will be served in Elvet Riverside ER144
START OF PARALLEL SESSIONS

**Session B**

**Lecture Theatre ER145**

1:30 Suzanne L K Stewart*, Astrid Schepman*, Matthew Haigh, Rhian McHugh* and Andrew J Stewart (University of Chester, Northumbria University and University of Manchester)
Theory of mind inferences contextually influence the recognition of emotional facial expressions

2:00 Michael Burt* and Markus Hausmann* (Durham University) (Sponsor: Anthony Atkinson)
Lateralized categorical perception of facial emotional expressions

2:30 Luna C M Centifanti*, Matthias Gamer* and Nicholas Thomson* (Durham University and University of Wuerzburg, Germany) (Sponsor: David Sanderson)
Reflexive eye-gaze and callous-unemotional traits

3:00 Katie Fisher*, John Towler and Martin Eimer (Birkbeck College, University of London) Developmental prosopagnosics have impaired perception of contrast information in the eye-region that is salient for identity processing

3:30 Tea

4:00 John Towler and Martin Eimer (Birkbeck College, University of London)
Electrophysiological evidence for parts and wholes in visual face memory

4:30 Lee De-Wit*, Annelien Buedts* and Caitlin Mullin* (University of Cambridge, University College London and University of Leuven, Belgium) (Sponsor: Karen Brandt)
Left and right in categorizing the faces of politicians from different countries

5:00 Harry Farmer*, Juliette Klamm*, Xijing Wang* and Antonia Hamilton (University College London and Ecole Normale Supérieure de Lyon)
Investigating the neural mechanisms underlying the relationship between similarity and liking

6:00 **POSTERS AND DRINKS RECEPTION** – Posters will be displayed and drinks will be served in Elvet Riverside ER144
**Session A**

**Lecture Theatre ER140**

**Symposium: Spatial and Temporal foundations of human foraging behaviour**

9:00  **Ranxiao Frances Wang** (University of Illinois)
Getting lost during navigation: The unconscious processes

9:30  **Kate Jeffery** (University College London)
Neural encoding of three dimensional space during foraging in rats

10:00  **Christopher Ramsey*, Christos Gatzidis*, Sebastien Miellet* and Jan M Wiener** (Bournemouth University)
Visual search during active locomotion in complex virtual environments: an eye-tracking study

10:30  Coffee

11:00  **Alastair D Smith** (University of Nottingham)
In all probability: Spatial statistics and search behaviour

11:30  **Iain D Gilchrist, Bruce M Hood and Kate A Longstaffe** (University of Bristol)
Learning directed by saliency in large scale search

12:00  **Carlo De Lillo** (Leicester University)
Foraging and cognitive assessment in healthy ageing

**End of Symposium**

12:30  Lunch
Session B
Lecture Theatre ER145

9:00  Ausaf A Farooqui* and Tom Manly* (MRC-CBU Cambridge) (Sponsor: John Duncan)
Rethinking attention: When attended perception deactivates fronto-parietal regions

9:30  Michael Jenkins*, Anna Grubert and Martin Eimer (Birkbeck University of London)
The speed of voluntary attention shifts: Evidence from event-related potentials

10:00 Anna Grubert, Michael Jenkins* and Martin Eimer (Birkbeck University of London)
Rapid parallel attentional selection of multiple objects

10:30  Coffee

11:00  Mark R Gardner, Zainabb Hull*, Donna A Taylor* and Caroline J Edmonds*
(University of Westminster and University of East London)
‘Spontaneous’ visual perspective-taking may be explained by attentional orienting that is voluntary, and not reflexive

11:30  Andriy Myachykov* (Northumbria University) (Sponsor: Kevin Paterson)
Overlap and interface between simulated knowledge representations

12:00  Anna-Katharina Hauperich* and Michael Morgan (University of Oxford and City University London)
A bias-free measure of motion adaptation reveals large individual differences in strength of adaptation

12:30  Lunch
Session A
Lecture Theatre ER140

1:30  Jasper Robinson, Emma J Whitt* and Peter M Jones (University of Nottingham and Plymouth University)
The origins of familiarity-based stimulus generalisation

Symposium: The role of temporal information and temporal processes in learning

2:00  David J Sanderson, Aletheia Lee*, Joseph M Austen* and David M Bannerman* (Durham University and University of Oxford)
The role of the GluA1 AMPA receptor subunit in time-dependent learning

2:30  Robert C Honey and Tzu-Ching Esther Lin* (Cardiff University)
Temporal contiguity in associative learning

3:00  Ralph R Miller* (State University of New York at Binghamton)
The role of encoded interstimulus intervals in cue competition and associative interference

3:30  Tea

4:00  Ruth S Ogden (Liverpool John Moores University)
How humans learn durations: The importance of integrating wider cognitive resources into models of timing

4:30  Charlotte Bonardi and Domhnall Jennings* (University of Nottingham and Newcastle University)
Timing and associative learning: Effects of fixed and variable cues on learning

5:00  Peter Balsam* (Barnard College and Columbia University)
Inhibition and temporal informativeness

End of Symposium

5:30  EPS Business Meeting

Frith Prize Winner Lecture

6:00  Rebecca Jackson* (University of Manchester)
Exploring the temporal and spatial dynamics of the semantic network using TMS and fMRI
Session B
Lecture Theatre ER145

1:30  Marko Nardini, James Negen*, Hannah Roome*, Seth Fletcher* and Lore Thaler* (Durham University)
Learning perceptual inference

2:00  Amir-Homayoun Javadi*, Fadi Ifram* and Lucile Boccara* (University of Kent and University College London) (Sponsor: Heather Ferguson)
Theta band activity during physical exercise correlates with memory improvement

2:30  Hannah E Roome* and John N Towse (Durham University and Lancaster University)
“I can’t remember”: The accessibility of memory representations in children’s working memory

3:00  Aidan J Horner, James A Bisby* and Neil Burgess (University of York and University College London)
Spatial boundaries shape long-term event representations

3:30  Tea

4:00  Phillip L Morgan and Chris Alford* (University of the West of England)
The effects of valent irrelevant background speech on serial recall memory

4:30  Sheila J Cunningham (Abertay University)
Applying self-processing biases in an educational context

BPS/EPS Undergraduate Prize Winner Talk

5:00  Amy Isham* (University of Warwick)
Applying the distractor devaluation effect to online impulse buying

Lecture Theatre ER140

5:30  EPS Business Meeting

Frith Prize Winner Lecture

6:00  Rebecca Jackson* (University of Manchester)
Exploring the temporal and spatial dynamics of the semantic network using TMS and fMRI
Session A
Lecture Theatre ER140

9:00  Angela de Bruin*, Thomas H Bak* and Sergio Della Sal (University of Edinburgh) (Sponsor: Kevin Paterson)
Does ageing affect inhibitory control in a motion flanker task?

9:30  Jade E Norris*, Kevin J Riggs* and Julie Castronovo (University of Hull)
Investigating magnitude processing and inhibitory control in ageing with the number Stroop paradigm

10:00 James A Grange, Agnieszka W Kowalczyk* and Rory O’Loughlin*
(Keele University)
The effect of episodic retrieval on inhibition in task switching

10:30  Coffee

11:00  Joseph M Austen* and David J Sanderson (Durham University)
Contexts control negative contrast and restrict the expression of flavor preference conditioning

11:30  Pam Blundell and Luke Budworth* (University of Leeds)
E-cigarettes: Conditioning and attentional bias

12:00  Melina Kunar, Derrick Watson and Sian Taylor-Phillips*
(University of Warwick)
The low prevalence effect in Mammograms: Computer aided detection both benefits and impairs visual search for cancers

12:30  Amelia R Hunt, Warren James* and Alasdair D F Clarke*
(University of Aberdeen)
Failure to use probability of success in deciding how to distribute effort over multiple goals

END OF MEETING
Friday 8 April, am

Session B
Lecture Theatre ER145

9:00  Marc Brysbaert, Michael Stevens*, Pawel Mandera* and Emmanuel Keuleers* (Ghent University)
How many words do we know? Practical estimates of vocabulary size dependent on word definition, the degree of language input and the participant's age

9:30  Amelia Aldrich* and Arnold Wilkins (University of Essex)
Colour reduces discomfort in migraine

10:00 Federica Degno*, Fruzsina Soltész*, Piril Hepsomali*, Nick Donnelly and Simon P Liversedge (University of Southampton)
Co-registration of eye movements and fixation-related potentials to investigate degradation and word frequency effects during reading

10:30  Coffee

11:00 Simon P Liversedge, Badriya H Al Farsi* and Sarah Rule* (University of Southampton and Ibri College of Applied Sciences, Oman)
Semantic neighborhood density effects in word identification during normal reading

11:30  Lin Li*, Sha Li*, Jingxin Wang* and Kevin B Paterson (Tianjin Normal University, China and University of Leicester)
Adult age differences in Chinese reading: Effects of character complexity

12:00  Eva Belke and Johanna Bebout* (Ruhr-Universität Bochum, DE)
Rhythmic and melodic input presentation facilitates gender-like category induction in language learning

12:30  Markus Hausmann*, Sophie Hodgetts* and Tuomas Eerola* (Durham University) (Sponsor: Anthony McGregor)
Music-induced changes in functional cerebral asymmetries

END OF MEETING
1. Agnieszka Kowalczyk* and James A Grange (Keele University)  
   Task switching: The reliability of backward inhibition

2. Micheala Lawes* and Phillip L Morgan (University of the West of England)  
   Investigating the effects of interruption and incubation on verbal insight problem solving ability

3. James N MacGregor, J Barton Cunningham* and Jennifer Wallinga* (University of Victoria, Canada and Royal Roads University, Canada)  
   Further tests of a procedure for training insight problem solving

4. Yan Birch*, Anthony Atkinson and Amanda Ellison* (Durham University)  
   Rumination is positively associated with problem-solving in social and risk-based tasks, but not in abstract problem-solving tasks

5. Jennifer Boland*, Rachel Anderson and Kevin Riggs* (University of Hull)  
   Improving prospective thinking in depression: The effect of positive simulations on positive and negative future event appraisals

6. Jasmine Raw*, Mara Mather* and Michiko Sakaki (University of Reading and University of Southern California, USA)  
   Tonic arousal amplifies selective effects of emotion on memory

7. Lydia Grace*, Rachel Anderson and Stephen Dewhurst (University of Hull)  
   The relationship between autobiographical memory and the self in depression

8. Wiebke Struckmann*, Holger Wiese, Stefan R Schweinberger and Jessica Komes* (Friedrich-Schiller-University of Jena, Germany and Durham University)  
   Neural correlates of autobiographical memory in young and older adults – an ERP study

9. David Howe*, Steve Dewhurst and Rachel Anderson (University of Hull)  
   Implicit and explicit attitudinal consequences of false autobiographical memories and beliefs

10. Martina Slapkova* and Deborah Talmi (University of Manchester)  
    Understanding memory for words following amygdala damage

11. Michele S Y Chan*, Madeline J Eacott*, David Sanderson, Mu Sun* and Alexander Easton (Durham University and GSK Shanghai)  
    A continual trial apparatus to reduce the number of mice used in various memory tasks

12. Barbara-Anne Robertson*, Madeline Eacott* and Alex Easton (Durham University)  
    It’s not just down to context: Interference and training affect performance on contextual variants of an episodic memory task in rats
13. Sabrina V Seel*, Madeline J Eacott* and Alexander Easton (Durham University)
   The effects of cholinergic lesions of the hippocampus on episodic-like and context-place memory in a new behavioural apparatus

14. Jasmin A Strickland*, Joseph M Austen* and David J Sanderson (Durham University)
   An inverted U-shaped function of time between feeding on palatability in mice

15. Frouke Hermens (University of Lincoln)
   Anchoring effects in calorie estimation

16. Emma Lough*, Emma Flynn* and Deborah M Riby (Durham University)
   Interpersonal distance regulation in children with Williams syndrome: The effect of familiarity

17. Lauren Godfrey*, Chris Walton* and John Towse (Lancaster University)
   "Knowing me, knowing you!" When do social interactions permeate cognitive effects?

18. Francesca Pibiri*, Steven Poulter* and Colin Lever* (University of Durham)
   (Sponsor: Anthony McGregor)
   Single neuron firing in the rat amygdala during social interactions

   Using immersive virtual reality to study morality

20. Janet Mundy*, Phillip L Morgan and Chris Alford* (University of the West of England)
   Using eye-tracking to investigate the role of image-complexity and cognitive strategy use in 3D mental rotation

21. Flora Ioannidou* (University of Lincoln) (Sponsor: Frouke Hermens)
   Don't step on my toes: Gaze allocation when avoiding collisions with others

22. Liam J Norman*, Kathleen Akins*, Charles A Heywood* and Robert W Kentridge* (Durham University and Simon Fraser University, Canada) (Sponsor: Anthony McGregor)
   Surface colour is represented pre-attentively

23. Simone Tuettenberg*, Jessica Komes*, Stefan R Schweinberger and Holger Wiese (Durham University and Friedrich-Schiller-University of Jena, Germany)
   Effects of age in cross-domain immediate repetition priming in face recognition: An event-related potential study
24. **Kathleen Kang**, *Dana Schneider*, *Stefan R Schweinberger and Peter Mitchell*  
   (University of Nottingham and Friedrich Schiller University of Jena, Germany)  
   Interpreting facial expressions: Dissociating neural signatures of mentalizing and classifying

25. **Ralph Pawling**, *Paula Trotter*, *Susannah Walker* and *Francis McGlone*  
   (Liverpool John Moores University) (Sponsor: Ruth Ogden)  
   The rewarding properties of C-tactile afferents revealed through evaluative conditioning

26. **Manon A Krol** and **Tjeerd Jellema** (University of Hull) (Sponsor: Mary-Ellen Large)  
   Observation of individual versus joint actions: An EEG study

27. **Olivia Jones**, *Igor Schindler* and **Henning Holle** (University of Hull)  
   Reducing itch using brain stimulation

28. **Chelsea Orme** and **Daniel T Smith** (Loughborough University and Durham University)  
   The kinematic and psychological effects of pressure in skilled pool players
Transfer of shape-based spatial navigation across the boundary of an arena

Mark Haselgrove, Alastair D Smith and Matthew G Buckley
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mark.haselgrove@nottingham.ac.uk

Cognitive-mapping theories suggest that organisms can encode a global, allocentric, representation of the environmental shape during navigation. Associative accounts of spatial learning, suggest organisms encode shape in a more local and egocentric manner. In two experiments, participants were trained to find a hidden goal (Wi-Fi) within a distinctively-shaped virtual arena, before searching was tested on the outside of the arena. In Experiment 1, participants had to find a hidden goal in a right-angled corner of a kite-shaped arena (e.g. where a long wall was left of a short wall). Experiment 2 used an elongated cross-maze, where the north/south arms were twice as long as the east/west arms. Participants were again trained to navigate, for example, to a corner where the left-hand wall was longer than the right-hand wall on the inside of the arena. In both experiments, tests conducted on the outside of the arenas revealed that participants searched at the corner closest to the trained goal-location. From the outside, the left-hand wall was now shorter than the right-hand wall, thus, participants were not searching in the region that shared the local geometric cues rewarded during training. These results are discussed in terms of cognitive map- and associative-theories of navigation.

Effects of attentional distraction on motion adaptation measured with a bias-free method of visual search

Michael J Morgan and Katharine Hauperich
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It has been suggested [1] that motion adaptation is reduced if attention is distracted from a para-foveal adapting stimulus. However, it has proved difficult to repeat this effect [2-4]. One possibility is that only the early stages of motion adaptation are susceptible to distraction. To test this we developed a visual search method where observers adapted to brief (2 sec) presentations of a 4 x 4 parafoveal array of Gabor patches drifting in random directions. Adaptation top-ups were interleaved with tests in which the same patches were presented for 1 sec, but with one of them moving in the reverse direction to its adaptor. Participants had to indicate with a mouse which patch had changed. Performance (% correct) increased with the number of top-up trials. Attentional distraction was manipulated by a RSVP task at fixation, involving pressing a key when an uncommon red upright cross appeared instead of other combinations of shape and colour. There was evidence in some subjects that distraction impeded adaptation and decreased performance. However, in another version of the task, where adaptation was designed to decrease performance, distraction in some subjects also impeded performance. Distraction may have non-specific effects that persist into a following
test.


Morgan, M.J. (2011). Wohlgemuth was right: distracting attention from the adapting stimulus does not decrease the motion after-effect. *Vision Res* 51, 2169-2175.

Does spatial cueing affect location retrieval from visual short-term memory?

Rob Udale¹, Simon Farrell² and Chris Kent¹
¹ University of Bristol
² University of Western Australia, Australia
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When retrieving visual features, such as colour and shape, from visual short-term memory, evidence suggests that participants also retrieve feature locations, which are represented relative to the spatial configuration of the items in the display. This configural retrieval occurs in the change detection task, when multiple probes are presented, but not when single probes are presented. However, it is unclear whether configural retrieval will occur when a single cued item is probed, within a multi-item display. In a series of experiments, participants indicated whether a new feature had appeared between two sequentially presented displays of three coloured shapes. Participants either needed to make a decision about all of the items, or only a single, spatially cued, item. The test display items were presented in either their original locations, or in new locations. The colour-shape bindings also either remained the same or were switched between items. Participants appeared to retrieve the display’s configuration, irrespective of whether they made their decision about only a single item, or the entire display. Some participants apparently did not retrieve the display’s configuration, if they were able to report the cued location. Results are discussed in relation to models of relational encoding in visual short-term memory.

Beyond egocentric and allocentric: Tracing developmental changes in landmark use with virtual reality

James Negen, Hannah Roome and Marko Nardini
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We created a new virtual-reality paradigm for examining the development of the spatial
representations that are used in immediate spatial recall. In both experiments, children were shown a duck in virtual duck pond, asked to remember where it was, 'teleported' to a new viewpoint, and then asked to point to the duck's location. In Experiment 1, children aged 3.5-4.0 years were able to pass control conditions – they performed above chance when there were viable egocentric strategies. Children 4.0-4.5 were able to point to the duck when 'teleported' to a new viewpoint, leaving only allocentric strategies. In Experiment 2, additional symmetric landmarks were used. Children 4.5-5.5 were able to point near the correct landmark but did not use the other landmarks to distinguish the two ends. Children 5.5+ also pointed to the correct end. Together, the experiments show early development of basic allocentric coding, at 4.0 years - about a year before children pass similar tasks with tabletop models (Nardini et al., 2006). They also reveal a subsequent developmental progression from single-landmark allocentric to multiple-landmark allocentric representations, not shown by previous studies (e.g. Uttal et al., 2006).


Mentalising the body: Spatial and social cognition in anosognosia for hemiplegia

Paul M Jenkinson1, Sahba Besharati2,3,4, Stephanie J Forkel2, Michael Kopelman2, Mark Solms3 and Aikaterini Fotopoulou4

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2 King's College London
3 University of Cape Town, SA
4 University College London
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Following right-hemisphere damage, a specific disorder of motor awareness can occur called anosognosia for hemiplegia, i.e. the denial of motor deficits contralateral to a brain lesion. The study of anosognosia can offer unique insights into the neurocognitive basis of awareness and social cognition. Typically, however, awareness is assessed as a first person judgement, while the ability of patients to think about their bodies in more ‘objective’ (third person) terms is not directly assessed. This may be important, as right-hemisphere, spatial abilities may underlie our ability to take third person perspectives. We investigated third person perspective taking using visuospatial and verbal tasks in right-hemisphere stroke patients with and without anosognosia, as well as neurologically healthy controls. The anosognosic group performed worse than both control groups when performing the tasks from a third versus a first person perspective. Individual analysis further revealed a classical dissociation between most anosognosic patients and controls in mental (but not visuospatial)
third person perspective taking abilities. Finally, the severity of unawareness in anosognosia patients was correlated to greater impairments in third person, mental perspective taking abilities (but not visuospatial perspective taking). These results suggest that deficits in mental perspective taking may contribute to anosognosia and normal self-awareness.

Perceived body weight similarity and weight stigma modulate the understanding of observed familiar actions

Stergios Makris¹ and Valentina Cazzato²
¹ Edge Hill University
² University of Bradford
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Motor resonance (MR; i.e. the mapping of others’ actions onto one’s own motor repertoire) is influenced by individual differences in personality traits (e.g. narcissism). However, no evidence has been reported so far of the effects of physical appearance and negative attitudes toward obesity to the mechanism of MR. Thirty-six participants (18 normal-weight, 18 overweight) performed an implicit task, in which they were observing amateur actors reaching and grasping a light or heavy cube with or without deception (true vs. fake actions). Physical similarity between observers and actors was manipulated by presenting videos of slim or overweight actors. At the end of each video-clip participants were instructed to indicate the correct cube size (light or heavy). Fat phobic attitudes and automatic preference for thin than fat people were also examined. Signal detection analysis (d’) on the acquired accuracy data has indicated that both normal and overweight participants were able to better simulate the actions performed by the slim as compared to overweight actors. Furthermore, this finding was correlated with increased scores of anti-fat bias in both participant groups. Hence, for the first time we provide experimental evidence of action simulation and understanding being modulated by an implicit preference towards slim bodies.

Appreciation of body shape and motion in adolescent athletes practicing aesthetic and non-aesthetic sports

Valentina Cazzato¹ and Cosimo Urgesi²,³
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² University of Udine, Italy
³ Bangor University
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Body shape may influence performance in aesthetic sports (e.g., gymnastics) and the desire/pressure to get a leaner shape in these settings may play a role in the initiation of Eating Disorders (EDs). Here, we investigated how perception of implied motion and body weight influences body aesthetic evaluation in aesthetic and non-aesthetic sports. Seventeen females competing in rhythmic gymnastics were compared to 17 volleyball athletes in expressing liking judgments about unfamiliar bodies with variable body size and implied motion.
Dynamic bodies were always liked more than static bodies for all body weights in both groups. Furthermore, extreme slim and fat bodies received the highest and lowest liking scores respectively in both groups, but the effect of extreme body weight was higher for the gymnastics than for the volleyball athletes. This effect was body-specific, since no such modulation was observed when athletes judged a familiar object. Results show that the appreciation of human bodies in aesthetic sport athletes is more influenced by body shape as compared to non-aesthetic ones, pointing to their greater susceptibility to extreme thin-body ideals. These findings are in keeping with the view that being involved in aesthetic sports in adolescence may be a risk factor for developing EDs.

**Theory of mind inferences contextually influence the recognition of emotional facial expression**

Suzanne L K Stewart¹, Astrid Schepman¹, Matthew Haigh², Rhian McHugh¹ and Andrew J Stewart³

¹ University of Chester  
² Northumbria University  
³ University of Manchester  
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Research shows that the recognition of emotional facial expressions is often subject to contextual influence. We investigated whether spontaneous, incidental theory of mind inferences made while reading social vignettes produced contextual effects on the ability to identify emotions from subsequently presented faces that were either of the same valence (Experiment 1: anger - fear) or of a different valence (Experiment 2: happiness - sadness) to the vignettes. Our findings demonstrated a reaction time penalty when the specific facial emotion was incongruent with the preceding theory of mind inference in both experiments and occurred regardless of valence (anger – fear; happiness – sadness). However, an increase in errors was found only when mismatching facial emotions and theory of mind inferences shared the same valence (anger - fear). We conclude that spontaneous, incidental theory of mind inferences made at the pragmatic level of a text act as a contextual influence on the decoding of emotional facial expressions, suggesting that even differently valenced emotions are “confusable” early in the perceptual process.

**Lateralized categorical perception of facial emotional expressions**

Michael Burt and Markus Hausmann  
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Categorical perception of colour (i.e. better discrimination of same sized physical differences between rather than within category) has been found to be lateralized to the right visual field (RVF) probably due to left hemisphere lexical coding of colour (Franklin et al., 2008). Here we investigate whether the left hemispheric dominance in categorical perception
also applies to emotional facial expressions. Participants discriminated between pairs of laterally presented faces indicating which face matched a previously presented central stimulus. When the task was presented without further instruction, categorical perception of emotional facial expressions was, as predicted, lateralized to the RVF consistent with left hemisphere lexical coding. However, when participants were aware that the task involved facial expressions, having previously categorized facial expressions, categorical perception was present in both visual fields. Thus, spontaneously perception results in facial expression category processing by the left hemisphere, implicating lexical coding, but categorical coding of information initially processed by the right hemisphere seems dependent upon prior knowledge which presumably effects strategy.

Reflexive eye-gaze and callous-unemotional traits

Luna C M Centifanti¹, Matthias Gamer² and Nicholas Thomson¹
¹ Durham University
² University of Wuerzburg, Germany
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It is hypothesized that the aberrant fear processing in disruptive behavior disorders and CU traits is related to reduced shifting of attention towards the eyes, which are most diagnostic for fear recognition (Dadds et al., 2006; Gamer et al 2009). Children (N=73; 84% male) from special schools were presented with fearful, angry and happy faces that were shifted vertically so as to assure initial fixation was either on the emotion-diagnostic (i.e., the eyes for fear) or non-diagnostic (i.e., the mouth for fear) facial features. Children with disruptive behavior disorders were unlikely to shift attention to the diagnostic region when viewing a fearful face, and this was moderated by callous traits which made this reflexive shift to the eyes more unlikely (controlling for anxiety). Further, callous traits were related to deficits in reading fear in faces. Thus, the combination of DBD and callousness may involve deficits related to proper functioning of the amygdala, which guides attention to the eyes. A useful target in interventions to curb callously disruptive behavior problems may be the lack of attention to the salient features of the face to understand and decode fear.


Developmental prosopagnosics have impaired perception of contrast information in the eye-region that is salient for identity processing

Katie Fisher, John Towler and Martin Eimer
Birkbeck College, University of London
Facial contrast signals, particularly from the eye-region, are extremely important for face perception and recognition, as shown by the poor recognisability of contrast-inverted face images. Individuals with developmental prosopagnosia (DP) have severe face recognition problems which may arise from deficits in the perceptual processing of facial contrast information. To test this hypothesis, we measured N170 components in DP participants and age-matched controls in response to face images where the contrast polarity of the eyes and of the rest of the face was independently manipulated. In the Control group, contrast-reversal of the eyes resulted in enhanced and delayed N170 components, irrespective of the contrast of other face parts. In the DP group, these effects of eye contrast on N170 amplitudes were significantly reduced, demonstrating that perceptual face processing in DP is less well tuned to contrast information from the eye region. N170 modulations elicited by the contrast of face parts outside the eye region did not differ between DPs and Controls, indicating that DPs are not generally insensitive to face contrast. These results provide new evidence that a selective deficit in processing identity-related information provided by contrast signals from the eye region may contribute to the face recognition impairment in DP.

**Electrophysiological evidence for parts and wholes in visual face memory**

John Towler and Martin Eimer  
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It is often assumed that upright faces are represented as non-decomposable wholes, while representations of inverted faces are part-based. To assess this hypothesis, we recorded event-related potentials (ERPs) during a sequential face identity matching task where successively presented pairs of upright or inverted faces were either identical or differed with respect to their internal features, their external features, or both. Participants’ reported on each trial whether the face pair was identical or different. To investigate the structure of visual face memory, we measured N250r components that emerge over posterior face-selective regions during the successful match between a face and a visual face memory. N250r components to full identity repetitions were delayed and attenuated by face inversion, demonstrating that inversion quantitatively impairs face identity matching processes. For upright faces, N250r components were elicited by partial face repetitions, and the N250r to full identity repetitions was super-additive (i.e., larger than the sum of the partial repetitions). These results demonstrate that holistic representations are involved in identity matching processes, however, face identities are not exclusively represented as non-decomposable wholes. For inverted faces, N250r components to full and partial identity repetitions were strictly additive, indicating that identity matching operated in an entirely part-based fashion.

**Left and right in categorizing the faces of politicians from different countries**

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Previous work has been somewhat inconsistent as to whether the political leaning of an individual can be guessed simply from a photo of their face. Our research provides robust evidence from two large experiments (+100 participants in each), that the political leanings of individual politicians are identifiable merely from a picture of their face. Our first study also extends these findings by demonstrating that participants are above chance in classifying politicians as left or right wing, even when they come from different countries (t=17.4, df=111, p<0.0001, 95%CI=55.46%-56.86%, BF=2.1e30). Thus suggesting that the distinction between left and right provides a useful framework across different countries, although it also suggests limits to the universality of this distinction, as participants were not above chance in classifying politicians from a number of former members of the soviet union. Our second experiment tests what features of a face are being used by participants to make this classification by testing whether the internal (mouth, eyes, nose) or external (shape of the face, hair style) features have more influence. This second experiment provides evidence that, whilst participants are significantly influenced by internal features alone, the external features have a larger influence (t(103)=4.8, p<0.0001, 95%CI=7%-17%, BF=4428).

Investigating the neural mechanisms underlying the relationship between similarity and liking

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Discovering that another person shares our preferences tends to lead to greater feelings of affiliation, however the neural mechanisms by which such shared preferences influence judgments of affiliation are unclear. We investigated this issue in an fMRI study. 25 participants (11 male) made judgments about which of two pieces of artwork they preferred and then saw the decisions of two confederates. The decisions of the confederates were manipulated such that one of them agreed with the participants’ choices in 75% of trials while the other agreed in only 25% of trials. Participants completed 80 trials overall and rated the confederates on their similarity and likeability after every 20 trials. Behavioural results showed that participants rated the similar choice confederate as more similar to them and likeable than the different confederate. fMRI data showed that observing the different compared to similar confederate led to greater activation in the right orbitofrontal and bilateral medial prefrontal cortices, areas that have been previously linked to social learning and the representation of value. These findings shed light on the brain mechanisms underlying our judgements of others based on our shared preferences.
Getting lost during navigation: The unconscious processes

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Navigation is the cognitive activity shown by most animals to remember and go to a specific location. It is common belief that there are two main schemes to accomplish navigation tasks, i.e., a primitive method called path integration that is possessed by most animals but has many limitations, and an advanced, fundamentally different system called cognitive map that is more powerful and flexible but can be achieved only by certain animal species. However, recent studies showed that the map-like behavior in humans is actually accomplished by a dynamic process called spatial updating, which is an extension from the path integration system. In this talk I will discuss how path integration and spatial updating work, the properties of such a navigation system that lead to people easily getting lost in certain environments, and how to overcome those difficulties.

Neural encoding of three dimensional space during foraging in rats

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Early studies of spatial learning in animals, especially rats, considered all learning to be stimulus-stimulus or stimulus-response based. However, when technology to enable single neuron recording in behaving animals was developed in the 1960s and 70s, and the spatially encoding "place cells" were discovered, it became evident that much spatial learning occurs latently when animals are foraging in an undirected way. This talk will review the spatially encoding neurons, which include - in addition to place cells - head direction cells and grid cells. Recently, we have begun to explore how these neurons encode space when the animal moves vertically as well as horizontally. Vertical movement is relevant to foraging because it requires more effort, and increases pressure on the system to discover optimal algorithms with which to explore the space efficiently. With both behavioural and single neuron experiments we have studied foraging in vertical vs horizontal spaces and have concluded that the brain constructs (in a latent manner) planar representations of the space, which privilege the horizontal dimension and lead to behaviour that is organised in a layer-like fashion.

Visual search during active locomotion in complex virtual environments: an eye-tracking study

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The process of visually searching for target objects, particularly while moving through the environment, can be conceptualised as a special form of foraging. We present results from a visual search task in which participants 'walked' through complex virtual indoor environments, while their gaze behaviour was recorded. Participants were first presented with a static view of the environment (static visual search) and instructed to search for a target object. If they found the object they pressed a button and then walked towards it to 'pick it up' (visual approach). If they did not find the object in the static scene, they actively navigated through the environment, searching until they spotted it (visual search + locomotion), and then walked towards the target to pick it up (visual approach). The comparison of eye-tracking data between these three distinct phases allowed us to disentangle the specific contributions of search and locomotion to gaze behaviour. Moreover, by combining virtual environments with eye-tracking technology we were able to translate the attended screen locations into 3D coordinates in the virtual environment, which allowed for novel analyses taking the three-dimensional structure of space into account. The results are discussed in the context of established effects in visual search.

**In all probability: Spatial statistics and search behaviour**

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Models of human foraging behaviour state that decisions between search areas are made on a probabilistic basis, with foragers directing their inspections according to the perceived likelihood of success. In the laboratory, cueing by spatial statistics has been studied using the visual search paradigm, and participants are found to reliably bias their search to the portion of the array within which the target is more likely to appear. Moreover, this probability cueing effects tends to operate below the level of conscious awareness. Over the last few years we have been exploring whether probability cueing can be reliably observed in a large-scale foraging-like search context, and I will discuss some of our formative findings. This includes the circumstances under which cueing is observed, the spatial reference frames within which it operates, and individual differences in sensitivity to cues (with particular reference to autism). I will then discuss current work from my laboratory that addresses whether probability cueing can transfer between different search environments, and whether sensitivity to spatial statistics can be modulated by transcranial direct current stimulation to the posterior parietal cortex.

**Learning directed by saliency in large scale search**

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Humans may use cues such a saliency to learn how to navigate a novel environment. We report two experiments in which participants searched in a room containing an array of
illuminated locations embedded in the floor. The participant’s task was to press the switches at the illuminated locations on the floor to locate a target that changed colour when pressed. The perceptual salience of search locations was manipulated by having some locations flashing and some static. In Experiment 1 the target was either always under a salient location or was always under a less salient location. Participants were more likely to learn this regularity, and to learn it more quickly, when the targets were at the salient locations. In Experiment 2 we replicated this effect under conditions where the target was more likely to be under the more or less salient locations. We suggest that this learning effect in large scale search is a result of enhanced encoding of salient locations in memory which in turn leads to the learning of the regularity in the environment.

Foraging and cognitive assessment in healthy ageing

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Realistic tasks that mimic the requirements of everyday activities have been claimed to be the most appropriate for the assessment of cognitive change in human ageing. From an evolutionary perspective, ecological validity pertains more to the conditions where cognitive skills emerged in the course of our natural history than to our current environment. Thus, we tested younger (below 35) and older (above 65) participants in a computerised foraging task based on studies of primate foraging for ephemeral fruit resources under conditions that have been claimed to have triggered the evolution of large brains in primates. Ageing negatively affected: 1) the identification and long-term retention of locations that needed to be avoided as they never yield reward, 2) the monitoring of multiple spatio-temporal patterns of reward availability that enabled the prediction of reward location in each trial and 3) working memory needed to avoid wasteful revisits of locations explored in each trial. With task practice the difference in foraging efficiency of older and younger participants was reduced. We discuss these results in relation to the potential of measures implicitly afforded by simple foraging tasks as a test battery for the assessment of cognitive decline in ageing.

Rethinking attention: When attended perception deactivates fronto-parietal regions

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Many attentional theories see the role of attention as amplifying and broadcasting perceptual representations beyond sensory cortices. However, these and related empirical studies conflate attention to an event with the goal related consequences of the attended event. The two, however, are different issues, and not all events attended to during task execution are consequential for the goal, e.g. the entire pile of papers being searched through is sequentially
attended, unlike other parts of the desk, but all papers other than the target are inconsequential to search. We found that fronto-parietal activity was determined by the consequentiality of the task event and not by attention or consciousness. Remarkably, attended but inconsequential events deactivated fronto-parietal regions suggesting that such events, instead of being amplified, may actually be barred from these regions. Likewise, we also found that inconsequential attention grabbing events did not cause attentional blink, suggesting that they did not deplete limited capacity cognitive reserves. We suggest that attention is not a non-specific amplifier/broadcaster of information into the fronto-parietal cortex but a goal directed cognitive tool that can both amplify or inhibit the broadcast of representation under its focus depending on the role of that representation in the ongoing mental program.

The speed of voluntary attention shifts: Evidence from event-related potentials

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How fast are sequential movements of attention between two task-relevant objects? In a previous study (Grubert & Eimer, 2016), we imposed a serial selection strategy by instructing observers to first find a digit in a known target colour (T1) and to compare it to another digit in a different unpredictable colour (T2). N2pc components to T1 and T2 were measured as electrophysiological markers of their attentional selection. The N2pc to T2 emerged only 60 ms later than the N2pc to T1, suggesting that sequential attentional selection processes can operate very rapidly. However, the selection of T2 objects may not have been fully endogenous because these objects always had a distinct colour. To eliminate such priority-based attentional control mechanisms (Horowitz et al., 2009), we conducted two new N2pc experiments that required purely voluntary attention shifts to T2. Observers first selected a colour-defined benchmark (T1) and then shifted attention to a T2 object that was defined relative to the location of T1 (e.g., clockwise or counterclockwise). These endogenous attention movements took much longer than priority-based shifts (approximately 175 ms), demonstrating that attentional control operates more slowly when it is entirely voluntary than when it can be guided by bottom-up visual signals.


Rapid parallel attentional selection of multiple objects

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In a recent ERP study, we employed the N2pc component as an electrophysiological index of attentional object selection to show that when two colour-defined objects at different locations appear in rapid succession (with stimulus onset asynchronies between 10 and 100 ms), two parallel attentional foci are established where each selection episode follows its own independent time course (Eimer & Grubert, 2014). We will discuss this recent evidence for rapid parallel attentional selection, and present a series of new experiments investigating the nature of such simultaneous and independent attention allocation to multiple objects. Our experiments demonstrate that efficient parallel attention selection is not restricted to conditions where two colour-defined targets are presented sequentially. Multiple independent and parallel attentional foci are also activated when two targets are presented simultaneously, when target objects are defined by other features than colour or even by feature conjunctions, and also when more than two targets are presented in rapid succession. We also show that such attentional control processes do qualitatively not differ from single-object selection, and are sensitive to temporal sequence information that is inaccessible to conscious report. Together, these findings reveal the dynamic nature and flexibility of attentional selectivity in time and space.


‘Spontaneous’ visual perspective-taking may be explained by attentional orienting that is voluntary, and not reflexive

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Experiments revealing ‘spontaneous’ visual perspective-taking are conventionally interpreted as demonstrating that adults have the capacity to track simple mental states in a fast and efficient manner (‘implicit mentalising’). A rival account suggests that these experiments can be explained by the general purpose mechanisms responsible for reflexive attentional orienting. Here, we report two experiments designed to distinguish between these competing accounts. In Experiment 1, we assessed whether reflexive attention orienting was sufficient to yield findings interpreted as spontaneous perspective taking (‘avatar paradigm’, Samson et al., 2010), when the protocol was adapted so that participants were unaware that they were taking part in a perspective-taking experiment. Results revealed no evidence for perspective-taking. In Experiment 2, we employed a Posner paradigm to investigate the attentional orienting properties of the avatar stimuli. This revealed cue-validity effects only for longer stimulus onset asynchronies, which would tend to indicate a voluntary rather than reflexive shift in spatial attention. Taken together, these findings suggest that attentional orienting does indeed contribute to performance in Samson et al.’s avatar paradigm. However, attention orienting appears to be voluntary, rather than reflexive, perhaps because
the phenomenon measured may be less spontaneous than first thought.


Overlap and interface between simulated knowledge representations

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The question of the interplay between the domain-general and the domain-specific cognitive systems is at the heart of current psychological and neuroscientific research. This general question can be further subdivided into at least two more detailed questions. First, do mental representations that belong to different knowledge domains share properties due to a representational overlap between them? Second, how do different domain-specific processes interface with each other by means of tapping into the same components of the general cognitive architecture (e.g., visual attention)? In my presentation, I will report recent evidence from our research group confirming the existence of both types of representational interplay. First, I will present data from cross-domain priming studies showing that similar organizational principles may underlie representations from different abstract-knowledge systems (e.g. mental arithmetic, time, spatial and emotional semantics). Second, I will report data showing how visual attention may subserve activation of distinct knowledge representations by acting as an interface between them.

A bias-free measure of motion adaptation reveals large individual differences in strength of adaptation

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The strength of the motion after effect usually relies on subjective reports of the duration or speed of the effect (1). This experiment tested a bias-free technique to measure the extent of motion adaptation.

After an adaption period of 2 sec to grids of 4, 9 or 16 moving Gabors and a blank-screen interval of 1 sec, either one of the Gabors (the target), or all but one of the Gabors changed direction. This was expected to make the target pop-out from the display, since it would differ from the distractors either in speed or contrast.

Participants were instructed to move their gaze from the central fixation point to the target. Despite no instructions on target attributes, most observers were above chance in
performance. Performance was no better with 9 Gabors than with 16, showing that explicit memory was not involved. The task was easier if one Gabor changed direction than if all but one did, perhaps because a fast-moving target is more salient than an exceptional slow-moving target. Large individual differences were found regarding task performance, perhaps due to adaptability. An advantage of the method is that these differences cannot be due to report-bias.

The origins of familiarity-based stimulus generalisation

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We report that rats are sensitive to stimulus familiarity in stimulus generalisation testing even when two possible sources of experimental artefact are eliminated. Rats' use of stimulus familiarity is something required in contemporary theories of recognition memory but much evidence for this comes from object recognition experiments that are explicable in alternative terms. Stronger evidence for rats' familiarity sensitivity comes from Pavlovian generalization tests. Pavlovian Tone → shock pairings will result in rats suppressing their instrumental responding for food. That conditioned response (suppression) will generalise to other auditory stimuli, such as a clicker, which can be modified by pre-exposing the tone or the click or both or neither in four groups of rats. Suppression is greater when the familiarity of the tone is matched (both or neither is pre-exposed) than when familiarity is not matched (only the tone or the click is pre-exposed). Artefactual interpretations based on differences in the dis-habituation of unconditioned suppression to the click (Experiment 1) and sensory preconditioning (Experiment 2) find no support and, by elimination, rats appear sensitive to stimulus familiarity as maintained by contemporary theories of recognition memory.

The role of the GluA1 AMPA receptor subunit in time-dependent learning

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Temporal contiguity between events aids the formation of associations, suggesting, that there is a critical temporal window for learning. I will present work that examines the role of the GluA1 subunit of the AMPA receptor in determining the size of the temporal window for learning. The results provide evidence that GluA1 deletion in mice reduces sensitivity to manipulations of temporal contiguity between events, with GluA1 deletion preventing the development of inhibitory learning when events are separated by a short period of time.

Temporal contiguity in associative learning

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Temporal contiguity between the mnemonic activity provoked by different stimuli is a key determinant of associative learning in animals. For example, introducing a trace interval in a simple Pavlovian conditioning experiment disrupts learning. One enduring analysis for this trace-conditioning deficit is in terms of trace decay: with trace conditioning supporting learning only to the extent that a trace of one stimulus (the CS; e.g., a tone) remains active when the other stimulus (the US; food) is presented. Here, we report a series of experiments with rodents that undermines this account and suggests that trace conditioning changes the nature of what is associated: It changes the content of the association.

The role of encoded interstimulus intervals in cue competition and associative interference

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Growing evidence indicates that associative cues predict not only 'what' outcome is going to happen, but 'when' [and 'where'] the outcome will happen. I will review experiments demonstrating that this coding of the interstimulus interval not only influences the timing of conditioned response to the cue in question, but also how the cue-outcome association competes with other associations to the same outcome that were acquired at the same time (i.e., cue competition), and it interferes with the expression of similar associations (i.e., same outcome or same cue) that were acquired before or after the interfering association. Cue competition and associative interference appears to be maximal when the interacting associations encode the same interstimulus interval. The ubiquitous nature of temporal coding in associative learning challenges many neural net models.

How humans learn durations: The importance of integrating wider cognitive resources into models of timing

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It is well established that humans are able to accurately judge and remember the duration of events. Whilst the precise neural mechanism for this remains debated, successful cognitive models of timing suggest that some form of pacemaker-accumulator clock produces the raw representations of duration. For these representations to be used to guide behaviour, they must be encoded into memory. The precise nature of the memory systems used during timing are, however, poorly specified in dominant models (Ogden, Wearden & Montgomery, 2014). For example, Scalar Expectancy Theory (SET: Gibbon, Church & Meck, 1984) includes a reference memory and short-term memory store, however, it does not specify how these relate to established memory systems (e.g. working memory) or the memory systems used in other forms of magnitude judgment (e.g. length and numerosity). In this talk I will discuss evidence suggesting that working memory function is critical to the encoding and
learning of temporal information. I will also present evidence that temporal perception requires different working memory and short-term memory resources than other forms of magnitude judgment. Together, the findings demonstrate a need to integrate models of temporal perception with general memory systems.


Timing and associative learning: Effects of fixed and variable cues on learning

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In a series of experiments we compared conditioning to fixed duration cues with that to stimuli whose duration varied from trial to trial, but was on average matched to that of the fixed stimuli. Fixed duration CSs supported higher levels of conditioned responding, even when testing conditions were equated. Fixed duration cues also showed greater capacity to produce cue competition effects - producing better overshadowing and better blocking than their variable-duration counterparts. These results are consistent with the possibility that the strength of the association between the CS and the US is at least in part determined by the temporal distribution of the CS. Implications of these findings for theories of conditioning and timing will be discussed.

Inhibition and temporal informativeness

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Inhibition develops when a cue signals a decrease in the likelihood of an unconditioned stimulus (US). In error prediction models inhibition develops because a cue signals the omission of expected US's. In contingency models inhibition develops when the rate of US presentation in the presence of a cue is lower than the rate in the absence of that cue. In several experiments we found that even though a cue signals a perfect negative contingency (CS-) its ability to inhibit ongoing behavior does not depend on the fact that it is a signal for non-occurrence of the US rather it depends on the relative increase in the delay to the next US
signaled by that cue. However, in addition to signaling longer delays to the next US, this increase makes the absence of the CS more informative about when US’s will occur. Surprisingly, inhibition appears to be inversely related to the informativeness of positive CS’s rather than based on information conveyed by an inhibitor about the US. Inhibitors may convey information about the absence of valued conditions not information about when US’s will occur.

**Exploring the temporal and spatial dynamics of the semantic network using TMS and fMRI**

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Convergent findings have elucidated the regions involved in semantic cognition. The anterior temporal lobes (ATL) act as a hub for multimodal semantic processing alongside modality-specific ‘spoke’ regions. Areas of inferior parietal, posterior temporal and frontal cortex are necessary for the controlled access and manipulation of semantic representations. However, critical questions remain regarding the spatial and temporal dynamics of the ATL and semantic network. Using chronometric TMS, the ATL was found to be necessary for semantic cognition from 400ms post-stimuli presentation. This time is known to be important for multimodal semantic cognition, supporting the central role of the ATL in this process. Dual echo fMRI (designed to preserve ATL signal) was employed to assess how different types of semantic relationships are instantiated within the brain. Distinct hubs have been hypothesised for association (spatially and temporally co-occurring concepts) and conceptual similarity (concepts sharing features). Direct comparison in neurologically intact participants demonstrated reliance on the same set of cortical regions, including the ATL hub. All of the regions consistently activated during semantic cognition were shown to be functionally connected during an explicit semantic task and during the resting-state. This is considered evidence of a cohesive network responsible for semantic cognition regardless of context. This included ventral and lateral regions of the ATL, but not the superior temporal gyrus (instead connected to language-related regions). Overall, these studies add to the hub-and-spoke model of semantic cognition, elucidating the types of relationship involved, how regions interact and the precise temporal and spatial dynamics of these areas.

**Learning perceptual inference**

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Perceptual uncertainty can be reduced by reliability-weighted combination of multiple estimates. Human adults routinely carry out this kind of probabilistic inference during
perception (e.g. Ernst & Banks, 2002), but in children this ability does not develop until after age 10 years (e.g. Nardini et al, 2008). Does this reflect late maturation of human perceptual inference abilities, or more simply the need for long experience with specific perceptual cues? To test this, we are training adults with “new” sensory cues. The maturation account predicts that adults will immediately make optimal perceptual inferences using newly-learnt cues. In Experiment 1, participants (N=10) were trained in using a new sense, echolocation, together with vision, to judge distance. In Experiment 2, participants (N=10) were trained at using two visual properties of new objects to predict their behaviour. In each case, we asked whether subjects reduced perceptual uncertainty by combining newly-learnt cues, in line with optimal inference predictions. Neither experiment showed clear evidence for immediate optimal inference after short (30-60 minutes) training, although a minority of individual participants did show this pattern. We are now testing how performance changes after longer training and which aspects of single-cue learning predict individual differences in use of combined cues.


Theta band activity during physical exercise correlates with memory improvement

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It has been shown that physical exercise is beneficial for cognition, however, the neuronal mechanism underpinning this process is not yet clear. In a study examining the immediate effects of physical exercise on long-term memory, we aimed to investigate the correlation of brain activity during physical exercise with memory performance. Healthy adult participants (n = 18) were asked to memorise a set of 80 stimuli. Subsequently, they were asked either to cycle on an exercise bike for ~30 minutes (2 minutes of warm-up + 6 blocks of 4-minute cycling 1-minute rest) while their EEG was recorded, or to sit on the exercise bike comfortably and watch a documentary for 30 minutes. After a 1.5 hour retention interval period, they were shown 160 stimuli (80 old and 80 new) and were asked to perform an old/new recognition task. The behavioural data showed an improvement in memory performance (exercise 71.11% vs. rest 66.67%, p=0.02). More importantly, the theta band oscillatory activity of an electrode over the dorsolateral prefrontal cortex (DLPFC) was negatively correlated with the enhanced performance (r=−0.48, p=0.04). Results highlight the modulatory effect of physical exercise on neuronal activity and a functional role of theta activity in memory enhancement during consolidation.

“I can’t remember”: The accessibility of memory representations in children’s working
Working memory is an important construct in cognitive psychology and it is critical to understand the nature of memory representations and their contribution to the development of working memory capacity (WMC). Unsworth and Engle (2007) suggested that active maintenance in primary memory (PM) and cue-dependent search in secondary memory (SM) contribute to adult WMC. We report data from five experiments that characterise access to PM and SM in children aged 5 - 10 years compared to adults. We show that (1) PM and SM estimates generated from free recall paradigms demonstrate children’s reliance on PM in comparison to adults more balanced PM and SM distributions; (2) a probed split span task using list segregation and recall probes revealed children’s reluctant split to report representations outside of immediate access; (3) presentation modality, manipulated in the two paradigms influenced the accessibility of memory items and their susceptibility to output interference; (4) alternative experimental paradigms offer important information on measures of PM (serial interleaved items task; Roome, Towse & Jarrold, 2014) and SM (delayed cued recall, cued listening span and conceptual span tasks). Overall the data provide evidence of qualitative and quantitative differences in the nature of adults and children’s representations in working memory.


Spatial boundaries shape long-term event representations

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When remembering the past, we typically recall ‘events’ that are bounded in time and space. However, as we navigate our environment our senses receive a continuous stream of information. How do we create discrete long-term episodic memories from continuous input? Although previous research has provided evidence for a role of spatial boundaries in the online segmentation of our sensory experience, it is not known how this segmentation
contributes to subsequent long-term episodic memory. Here we show that the presence of a spatial boundary at encoding (a doorway between two rooms) impairs participants’ later ability to remember the order that objects were presented in. A sequence of two objects presented in the same room in a virtual reality environment is more accurately remembered than a sequence of two objects presented in adjoining rooms. The results are captured by a simple model in which items are associated to a context representation that changes gradually over time, and changes more rapidly when crossing a spatial boundary. We therefore provide the evidence that the structure of long-term episodic memory, as opposed to perception or short-term memory, is shaped by the presence of a spatial boundary.

The effects of valent irrelevant background speech on serial recall memory

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Immediate serial recall of visual to-be-remembered/TBR stimuli is almost universally disrupted when irrelevant to-be-ignored/TBI auditory stimuli are presented during encoding or retrieval. A body of evidence suggests that the degree of disruption is related to changing state acoustical properties of TBI stimuli and not the meaningful nature of irrelevant background speech. However, Buchner, Rothermund, Wentura, and Mehl (2004) found that meaningful valent TBI distractor words impaired serial recall memory more than non-valent words; with negative speech more disruptive than positive. The current experiment (N = 64) built upon this and employed TBI stimuli from the widely used Affective Norms of English Words/ANEW database (Bradley & Lang, 1999) with different words presented on each experimental trial. Also, TBR items were randomly ordered meaningless number strings. Positive and negative valent distractor words were more disruptive than neutral words with a large effect size. However, negative words were no more disruptive than positive words. TBI valent speech items – irrespective of having positive or negative connotations – do therefore seem to capture attention and interfere with encoding and rehearsal processes involving seriation. Implications for working memory accounts that do not support a role of attention in maintaining items in immediate serial recall memory are discussed.


Applying self-processing biases in an educational context

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When information is processed in a self-referent context, this elicits processing biases
that increase attentional focus, processing efficiency and subsequent memory. These self-processing biases arise early in childhood so may usefully be applied in an educational context. Here, data are presented from two studies that support this proposal. In the first study, children aged 7-9 years (N=79) practised spelling a set of words by generating self-referent or other-referent sentences. It was found that self-referent sentences were longer and produced significantly better performance in a subsequent spelling test, indicating better task engagement and learning. In the second study, 6-9 year old children (N=108) answered mathematical problem-solving questions that either did or did not include a self-referent pronoun, while a simultaneous monitoring task measured attentional availability. It was found that the inclusion of a self-referent pronoun significantly improved task performance—participants’ problem solving was faster and more accurate in self-referent than other-referent questions, and they responded more quickly to the monitoring task while processing the self-referent questions. Together, these findings suggest that applying self-referential strategies in education has potential benefits for children’s processing and learning, and that examining these benefits more broadly should be a research priority.

**Applying the distractor devaluation effect to online impulse buying**

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Using a two-item target localisation task, Raymond, Fenske, and Tavassoli (2003) found that having to select against an abstract item led individuals to subsequently rate this same item less favourably. This phenomenon has been named the distractor-devaluation effect. With the rapid expansion of the e-commerce industry researchers have begun to examine the factors that can lead to online impulse buying, yet the relevance of the distractor-devaluation effect to online shopping behaviour has so far been ignored. We therefore tested the effects of selecting against a number of ‘impulse’ items on a website’s product page during a shopping task on the likelihood that one of these items was purchased impulsively when offered at the checkout page. Two groups (impulse items present on product page, impulse items absent on product page) were tested using a hypothetical university souvenirs website. Trait levels of buying impulsivity were also examined. The presence of the ‘impulse’ items on the product page significantly reduced the likelihood of such items being purchased at the checkout and this effect was not influenced by individuals’ trait levels of buying impulsivity. The conclusions are that if online retailers want to increase the probability of their customers making impulse purchases then they should avoid advertising items on pages whereby individuals may be engaged in another task.
Does ageing affect inhibitory control in a motion flanker task?

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Older adults have been found to have impaired inhibitory control (e.g., Hasher & Zacks, 1988). We assessed whether ageing affects inhibition in a motion detection task with various levels of conflicting stimuli. Twenty younger and twenty older adults had to indicate the motion direction of target dots surrounded by two flanker groups moving congruently or incongruently. In both conditions, the percentage of flanker dots moving in a coherent direction varied, thus leading to different levels of conflict (i.e., 40%, 60%, 80%, or 100% moving congruently or incongruently). Results showed slower reaction times (RTs) for incongruent than congruent trials. Overall RTs and the flanker cost (difference between incongruent and congruent trials) increased with conflict level. Although older adults were slower than younger adults, the two age groups showed similar flanker costs. This suggests that inhibitory control was not affected by age and conflict levels affected inhibitory control to same extent in younger and older adults. In older adults, furthermore, faster motion perception was associated with larger flanker costs, suggesting that stimulus perception speed can modulate inhibitory control. In addition to this study, we will present a replication study comparing the motion flanker task to a static flanker paradigm.


Investigating magnitude processing and inhibitory control in ageing with the number Stroop paradigm

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Recent research indicates that basic numerical abilities may be preserved in ageing (e.g. discriminating two Arabic digits or sets of dots: Cappelletti et al., 2014; Norris et al., 2015). Quantity discrimination tasks have most often been used to study basic numerical abilities in ageing, with the number Stroop paradigm administered as a measure of inhibitory control. In the present study, two number Stroop tasks (physical and numerical) were used to measure magnitude processing. In the physical task, participants ignore the numerical magnitude of a pair of digits and indicate which is physically largest. In the numerical task, physical size is ignored whilst selecting the larger number in terms of numerical magnitude. The current study directly investigated the impact of age, distance, and congruency on number Stroop performance to further explore symbolic numerical processing and interference effects in older and younger adults. Interference effects were found for the physical and magnitude
tasks. Older adults were slower, and demonstrated a slight distance effect during the physical task compared to younger adults. Moreover, older adults presented stronger interference compared to younger adults during the magnitude task only. The results indicate that magnitude processing is preserved in normal ageing, but that impaired inhibitory control results in intrusion from the irrelevant magnitude dimension.


The effect of episodic retrieval on inhibition in task switching

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Inhibition in task switching is inferred from n–2 repetition costs: the observation that ABA task switching sequences are responded to slower than CBA sequences. This is thought to reflect the persisting inhibition of task A, which slows re-activation attempts. Mayr (2002) tested a critical non-inhibitory account of this effect, namely episodic retrieval: If the trial parameters for task A match across ABA sequences, responses should be facilitated due to priming from episodic retrieval; a cost would occur if trial parameters mismatch. Mayr reported no significant difference in n–2 repetition cost when the trial parameters repeated or switched across an ABA sequence, in contrast to the episodic retrieval account. Whilst these findings clearly show episodic retrieval could not account fully for the n–2 repetition cost, whether it has any influence on inhibition in task switching remains unclear. In the present study we provide a replication of the critical aspects of Mayr’s design. We find clear evidence for reduced n–2 repetition costs when trial parameters repeat compared to when they switch. This finding shows episodic retrieval reduces the estimate of inhibition in task switching, which has clear empirical and theoretical implications for researchers interested in inhibitory control.


Contexts control negative contrast and restrict the expression of flavor preference conditioning

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Consumption of a high concentration of sucrose can have either a detrimental, negative
contrast effect or a facilitatory, preference conditioning effect on subsequent consumption of a low concentration of sucrose, depending on the cues that are present during consumption. The roles of context and flavor cues in determining these effects were studied using analysis of the microstructure of licking in mice. Exposure to a high concentration followed by exposure to a low concentration resulted in a transient, context dependent reduction in mean lick cluster size. However, there were no changes in measures of consumption. When a flavor that had previously been paired with a high concentration was paired with a low concentration, there were increases in measures of consumption, but no change in the mean lick cluster size. Pairing a high concentration with a flavor in a particular context before pairing the context and flavor compound with a low concentration resulted in abolishing the expression of the flavor preference conditioning effect on the consumption measures. These results demonstrate that while context and flavor cues have dissociable effects on licking behavior, their interaction has an antagonistic effect on the behavioral expression of memory.

**E-cigarettes: Conditioning and attentional bias**

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E-cigarettes are widely promoted as a nicotine replacement therapy, however the effect of presenting novel odours with nicotine has not been examined. In this study we examined the ability of nicotine to add reward value, through Pavlovian conditioning, to previously neutral olfactory cues, using E-cigarettes. We also examined attentional bias towards E-cigarette related cues. 25 E-cigarette users were trained in a within subjects procedure such that one flavour was paired with nicotine and one flavour was paired with placebo.

Although no differences in the liking or preference for the nicotine paired flavour was found, we did find differences in the amount of e-cigarette flavour consumed in a 24 hour period post-conditioning. We also found that even placebo e-cigarette use was sufficient to alleviate craving. We found evidence of attentional bias toward e-cigarette related stimuli, however this was not attenuated by the nicotine paired odour.

These results suggest that the visual and olfactory cues of e-cigarettes can form part of the constellation of cues that maintain nicotine dependence, and that e-cigarettes provide cues that are effective at alleviating craving.

**The low prevalence effect in mammograms: Computer aided detection both benefits and impairs visual search for cancers**

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Previous research has shown that, in visual search, people miss a high proportion of targets when they only appear rarely (Wolfe et al., 2005). This ‘Low Prevalence’ (LP) effect is
alarming as it highlights the high miss errors that could potentially occur in real world search (e.g., radiologists searching mammograms for low prevalence cancers). Recent research has focussed on trying to understand and combat this LP effect. However, this research has mostly used visual search displays consisting of letter stimuli (e.g. search for Ts among Ls), thus it remains unknown whether the LP effect occurs in more realistic mammogram displays. We examine this further. Experiment 1 replicated the LP effect using mammograms containing simulated cancers. The results showed that observers missed more cancers under LP conditions compared to when the target had a high prevalence. Experiment 2 examined the influence of Computer Aided Detection (CAD) to help observers find cancers. CAD is a diagnostic tool that prompts observers to ‘suspicious’ areas which may contain a cancer. The results showed that if CAD correctly identified a cancer, miss errors were reduced. However if CAD failed to highlight a cancer, miss errors were increased in comparison to a no CAD baseline.


**Failure to use probability of success in deciding how to distribute effort over multiple goals**

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Difficult tasks should be attempted one at a time, while easy tasks can be undertaken in parallel. As obvious as this sounds, we recently demonstrated a profound failure of participants to apply this simple logic. Here we asked whether participants fail due to imprecise estimation of information about their probability of success. Participants first chose a place to stand to try to throw a beanbag into one of two hoops. The distance between hoops varied from trial to trial. After their choice, we told participants into which of the two hoops to throw the beanbag. To maximise throwing performance, participants should choose to stand midway between the hoops when they are close together, and near one hoop when they are far apart. As we have shown previously in a variety of tasks, none of our participants successfully applied this optimal strategy. Moreover, when we asked participants to verbally report their odds of successfully throwing the beanbag into each hoop from the location they had chosen, estimates were highly accurate. Nonetheless, participants failed to use this information appropriately to maximize success, suggesting a failure of insight, rather than limited or inaccurate information, can account for their suboptimal decisions.

**How many words do we know? Practical estimates of vocabulary size dependent on word definition, the degree of language input and the participant's age**

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Based on an analysis of the literature and a large scale crowdsourcing experiment, we estimate that an average 20 year old native speaker of American English knows 42,000 lemmas and 4,200 non-transparent phrasal expressions, derived from 11,100 word families. The numbers range from 27,000 lemmas for the lowest 5% to 52,000 for the highest 5%. Between the ages of 20 and 60, the average person learns 6,000 extra lemmas or about one new lemma every two days. The knowledge of the words can be as shallow as knowing that the word exists. In addition, people learn thousands of inflected forms and tens of thousands proper nouns (names), which account for the substantially high numbers of ‘words known’ mentioned in other publications.

Colour reduces discomfort in migraine

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Patterns of stripes with certain spatial characteristics are generally uncomfortable to look at, but particularly so for people with migraine. When observing gratings, individuals with migraine report photophobic symptoms at a lower contrast than headache-free individuals (Mulleners et al 2001). Individuals with migraine (9 with aura and 8 without) and 10 headache-free controls observed text in a colorizer (Intuitive Colorimeter) that illuminated the text with coloured light and permitted the separate control of hue and saturation at constant luminance. They found a colour that was “comfortable” and one that was “uncomfortable” for viewing the text. Under each colour, six gratings of increasing contrast were then presented until the participant experienced discomfort. The threshold contrast at which discomfort occurred differed significantly for comfortable and uncomfortable colours. The threshold for uncomfortable colours was significantly lower in the migraine group but not in the control group. A coloured light identified as comfortable by an individual with migraine appears to reliably reduce perceptual distortions and improve clarity.


Co-registration of eye movements and fixation-related potentials to investigate degradation and word frequency effects during reading

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Previous event-related potential (ERP) experiments investigating visual word
recognition have mainly focused on late ERP components. In these experiments, words are typically presented centrally, one at a time. Here, we recorded eye movements and ERPs simultaneously in a boundary paradigm experiment (Rayner, 1975) to investigate foveal and parafoveal lexical processing in normal reading. Target words embedded in sentences were manipulated for degradation (identical vs. degraded) and word frequency (low vs. high). Eye movement data were analysed for the pre-target, target and post-target words and ERP analyses for early components time-locked to fixation episodes (pre-target, target and post-target fixations). Degradation affected fixations and ERPs (P1 or N1 components) for all three regions. Frequency effects occurred in the eye movement record for the target and post-target words, and ERPs, P1 and N1 components, for the target and post-target words respectively. Robust interactive effects in ERPs occurred at the target (and were marginal for the pre-target word). Our results demonstrate the effectiveness of our co-registration technique, and provide insight into the neural correlates of visual and lexical constraints on word identification across fixations. We will focus on the time course of effects in the discussion of our findings.

**Semantic neighborhood density effects in word identification during normal reading**

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Two eye movement experiments investigated the effect of a word’s semantic neighborhood density (SND, Shaoul & Westbury, 2010) on its lexical identification during normal reading. In Experiment 1 we demonstrated robust SND effects for early and late eye movement measures of reading time. Words with high SND were read faster than matched words with low SND. In Experiment 2 we showed that word frequency and orthographic neighborhood modulated SND effects, such that they were greater for high than low frequency words, and reduced for words with more than fewer neighbors. The results suggest that semantic representations associated with a word are activated early in reading, and that these constrain unique word identification. We discuss our findings in terms of Stolz and Besner’s (1996) embellished Interactive-Activation model of word identification (McClelland & Rumelhart, 1981), and in relation to models of eye movement control during reading.


Adult age differences in Chinese reading: Effects of character complexity

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Older adults produce characteristic patterns of age-related reading difficulty for both alphabetic and non-alphabetic languages. But while this reading difficulty is a likely result of visual and cognitive declines in older age, its precise nature is yet to be fully understood. The present research focused on the role of visual complexity, which is a probable source of reading difficulty (see Wang, He, & Legge, 2014). Chinese is ideally suited to investigating such effects, as Chinese characters are formed from differing numbers of individual brush-strokes but always occupy the same square area of space, and so effects of visual complexity are not confounded with word length. In our experiment, young (18-28 years) and older (65+ years) adults read text containing interchangeable high-complexity (>9 strokes) or low-complexity (<=7 strokes) two-characters words that were matched for lexical frequency and predictability. Typical patterns of age-related reading difficulty were observed. But, in addition, an effect of visual complexity in fixation probabilities and gaze durations for the target words was greater for the older adults. The indication, therefore, is that the older readers had particular difficulty processing the more complex words. We discuss these findings in relations to the specific visual demands associated with Chinese reading.


Rhythmic and melodic input presentation facilitates gender-like category induction in language learning

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Acquiring the gender of nouns has been claimed to be virtually impossible unless nouns provide reliable semantic or phonological gender-relevant cues. However, learners might exploit syntactic cues, such as nominal inflection, to infer the gender of gender-unmarked nouns. Indeed, in children’s poems and songs, such syntactic cues are presented in a highly structured fashion. We assessed gender-like category induction for unmarked nouns, training participants with a structured or an unstructured artificial input presented in a prose fashion with neither rhyme nor melody, a rhyming, a melodic or a melodic and rhyming fashion. Input structuring significantly facilitated gender-like category induction. Participants trained in the rhyme-and-melody mode achieved significantly better results than participants trained in the
prose mode. The rhyme-only and melody-only modes yielded intermediate results. Thus, a highly structured linguistic input presented in a rhyming and melodic fashion substantially facilitates gender-like category induction.

**Music-induced changes in functional cerebral asymmetries**

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After decades of research, it remains unclear whether emotion lateralization occurs because one hemisphere is dominant for processing the emotional content of the stimuli, or whether emotional stimuli activate lateralised networks associated with the subjective emotional experience. By using emotion-induction procedures, we investigated the effect of listening to happy and sad music on three well-established laterality tasks. Participants listened to either one emotional excerpt, or sat in silence before completing an emotional chimeric faces task, visual line bisection task and a dichotic listening task. Listening to happy music resulted in a reduced right hemispheric bias in facial emotion recognition and visuospatial attention and increased left hemispheric bias in language lateralization. Although listening to happy music increased positive emotional state, mediation analyses revealed that the effect on laterality was not mediated by music-induced emotional changes. The direct effect of music listening on lateralization was investigated in an additional experiment in which tempo of the happy excerpt was manipulated by controlling for other acoustic features. However, the results made it rather unlikely that tempo is the critical cue accounting for the effects. We conclude that listening to music can affect laterality independent of music-induced changes in the emotion state.
Task switching: The reliability of Backward Inhibition

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Backward Inhibition (BI, Mayr & Keele, 2000) seen in task switching is the effect of slower response times when performing a recently completed task (e.g. an ABA sequence), compared to performing a task that was not recently completed (e.g. a CBA sequence). BI is thought to reflect cognitive inhibition of task representations and has been shown to be robust (e.g. Koch, Gade, Schuch, & Philipp, 2010). As such, BI has started to be used as a measure of individual differences in inhibitory control (e.g. Fales, Vanek, & Knowlton, 2006; Whitmer & Banich, 2007), but its reliability as a measure has not been assessed. The current study aimed to address this important issue. Seventy-eight participants were recruited; participants performed three task switching paradigms, alongside the Rumination Responses Scale and the Digit-Symbol substitution processing speed task – measures of individual characteristics expected to potentially affect the size of BI. The reliability of BI in each of the three paradigms was analysed using the split-half reliability method. The correlation between BI across each paradigm was also assessed. The results and implications for the utility of the BI for measuring individual differences in cognitive control are discussed.


Investigating the effects of interruption and incubation on verbal insight problem solving ability

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The current experiment compares incubation and interruption as possible methods to improve verbal insight problem solving (IPS). Whilst some prefer to ‘walk away’ from a challenging IP to think about a possible solution, others (especially in busy workplace environments) may switch to another task. However, switching to another task will interrupt
thought processes linked to the primary IP. We assert that incubation will free-up cognitive resources and better facilitate representational change whereas interruption will stretch cognitive resources and possibly even impair IPS. We also predict that longer incubation periods will be more effective whereas longer interruptions will further impair performance. A 3 (method: control, incubation, interruption) \times 2 \text{ (duration: 30-seconds/short, 120-seconds/long)} repeated measures design was employed and participants (N = 24) solved six verbal insight problems. Participants were interrupted by arithmetic matchstick problems. Time taken to solve problems and number of attempts were recorded. As predicted, there was a significant interaction between method and duration with a longer incubation period facilitating faster IPS. Additionally, interruptions were disruptive irrespective of the duration of the interruption. Practical implications for workplaces are discussed as well as implications for theories of both task interruption and IPS.

Further tests of a procedure for training insight problem solving

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An experiment tested procedures for training insight problem solving. Two variables were manipulated orthogonally, type of training (control, divergent thinking, assumptions and barriers) and form of presentation (instructor versus scripts) yielding a \(3 \times 2\) design. The dependent variable was a battery of five spatial insight problems, scored 1 if solved and 0 if not, yielding scores ranging from 0 to 5. Sixty-one participants were randomly assigned to conditions with approximately equal \(n\) per cell.

Results were analyzed with a factorial ANOVA, yielding a significant main effect of type of training and a significant interaction effect. Bonferroni comparisons indicated that instructor training in overcoming assumptions and barriers was significantly more effective than either instructor based control or divergent thinking training. It was also more effective than script-based control training. No other differences were significant. While the results support that our previous findings on training insight performance (Walinga et al), the failure of script-based training is inconsistent with other reported findings (Krysikou). Future research will compare different forms of scripts.

Rumination is positively associated with problem-solving in social and risk-based tasks, but not in abstract problem-solving tasks

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Rumination has long been characterised as maladaptive, predicting subsequent onset and duration of depressive episodes. However, recent evidence suggests that rumination comprises
two components: an adaptive, reflective component and a maladaptive, brooding component. A separate but complimentary line of research suggests that non-clinical levels of rumination may facilitate problem-solving. The present study sought to bridge these two literatures by investigating specific aspects of rumination (i.e. reflective, brooding) in relation to performance on a variety of problem-solving tasks in a non-clinical population. Results indicate that reflective rumination is associated with better problem-solving in social and risk-based tasks, but not in abstract problem-solving tasks. Contrary to our hypotheses, brooding rumination did not demonstrate a negative relationship with problem-solving across all tasks. Rather, brooding rumination was found to be associated with better decision making in a risk-based task. These results suggest that the adaptive-maladaptive dichotomy is not as clear as first thought. Instead, we argue that it is the relative balance between reflection and brooding rumination which is critical, such that at non-clinical levels, both reflection and brooding may be adaptive under the right circumstances provided reflective rumination remains the dominant process. Clinical relevance and future directions are also discussed.

Improving prospective thinking in depression: The effect of positive simulations on positive and negative future event appraisals

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Previous research has evidenced that depressed individuals have difficulties with future directed cognitions. For instance, compared with non-depressed individuals, they believe positive events are less likely to occur. Recent work, however, has suggested that episodic simulation of positive future events may represent a useful strategy for improving these difficulties in prospection. The current work examined the usefulness of positive future episodic simulation as a method of modifying how individuals appraise positive and negative future events (vividness, likelihood of occurrence, perceived control, and event importance). Data was collected using both non-dysphoric and dysphoric/depressed participants. Results suggest that positive episodic future simulation can improve prospective appraisals and may represent a useful addition to cognitive therapeutic techniques.

Tonic arousal amplifies selective effects of emotion on memory

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Phasic arousal induced by emotional events is known to enhance some aspects of memory, while impairing others (Sakaki, Fryer & Mather, 2014). The arousal-biased competition (ABC) theory explains these opposing effects of emotional arousal by positing that information which corresponds with our top-down goals (high-priority information) is
enhanced by emotional arousal, whereas information that does not (low-priority information) is impaired (Mather & Sutherland, 2011). However, it remains unclear how the effects of phasic emotional arousal on memory are modulated by tonic/state arousal levels. In the present study, we addressed this issue by manipulating tonic and phasic arousal. Participants were asked to either strongly squeeze a hand-dynamometer (handgrip condition) or relax (control condition) before an encoding phase. During the encoding phase, they were presented with high- and low- priority stimuli, followed by either a negative arousing, or neutral non-arousing tone. The results indicate that tonic arousal increases overall memory for high-priority stimuli. Furthermore, the results yielded a significant interaction between tonic and phasic arousal, such that phasic arousal impaired memory for low-priority items only when tonic arousal was high. These results extend the ABC theory and suggest that tonic arousal amplifies the selective effects of phasic emotional arousal.


The relationship between autobiographical memory and the self in depression

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To date, little is known about how autobiographical memory (ABM) and the self interact in depression. The present study investigated the effects of recalling past events on self identity in individuals experiencing high levels of depressive symptoms. The study employed a 2x2 between subjects design whereby dysphoric and non-dysphoric participants were asked to spend five minutes recalling either positive or negative ABMs. Participants subsequently completed a number of different measures assessing self-continuity and self-concept. The main findings from the study indicated that dysphoric, compared to non-dysphoric, individuals had significantly lower scores of future personal self-continuity suggesting that they feel less connected to who they will be in the future. For both dysphoric and non-dysphoric participants, ratings of future personal continuity are significantly affected by ABM recall, with higher self-continuity ratings following positive compared to negative recall. Findings are discussed in the context of how biases in ABM may serve to maintain depressive symptomatology and how interventions utilising positive ABM recall may enhance feelings of future self-continuity.

Neural correlates of autobiographical memory in young and older adults – an ERP study

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Poster Abstracts

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It is widely agreed that familiarity-based retrieval is preserved in older age, whereas recollection-based retrieval declines. However, it remains unclear whether these findings extend to recognition of self-referential, autobiographical information. In the present study, we used event-related potentials (ERPs) in an ecologically valid photo-paradigm to examine the neural processes involved in autobiographical memory retrieval, and to identify respective age-related changes. Between 300-500ms, photographs of local scenes taken in the hometown of our young and older participants (autobiographical condition) elicited more positive ERP amplitudes than comparable photographs taken by the experimenters (familiar condition) which, in turn, were more positive than unknown scenes. This graded pattern likely reflects familiarity-based retrieval. Between 500-800ms, autobiographical photos elicited more positive amplitudes relative to both other conditions, probably reflecting recollection-based retrieval. Whereas the familiarity effect was similar in both groups, the recollection effect was clearly present, but smaller in the older sample, which was paralleled by highly accurate identification of autobiographical pictures. Our results tie in with previous findings that familiarity remains largely unaffected by aging. Crucially, this study reveals that whereas neural correlates of recollection can be reduced, the underlying processes remain sufficiently intact for accurate recognition of self-referential content in older adults.

Implicit and explicit attitudinal consequences of false autobiographical memories and beliefs

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Past research has found that false autobiographical memories and beliefs of positive experiences involving certain attitude objects can result in explicit attitude change towards that object. Past studies have suggested that that false memories and false beliefs are indistinguishable in their attitudinal effects. We investigate whether these effects extend to implicit as well as explicit attitudes. Using a false-feedback/imagination-inflation paradigm, false memories and beliefs of loving a certain food as a child were elicited in a subset of participants. Consistent with previous research, false memories and beliefs both resulted in participants reporting more preferable explicit attitudes towards the relevant food item post-manipulation (with memories and beliefs having very similar effects). A novel finding was that participants who formed a false memory exhibited significantly more positive implicit attitudes than those with a false belief, whilst those with a false belief did not differ significantly from controls and those who rejected the false suggestion. Another novel finding was that the vividness and level of sensory detail of reported false memories significantly predicted implicit attitude scores towards the relevant item. These results imply that whilst false memories and beliefs may similarly affect explicit attitudes, implicit attitudes are affected selectively by false memories.
Understanding memory for words following amygdala damage

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The emotional enhancement of memory (EEM) describes the advantage of remembering emotional stimuli. Mediation theory suggests that emotion as a category does not enhance memory performance, and it is rather the way we process emotional items at encoding that causes such disparity. This study used an adaptation of the Rey Auditory-Verbal Learning Task to look at memory for emotional and neutral material in detail, including learning rate, retroactive interference, forgetting and recognition. We controlled for all stimulus attributes known to cause the EEM, including semantic relatedness. Apart from an advantage for the first neutral list, compared to the first emotional list, which persisted throughout the task, no difference between emotional and neutral stimuli was found, supporting mediation theory. Moreover, the advantage for the first neutral list may be caused by subtle differences between the word lists rather than by any additional higher-order processes. These findings further replicate previous work suggesting that emotional words are not remembered any differently than neutral ones, and advances it to show that once stimulus differences are controlled, interference and forgetting rates are also equivalent. These findings also help us interpret unpublished data from our lab using a similar testing paradigm with bilaterally lesioned amygdala patients.

A continual trial apparatus to reduce the number of mice used in various memory tasks

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Spontaneous object recognition task and its variants have been widely used to investigate different aspects of memory in Alzheimer’s disease and other neurodegenerative conditions. By running multiple trials within a testing session, Ameen-Ali et al.(2012), managed to reduce the variance normally associated with performing one-trial-a-day. To maximise the potential of the continual trials apparatus, we have adapted the apparatus to test mice. Our findings have shown that with the continual trials apparatus, equivalent statistical significance could be achieved with smaller numbers of mice. This is true in animals at different ages, including older (10 month) animals where behaviour in spontaneous tasks can be difficult to assess. We have also validated the apparatus using a mouse model of Alzheimer’s disease (TASTPM mice). In contrast to some previous reports in the literature, these animals were able to perform the spontaneous object recognition and object-location tasks at 7 and 10 months of age, suggesting that the increased reliability of performance on these tasks can help clarify discrepancies in the literature.
This study, therefore, demonstrates how a simple procedural change can refine a behavioural task leading to reduction in animal numbers. In addition the improved reliability provides clearer understanding of the neural basis of recognition memory.

**It’s not just down to context: Interference and training affect performance on contextual variants of an episodic memory task in rats**

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Episodic memory in rodents is thought to be an integrated representation of components in the environment which make up an event including the memory for What (object) – Where (location) – Which occasion (context/time) (WWWhich). The question raised presently is how rats would perform on a task of episodic memory (for which contextual changes define the occasion being remembered) when intra-maze contextual cues (visual and tactile) were varied along with how the trials were presented: massed or spaced.

Rats were given massed- and spaced-trial versions of the WWWhich task under two conditions where context was defined in a way that mirrored conditions in which place cells do remap (contextually unique) and in a condition where place cells do not remap (contextually identical). Rats that had previously been unable to discriminate the novel configuration in the contextually identical version could perform this task normally when trials were spaced. This performance was maintained when trials were later massed together again. Behaviour was consistent with previous findings that place cells remap according to context. For the massed, but not the spaced trials version of the WWWhich task, training through spacing trials may have overcome interference provided by the contextual similarity of the events.


**The effects of cholinergic lesions of the hippocampus on episodic-like and context-place memory in a new behavioural apparatus**

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Animals’ memory can be assessed through their spontaneous exploration of novel configurations of an environment, but normally animals only complete one trial per day. This means that many animals are required to maintain statistical power and data accumulation is
slow.

This study sought to determine how effectively episodic memory can be tested in a multiple trial apparatus in intact and lesion animals. Previous studies have shown that tasks of episodic (what-where-which) memory are impaired by lesions of the fornix (Eacott & Norman, 2004) and the hippocampus (Langston & Wood, 2010). Animals with acetylcholine depletion of the hippocampus showed no deficit in performance on this episodic memory task. Nonetheless, rats were unable to perform a ‘where-which’ task, which required an association of different places with different contexts (Easton et al., 2011).

Here we replicate this earlier finding in an apparatus where multiple trials are run in a single session, meaning a reduction in animal numbers. The findings demonstrate the reliability of the dissociation within the hippocampus based on cholinergic function within the hippocampus, and verifies the new apparatus as assessing episodic memory in the same manner as earlier studies, improving the reliability of the task and having a significant 3Rs benefit.


An inverted U-shaped function of time between feeding on palatability in mice

Jasmin A Strickland, Joseph M Austen and David J Sanderson
Durham University
jasmin.a.strickland@durham.ac.uk

Recent consumption of a palatable liquid leads to a short-term reduction in consumption and palatability. The time course of this reduction was explored in mice using an analysis of the microstructure of licking. Mice received sessions in which they were allowed two one-minute periods of access to a sipper tube that contained 16% sucrose. The interval between the periods of access was either 5 seconds, 10 minutes or 1 hour. Mice received five sessions with each interval in a pseudo-random order. As anticipated, measures of consumption (number of licks) and palatability (mean lick cluster size) were reduced in the second one-minute period when the interval was 5 seconds, but this was not found with a 10-minute interval. Surprisingly, there was also a reduction in palatability when there was a 1-hour interval. Therefore, the effect of interval on palatability followed an inverted U-shaped function. While the reduction at 5 seconds may reflect a short-term adaptation process, the
reduction at 1 hour must reflect a separate process. A frustrative nonreward account of the performance at the 1-hour interval is discussed.

**Anchoring effects in calorie estimation**

Frouke Hermens  
University of Lincoln  
fhermens@lincoln.ac.uk

Anchoring refers to the finding that if people are presented with an initial estimate, their subsequent estimate of a quantity will be biased towards the initial estimate. This finding has been used in the context of overeating, by serving foods on smaller plates. Here we investigate more explicit anchoring effects on calorie estimation. Participants (N=118) were asked (1) to indicate whether the calorie content of foods was below or above a given number (the anchor), (2) to estimate the calorie content of that food, and (3) to indicate how confident they were about the estimate. Nine foods were tested, which either had (1) no anchor, (2) a high anchor, or (3) a low anchor (with anchors either 30% or 70% larger or smaller than the actual calorie content). Results showed that high anchors led to overestimations and low anchors to underestimations, but no effect of anchor size was found. Anchoring was not systematically affected by the confidence in the estimates, but confidence increased with actual calorie content. The findings suggest that adding a statement ‘less than … calories’ on food labels may make people overestimate the calorie content of the food.

**Interpersonal distance regulation in children with Williams syndrome: The effect of familiarity**

Emma Lough, Emma Flynn and Deborah M Riby  
Durham University  
e.f.lough@durham.ac.uk

Personal space refers to a protective barrier that we strive to maintain around our body. In the current study, we examined personal space regulation in young people with the developmental disorder of Williams syndrome (WS; n = 18) and their typically developing (TD), chronological age-matched peers. The study incorporated a parent report questionnaire (Social Responsiveness Scale, SRS; Constantinno & Gruber, 2005) and an experimental stop-distance paradigm. Individuals with WS were reported by their parents to be more likely to violate the personal space of others compared to TD children. In the experimental stop-distance task, the WS group maintained a significantly shorter interpersonal distance. Interestingly, when children with WS were approached by an unfamiliar adult, they let that individual come significantly closer to them compared to the decisions made by the TD group. Likewise, when the individuals with WS were approaching an unfamiliar adult, they stood much closer than their TD peers, suggesting that WS individuals struggle to regulate their personal space when interacting with unfamiliar people. These differences were not observed with familiar people. Findings are discussed in relation to the wider social profile associated
with WS, and the possible impact of atypical personal space regulation on social vulnerability.


"Knowing me, knowing you!” When do social interactions permeate cognitive effects?

Lauren Godfrey, Chris Walton and John Towse
Lancaster University
l.godfrey@lancaster.ac.uk

A joint action can occur when two or more individuals coordinate their behavioural responses. The Joint Simon Task (JST) is one task used to measure joint action between two individuals. Here, a pair of participants make spatially defined responses (left/right keys) to a relevant stimuli characteristic (colour/shape), in an irrelevant spatial location (left/right display). The Joint Simon Effect (JSE) refers to the finding that participants are slower to respond to an assigned stimuli (i.e. a blue square) when it is presented on the same side of the display as their co-actors response key compared their own (a compatibility effect for their partner’s S-R mappings) see Sebanz, Knoblich & Prinz (2003). We present two JST studies. In the first, a bright blue or yellow square was assigned to each participant and there was no reliable JSE, in the second, left and right arrows were assigned to each participant and there was a reliable JSE. We conclude that the type of stimuli can influence whether or not the JSE appears, which implies that the effect cannot only be a measure of socially-generated co-representation, but can be modulated by non-social factors as well.


Single neuron firing in the rat amygdala during social interactions

Francesca Pibiri, Steven Poulter and Colin Lever
University of Durham
francesca.pibiri@durham.ac.uk

The high prevalence of Autistic Spectrum Disorders (ASD), the hypothesised role of the amygdala in ASD, and the need for rodent models of ASD, all suggest the importance of examining the typical responses of amygdala neurons in rodent social interaction.

As a first step in characterising the rodent social amygdala, we pair Lister Hooded rats in an apparatus where they are free to engage in a variety of positive social interactions with typically infrequent aggressive behaviours. We perform extracellular electrophysiological recordings in the rat amygdala tested in various social and non-social conditions (e.g. familiar rat vs empty cage, familiar rat vs novel rats). In addition, we simultaneously record behaviour with images time-stamped in synchronisation with the electrophysiological recordings. Preliminary results show that there are pyramidal neurons in the rodent amygdala which
respond strongly to social interaction. We have conducted preliminary analysis from 131 neurons (which fired ≥100 spikes per trial) from 3 recording sessions. More than 20% of cells showed changes in the firing rate when a familiar social stimulus was present. Furthermore, the data from one rat revealed that about 20% of the cells increased their firing rate when exposed to a novel compared to a familiar rat.

**Using Immersive Virtual Reality to study morality**

Sylvia Terbeck, Katherine Francis, Charles Howard, Ian Howard, Michaela Gummerum and Giorgio Ganis
University of Plymouth
sylivia.terbeck@plymouth.ac.uk

Previously researchers in experimental social and moral psychology have used vignettes or other paper and pencil methods to investigate judgments of morality; decisions about what is good and bad, what one ought to do. In this study we first used Immersive 3D Virtual Reality (IVR) to create moral dilemma scenarios in which the participant is faced with the decision whether to actively kill one avatar in order to save many others. We found that, unlike in the theoretical vignette condition, most people acted in a utilitarian manner in IVR. Furthermore we found that a bundle of personality variables, including psychopathy, predicted the decision in IVR but not on paper and pencil, or on a control non-moral IVR condition. We suggest that state-of-the-art computer science methods might aid the field of experimental psychology investigating complex realistic decisions.

**Using eye-tracking to investigate the role of image-complexity and cognitive strategy use in 3D mental rotation**

Janet Mundy, Phillip L Morgan and Chris Alford
University of the West of England
janet2.mundy@live.uwe.ac.uk

Gender variation in spatial skills has been associated with female under-representation in STEM education and careers (Hyde, 2014) prompting research into practical improvement interventions. The Mental Rotation Test (MRT) is the classic 3D spatial skills measure (developed by Vandenburg & Kuse 1978 redrawn by Peters, et al., 1995). MRT is used widely to assess the effectiveness of such interventions and in personnel selection. Underlying causes of the male MRT advantage (Voyer et al., 1995 approximated 0.8 – 1.0 SD) are however not fully understood but may be associated with strategy (optimal holistic versus high-cognitive-load analytic) used. The current experiment employed an eye-tracker (ASL 6) to investigate strategy through gaze-activity. Participants (N=53) performed initial MRT, two Operation Span working memory tests and finally a novel MRT. High-quality gaze data (95%+) was found within only 33% of experimental trials, partly because the screen layout was kept in classic MRT format. Nevertheless, and with this limited data set, analysis of eye-fixations, dwell-times and pupil-diameter lends support for the theoretical association between low-
average MRT score and effortful, analytic strategy, and high scorers adopting more efficient holistic strategy. Mirroring widely-used MRT form on-screen does not lend well to fine-grained eye-tracker analysis.


Don't step on my toes: Gaze allocation when avoiding collisions with others

Flora Ioannidou  
University of Lincoln  
(Sponsor: Frouke Hermens)  
fioannidou@lincoln.ac.uk

Previous studies have suggested the importance of gaze allocation in the prevention of collisions with others when navigating (Jovancevic et al., 2006; 2007; 2009). Specifically, it was found that potential colliders and people with changeable navigation behaviour attracted the largest number of fixations from the navigators. The present study aims to confirm and extend these lab and semi-real-world observations to a free-exploration situation within a complex environment with significant distractions (a museum). Twelve participants freely walked around in the McManus museum in Dundee, while their eye movements were recorded with a Positive science mobile eye tracker. Analysis of these eye movements showed, in agreement with the earlier work, that other visitors who were about to collide with the participant were fixated most often and for longer. Future work could address whether similar gaze allocation is applied when navigating less restricted spaces (e.g. a park) and when encountering other potential obstacles (such as cars, cyclists, and pets).


Poster Abstracts


**Surface colour is represented pre-attentively**

Liam J Norman¹, Kathleen Akins², Charles A Heywood¹ and Robert W Kentridge¹
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² Simon Fraser University, Canada
liam.norman@dur.ac.uk

The colour of light reflected from an object is the result of the interplay between the object’s spectral reflectance and the spectral power distribution of the illuminating light. Arend and Reeves (1986) showed that we retain conscious access to two distinct representations of colour – reflected colour (our raw sensation) and surface colour (our judgment of the object’s material colour). There is a common view that we are only able to report on the surface colour, and thus achieve colour constancy, through attentional processing of our representation of reflected colour. Here we test this notion using a feature-based attention paradigm to determine which of these two colour representations forms the basis of the visual system’s pre-attentive representation of an object. By introducing an illuminant change between the onset of the cue and the target-objects we find that the target-objects selected for attentional processing are those that share the surface colour, and not reflected colour, of the cue. As this selection of the objects is, by necessity, determined preattentively, it is concluded that surface colour is in fact the visual system’s preattentive representation of an object’s colour.


**Effects of age in cross-domain immediate repetition priming in face recognition: An event-related potential study**

Simone Tuettenberg¹,², Jessica Komes¹,², Stefan R Schweinberger² and Holger Wiese¹²
¹ Durham University
² Friedrich-Schiller-University of Jena, Germany
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Older adults often experience difficulties in person recognition, such as less efficient access of person-related information. The present study aimed at examining the specific processes underlying age-related changes in person recognition. For that purpose, we examined cross-domain immediate repetition priming, reflected in faster familiarity decisions to a known person’s face when immediately preceded by the same (relative to a different) person’s name, in younger and older adults. In addition to behavioural priming effects, we
further examined neural correlates of cognitive aging by analysing event-related brain potentials (ERP). As expected, younger participants showed faster responses for primed relative to unprimed faces. In addition, a clear N400 priming effect was observed, with more negative amplitudes for primed relative to unprimed targets, indicating facilitated access to domain-general person representations. Older participants revealed slower responses overall, and reduced behavioural priming. Moreover, the N400 priming effect was delayed and temporally restricted in the elderly, suggestive of less efficient processing at a domain-general processing stage. In conclusion, these findings provide novel evidence for specific deficits in person recognition associated with cognitive aging.

Interpreting facial expressions: Dissociating neural signatures of mentalizing and classifying

Kathleen Kang¹, Dana Schneider², Stefan R. Schweinberger² and Peter Mitchell¹  
¹ University of Nottingham  
² Friedrich Schiller University of Jena, Germany  
lpxkykan@nottingham.ac.uk

‘Theory of mind’ studies have often used facial expressions to investigate mentalizing processes. However, it is not known whether perceivers in such circumstances process mental states or whether they engage in a more basic process of classification. The aim of this study was to investigate ERP components for both (mentalizing and classification) processing strategies. In the classification group, participants were asked to choose a photograph (using a forced choice judgment scale), which best represents the facial expression of a target person. In the mentalizing group, perceivers were asked to guess which photograph (using the same judgment scale) targets were looking at, a task that we suppose involves ‘retrodictive mentalizing’ (Gallese & Goldman, 1998). In the classification task, perceivers showed more prevalent ERP components at N170, P200 and P300-600. In later components between 800-1000 ms, there was an interaction between group and hemisphere: Activity in the mentalizing group was sustained over the right hemisphere while activity in the classification group started returning to baseline. These findings suggest that participants do not engage in full-blown mentalizing when merely classifying facial expressions. Instead, such processing might have been reserved for when participants were asked to infer the cause of the target’s expression.


The rewarding properties of C-tactile afferents revealed through evaluative conditioning

Ralph Pawling, Paula Trotter, Susannah Walker and Francis McGlone  
(Sponsor: Ruth Ogden)  
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r.pawling@ljmu.ac.uk
The rewarding sensation of touch in affiliative interactions is hypothesised to be underpinned by a specialised system of nerve fibres called C-tactile afferents (CTs), which respond optimally to slowly moving, gentle touch, typical of a caress. In the current study we employed evaluative conditioning to examine whether CT activation carries an innate reward value. Participants rated the approachability of faces pre and post-conditioning. During conditioning, a subset of each participant’s most neutrally rated faces was paired with robotically delivered touch to their forearm. For half the faces touch was delivered at CT-optimal speed, 3cm/second. For the other half touch was delivered at a faster, CT-non-optimal speed, 30cm/second. Heart-rate was recorded during conditioning. A significant touch by time interaction was found. Whilst rated equally approachable pre-conditioning, post-conditioning faces that had been paired with CT-optimal touch were judged significantly more approachable than those paired with CT-non-optimal touch. CT-touch also caused greater heart-rate deceleration than CT-non-optimal touch, during conditioning. The results offer empirical evidence that CT-touch carries affective value which can be imbued to socially relevant stimuli. Our findings support the theory that CT-touch can reduce arousal levels, perhaps underpinning the role of CTs in social support.

Observation of individual versus joint actions: An EEG study

Manon A Krol and Tjeerd Jellema
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m.krol@2013.hull.ac.uk

The functional role of the mirror neuron mechanism (MNM), which becomes active during both action execution and action observation, is still unclear. We investigated the onset and development of power reductions in the sensory-motor alpha band (8-13Hz; mu rhythm), which were taken as an index for MNM activity, to explore whether MNM activity was differently modulated by dyadic versus individual actions. EEG recordings of 25 typically-developed participants were made during the observation of video clips depicting one or two actors playing a card game governed by a rule, which allowed to predict upcoming actions. Four types of clips were presented: (1) social action involving two acting agents, (2) social action with one acting agent, (3) private action performed by one agent, and (4) no action. The results demonstrated a significant mu reduction in the three action conditions compared to the no-action condition, but the onset did not reveal evidence for MNM activity related to the anticipation of the upcoming actions. Dyadic actions resulted in a somewhat increased mu reduction compared to the individual actions, suggesting a possible modulatory role for the individual versus dyadic nature of observed actions.

Reducing itch using brain stimulation

Olivia Jones, Igor Schindler and Henning Holle
University of Hull
oliviajones567@gmail.com
Chronic disorders of the skin involving intense itching, such as atopic eczema, have become dramatically more common in recent decades, affecting up to 20% of children (Kalliomäki et al., 2001) and 17% of adults (Ständer et al, 2010). This profoundly impacts quality of life and the long term discomfort caused can be debilitating. While good progress has been made in identifying itch-specific receptors and peripheral pathways, surprisingly little is known about the processing of itch in the brain. The current study used a combination of evidence from both neuroimaging research focusing on itch and brain stimulation studies on pain, to locate which cortical areas are likely to be causally involved in the itch process. By temporarily disrupting activity in the somatosensory cortices using Transcranial Magnetic Stimulation (TMS), we aimed to test their role in histamine induced itch. The results indicate that itch can be significantly reduced post-stimulation of Secondary Somatosensory Cortex. The outcome of this study will not only inform current theorising about itch processing in the brain, but may also help to develop potential treatments of chronic itch.


The kinematic and psychological effects of pressure in skilled pool players

Chelsea Orme¹ and Daniel T Smith²
¹ Loughborough University
² Durham University
corme@btinternet.com

It is generally accepted that pressure can lead to performance decrements, otherwise known as ‘choke’. The underlining mechanisms associated with the performance and pressure relationship are less understood. The main aim of this study was to gain insight into these mechanisms by testing both the psychological and kinematic effects of pressure in an untested sport; pool. Participants were required to complete a questionnaire on self-confidence. Self-reported anxiety levels and kinematic responses in two conditions; pressure and no pressure, were then measured. It was found that the pressure manipulation increased anxiety and the extent of this increase correlated with an increase in average movement time, average time to peak velocity, and average time to peak acceleration. However, the pressure manipulation had no significant effect on performance accuracy. Levels of self-confidence had no effect on the analysis and so did not act as a mediator for anxiety. Although the participants did not ‘choke’ under pressure, the results suggest that pressure may have a more sensitive impact on performance and support the predictions of the Conscious Processing Hypothesis (CPH) by showing that pressure causes an action to slow down and become controlled.
Local information

Accommodation

There are 26 en-suite rooms available on campus at a cost of £60.00 per person per night, including breakfast. These will be allocated on a first come/first served basis. Please check availability before sending through your payment. Please book via the accommodation form by 23rd March 2016.

Durham has a range of reasonably bed and breakfast / hotel options located locally (see selection below). However these are not recommendations, and you should check the website and prices before making your booking:

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<th>Name</th>
<th>Address</th>
<th>Booking Contact Number</th>
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<td>8 Moor End Terrace, Durham DH1 1BJ</td>
<td>0191 384 2796</td>
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<tr>
<td>Sniperley Hall (2.7 miles)</td>
<td>Durham, DH1 5RA</td>
<td>0191 680 1158</td>
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<td>Ramside Hall Hotel &amp; Golf Club (2.2 miles)</td>
<td>Carrville, Durham, DH1 1TD</td>
<td>0191 386 5282</td>
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<td>The Town House (0.6 miles)</td>
<td>34 Old Elvet, Durham, DH1 3HN</td>
<td>0191 384 1037</td>
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<td>Radisson Blu Hotel (1.1 miles)</td>
<td>Frankland Lane, Durham, DH1 5TA</td>
<td>0191 372 7200</td>
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<td>King’s Lodge Hotel (1.4 miles)</td>
<td>Flas Vale, Waddington Street, Durham, DH1 4BG</td>
<td>0191 370 9977</td>
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<td>Premier Inn Durham City Centre (1.1 miles)</td>
<td>Freemans Place, Durham, DH1 1SQ</td>
<td>0871 527 8338</td>
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<tr>
<td>Durham Marriott Hotel Royal County (0.7 miles)</td>
<td>Old Elvet, Durham, DH1 3JN</td>
<td>0191 386 6821</td>
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<td>Farnley Tower (1.5 miles)</td>
<td>The Avenue, Durham, DH1 4DX</td>
<td>0191 375 0011</td>
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<td>Eden Terrace, Durham, DH1 2HJ</td>
<td>0191 384 6796</td>
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<td>Seven Stars Inn (0.8 miles)</td>
<td>High Street North, Durham, DH1 2NU</td>
<td>0191 384 8454</td>
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<td>The Avenue (1.4 miles)</td>
<td>Avenue Street, High Shincliffe, Durham, DH1 2PT</td>
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Try ‘This is Durham’ http://www.thissisdurham.com/accommodation/hotels or call the official Durham Visitor Contact Centre on 03000 262626 for more information. Also dedicated hotel booking websites, e.g. http://www.hotels.com

Conference Dinner

The conference dinner will be held at 8pm on Thursday 7th April at Hatfield College, Durham University, North Bailey, Durham, DH1 3RQ. A booking form is enclosed.

The cost will be £32.00 for 3 courses and coffee to follow. EPS members please reserve your place on the enclosed form which should be returned to Carolyn Loughlin, Department of Psychology, Durham University, Durham, DH1 3LE by 23rd March 2016.

Email: carolyn.loughlin@durham.ac.uk

Travel

By Road: Durham city centre is only two miles from the A1(M). Leave the motorway at Junction 62 on the A690 Durham - Sunderland road and follow signs to Durham City Centre.
N.B. Hatfield College has very limited access to vehicles, so people arriving by car will need to contact the local organiser (Anthony McGregor – anthony.mcgregor@durham.ac.uk) to make arrangements for parking.

By Air: Durham is a 30 minute drive from Newcastle Airport and about 40 minutes from Durham Tees Valley. Both have regular and domestic flights. Durham is linked to Newcastle Airport by rail and metro. Travellers into Durham Tees Valley can take advantage of the free Sky Express bus service that links the airport to Darlington railway station, with regular connections to Durham.

By Rail: InterCity trains from most major centres in the country call at Durham daily including 14 trains from London. The National Express high speed service takes under 3 hours from London King's Cross on the main East Coast line. First Transpeninne Express offers frequent links to Manchester, Sheffield and Leeds, while Cross Country links Durham directly with Scotland, the Midlands, and the South West.

A taxi will take you from the station to any College in about 5 minutes and you can walk to the city centre in 10 minutes.

For train times visit: http://www.nationalrail.co.uk

By Bus or Coach: There are several express coach services daily from most major cities to Durham. Durham is well served by both regional express services and the local bus network. From the city bus station - a short walk from the railway station - a bus service runs every 15 minutes past the Colleges on South Road.

More Information: Further details about the University and travel can be found at:
https://www.dur.ac.uk/about/location/

City Centre maps are available at: https://www.dur.ac.uk/map/ and
Eating and Drinking on Campus

For its size, Durham contains a large number of restaurants offering a broad range of cuisines. From traditional British fare to spicy Mexican there is sufficient variety to suit all tastes. Below is a list of some of the more popular restaurants in and around the city centre.

**Chinese**
- In Shanghai. The Gates Shopping Centre, Unit 30B, Durham, DH1 4SL. Tel: 0191 375 7333

**Indian**
- The Capital. 69 Claypath, Durham, DH1 1QT. Tel: 0191 386 8803
- Spice Lounge. St Nicholas Cottage, Market Place, Durham, DH1 3NJ. Tel: 0191 383 0927
- Rajpooth. 80 Claypath, Durham, DH1 1QT. Tel: 0191 386 1496
- Alishaan. 50-51 North Road, Durham, DH1 4SF. Tel: 0191 370 9180

**Italian**
- Ask. 4 Walkgate, Durham, DH1 1SQ. Tel: 0191 383 2567
- Pizza Express. 64 Saddler Street, Durham, DH1 3PG. Tel: 0191 383 2661
- La Spaghettata. 66 Saddler Street, Durham, DH1 3NP. Tel: 0191 383 9290

**French**
- Café Rouge. 21 Back Silver Street, Durham, DH1 3RB. Tel: 0191 384 3429
**Durham’s local attractions**

Durham lies in the heart of North East England, one of the country’s most vibrant and rapidly developing regions. The splendour, prestige and heritage of this City located on a dramatic peninsular overlooking the River Wear include the World Heritage Site that is Durham’s unique Norman Cathedral and Castle.

Durham is a small and compact city with everything within easy walking distance. Minutes from the bustling centre are the leafy riverside walks and the changing seasons of the Botanic Garden. The Oriental Museum holds fascinating collections of international significance, as well as offering key insights into local history.

**Other local attractions nearby**

- Baltic Centre for Contemporary Art in Gateshead – a dynamic, diverse and international display of contemporary visual art.

- Hadrian’s Wall – one of Rome’s most northerly outposts built when the Roman Empire was at its height. Snaking across dramatic countryside, it remains one of Britain’s most impressive ruins.

- Beamish Open Air Museum – telling the story of life in North East England in Georgian, Victorian and Edwardian times.

- Locomotion at Shildon – the largest railway museum in the world, home to over 300 years of history.

- Crook Hall Gardens – a 13th century Grade 1 listed medieval hall which provides a spectacular backdrop to the stunning gardens

- Angel of the North – Antony Gormley’s famous iconic landmark

- Sage Gateshead – the North East’s premium culture and music venue
The dinner is Thursday 7th April at 8:00pm, at Hatfield College, Durham University, North Bailey, Durham, DH1 3RQ. The cost will be £32.00 per person for 3 course meal and coffee to follow.  
**Postgraduates may attend the dinner for a subsidised cost of £16.00. In this instance the Booking form must be accompanied by a statement from an EPS member confirming Postgraduate status.**

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<td>Confit chicken terrine with toasted brioche and crispy quail egg</td>
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<td>Butternut squash, sweet potato and toasted seeds soup with freshly baked roll (v)</td>
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<td>Main</td>
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<td>Pork roasting joint with carrot puree, black pudding croquette, fondant potato and cider jus</td>
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<td>Wild mushroom and spinach tart with broccoli, roasted shallots and hollandaise sauce (v)</td>
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<td>Dessert</td>
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<td>Dark chocolate fondant with malted milk ice cream (v)</td>
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<td>Lemon tart with raspberries and raspberry sorbet</td>
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**Please return this form, with your cheque (made payable to Durham University) to:**  
Carolyn Loughlin, Department of Psychology, Durham University, Durham, DH1 3LE  
**by Wednesday 23rd March 2016.**  
Email: carolyn.loughlin@durham.ac.uk
Limited accommodation has been reserved for the nights of 6th and 7th April on campus at Hatfield College, Durham University, North Bailey, Durham, DH1 3RQ.
There are 26 en-suite rooms available at a cost of £60.00 per person per night, including breakfast. These will be allocated on a first come/first served basis. Please check availability before sending through your payment.

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Please return this form, with your cheque (made payable to Durham University) to:
Carolyn Loughlin, Department of Psychology, Durham University, Durham, DH1 3LE
by Wednesday 23rd March 2016.
Email: carolyn.loughlin@durham.ac.uk

BOOKING FORMS MUST BE RETURNED, TOGETHER WITH FULL PAYMENT BY:
WEDNESDAY 23rd MARCH
The Fifth EPS Frith Prize

will be delivered by

Rebecca Jackson

Department of Psychology
University of Manchester

Exploring the temporal and spatial dynamics of the semantic network using TMS and fMRI

6.00pm, Thursday 7th April 2016

Lecture Theatre ER140
Elvet Riverside
Durham University

The lecture will be open to the public
Membership Proposal Form

*Please use BLACK ink*

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**Full current professional address**

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**Degrees**

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**Experience**

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**Current research interests**

**Oral Papers delivered to EPS meetings, with dates (In the case of jointly authored papers, please indicate who spoke)**

**Publications (up to two examples of senior authored and peer reviewed: published articles, not “in press”)**

**Signature of applicant**

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In supporting this candidate, we are agreeing that the applicant has made independent contributions to the publications cited above and merits membership of the Society

**Proposer**

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EXPERIMENTAL PSYCHOLOGY SOCIETY

NOMINATIONS
Nominations for new members should be made using the form on the preceding page. Entries should be made in clear black type, using one side of the form only.
All information should be included on the form, not on additional sheets.

Under "Publications", only articles that have appeared in print by the time of nomination, in peer-reviewed psychological or cognate journals, should be listed. Because of space limitations, a complete publication list is not required; up to two recent examples, where the nominee is single or first author, are sufficient.

Applicants must be nominated by two EPS members.

These forms should be returned by 1st September to the EPS administrator: Sandra Harris, Department of Psychology, University of Lancaster, Lancaster, LA1 4YF.

CRITERIA AND PROCEDURES

Soon after the closing date of 1st September, brief details of all candidates will be circulated to members of the Society, who may request further information if they wish. The nomination forms will be considered by the Committee, usually in October. The Committee will decide whether each candidate is eligible for admission to Ordinary Membership, i.e. those candidates who have:

a) secured a PhD
b) published an independent account of their work in a reputable, peer-reviewed psychological journal, and
c) personally delivered an oral paper to the Society.

Candidates who do not meet all these criteria can be considered only in exceptional circumstances. Those who are resident outside Europe will be asked for assurance that they can attend meetings reasonably often.

Any Candidate not selected as eligible by the Committee will be informed of this and will be advised whether he/she may again be proposed for membership in a future year and if so subject to what conditions. The list of those selected as eligible will be put to the Annual General Meeting in January for approval.
April Meeting, 6\textsuperscript{th}-8\textsuperscript{th} April 2016

The programme for the April meeting is enclosed with this mailing. Conference dinner:
Booking forms are enclosed for the conference dinner at Hatfield College on Thursday 7\textsuperscript{th} April at 8:00pm. Please return the booking forms for the meal with your cheque payable to Durham University, to Carolyn Loughlin by Wednesday 23rd March 2016. Some places at the dinner are available to postgraduate students at half-price: bookings for these must be accompanied by a letter from an EPS member confirming the student’s status.

Accommodation at Durham University:
Booking forms are also enclosed for the 26 en-suite rooms available on campus. Please return the booking forms for the campus accommodation with payment to Carolyn Loughlin by Wednesday 23rd March.

The programme also includes:

Thursday 7\textsuperscript{th} April 5:00pm BPS/EPS Undergraduate Prize Winner talk:

\textbf{Applying the distractor devaluation effect to online impulse buying}
\textit{Amy Isham (University of Warwick)}

Thursday 7\textsuperscript{th} April 6:00pm 5th Frith Prize Lecture:

\textbf{Exploring the temporal and spatial dynamics of the semantic network using TMS and fMRI}
\textit{Dr Rebecca Jackson (University of Manchester)}

Thursday 7\textsuperscript{th} April 9:00am Symposium:

\textbf{Spatial and Temporal foundations of human foraging behaviour}
\textit{Organised by Dr David Sanderson}

Thursday 7\textsuperscript{th} April 2:00pm Symposium:

\textbf{The role of temporal information and temporal processes in learning}
\textit{Organised by Carlo de Lillo, Alastair D Smith and Anthony McGregor}
Oxford/SEPEX Meeting, 8-10 July 2016

The portals for submissions to this meeting will open on the website week commencing 11th April 2016.

The meeting will include the 44th Bartlett Lecture by Professor Jonathan Grainger with the title: Orthographic processing and reading, plus an accompanying symposium organised by Colin Davis.

The 22nd EPS Prize Lecture by Professor Gaia Scerif entitled: How does attentional control matter? Mechanisms and developmental dynamics plus an accompanying symposium organised by Lucy Cragg and Duncan Astle.

The local organisers are Kate Watkins and Chris Summerfield.

A copy of the EPS Handbook 2016 is included in this mailing.

Dr John Towse
Hon Secretary
The Business meeting will be held at 5:30pm on Thursday 7th April, 2016 in Lecture Theatre ER140, Elvet Riverside, Durham University.

AGENDA

16/15 Minutes of the 68th Annual General Meeting held at University College London, 26 Bedford Way on Thursday 8th January 2016.
16/16 Matters arising
16/17 Secretary’s Report
16/18 Treasurer’s Report
16/19 QJEP Editor's Report
16/20 Arrangements for future meetings
16/21 Any Other Business

Date, time and place of next meeting
EXPERIMENTAL PSYCHOLOGY SOCIETY

The 68th Annual General Meeting was held in the Ground Floor Lecture Theatre, Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, at 5:30pm on Thursday 8 January 2016.

MINUTES

Over 40 members were present and others joined later.

16/1 Minutes of the Business Meeting held at 5.30p.m. on Thursday 9 July 2015, in Minerva Building, University of Lincoln.

The Minutes of the July 2015 Business Meeting were approved by the President.

16/2 Matters arising

There were no matters arising.

16/3 Hon Secretary’s Report

The Hon Sec delivered a report at the meeting. He explained that the society continues to be in good shape, with 43 new members approved. The Postgraduate list currently includes over 140 members. The Committee has done much to support research. Each of the 2015 scientific meetings was marked by at least one keynote lecture delivered by one of the Society’s award lecturers. These talks, and their accompanying symposia, continue to provide highlights at the meetings. Last year the 43rd Bartlett lecture was delivered by Professor Lorraine Tyler; the 13th Mid-Career award lecture by Professor Martin Pickering; 22nd Prize lecture by Professor Manos Tsakiris and the 4th Frith Prize lecture by Dr Anushka Fernando. A large number of awards to support Members’ research continue to be made under our various schemes. If changes are to be made to the publishers for the QJEP, this needs to be decided this year and preliminary talks with alternatives already taking place. It was also noted some Society changes were being considered although discussions would take place regarding innovations or changes such as electronic registration, make-up of meetings, length of talks, etc. It is also the 70th birthday of the EPS and suggestions welcome for celebrating, although giving the website an ‘anniversary new look’ and the digitisation of archives will be taking place. Idea to display old archived papers at upcoming meetings maybe.

This meeting is also the last one to be presided over by Dr Karalyn Patterson, with the last financial report by Professor Tim Hollins, as both step down at the end of their term of office. Also last meeting for committee member Ines Jentszch. Hon Sec thanks all for their service to the Committee. The incoming President is Professor Mike Burton, Treasurer Professor Patrick Haggard.
The full Annual Report will be made available on the EPS web page as soon as possible.

16/4 Hon Treasurer's Report

The Treasurer presented a detailed report. The Society has a deficit of almost £27k for the last financial year, due to slightly lower income from royalties, and the increased expenditure due to the transitional year for the Hon Sec. Expenditure was £60k more over the last financial year, as compared to £281k in 2014. Spending on management and administration is slightly higher. The Treasurer confirmed that the Society had spent extra £11k on Grindley Grants, whilst spending on Study Visits was slightly decreased from last year. Spending on Small Grants and Student Bursaries has been significantly higher this year. However, the Society’s balance remains healthy and within the band required by the Charity Commission. The desired level of reserves is between one and two years’ annual expenditure. The overall balance at this point in the cycle stands at £351,750 which is in line with other January figures.

The President thanked the Treasurer.

16/5 QJEP Editor’s Report

We publish around 155 articles per year. Submissions reached 450 in 2015, which is a record number and guarantees that QJEP can sustain its current number of publications. There has also been an increase in the Impact Factor to above 2, where the journals should stay to remain competitive (the editor is fairly confident this level will be reached for 2016 as well). There are several good special issues in the pipeline – forthcoming QJEP Classics with reviews (almost 9 so far) and another couple due in 2016, with 2 more in 2017.

Last editor’s report at the London AGM as will step down at end of this year, but the journal is in a good position to negotiate for future.

The President thanked the Editor.

The President reminded Members of the option to nominate candidates for the various EPS prizes. Following final selection at EPS committee, the selected candidates are put to the AGM for ratification. The President mentioned the difficulty of making these decisions, in particular the Frith Prize attracts a highly competitive field of nominations. The following November committee-approved nominations were put to the 67th 2015 AGM

16/6 Announcement of 45th Bartlett lecturer
Professor Andy Young

16/7 Announcement of 15th Mid-Career award
Professor Kathy Rastle

16/8 Announcement of 24th Prize lecturer
Professor Frederick Verbruggen

16/9 Announcement of 6th Frith Prize winner
Dr Rebecca Jackson

16/10 Election of Officers and Committee Members 2016

Officers of the Society

QJEP Editor elect Professor Simon Liversedge

Ordinary Committee Member

Professor Louise Phillips

16/11 Admission of Honorary Members

No honorary members selected

16/12 Admission of Ordinary Members

Under Rule 7 the list of applicants for Ordinary Membership was earlier circulated electronically in the September mailing. No objections were raised and all applications were provisionally approved at the October Committee meeting subject to the final approval of the membership at the AGM.

The October Committee recommendations for admission to membership were all ratified at the AGM.

16/13 Arrangements for future meetings

The Conference Secretary reminded members of the arrangements for future meetings.

Durham, 6-8 April 2016. This meeting will include the 6th Frith Prize Lecture by Dr Rebecca Jackson. There will also be two symposiums; the first entitled ‘Spatial and temporal foundations of human foraging behaviour’, organised by Anthony McGregor and the second organised by David Sanderson and called ‘The role of temporal information and temporal processes in learning’.

The Local Organiser is Anthony McGregor.

Oxford, 8-10 July 2016. This meeting is being held jointly with SEPEX and will include the 44th Bartlett Lecture by Professor Jonathan Grainger plus an accompanying symposium to be organised by Colin Davis. The meeting will also include the 23rd Prize Lecture by Professor Gaia Scerif with an accompanying symposium organised by Lucy Cragg and Duncan Astle. The Local Organisers are Kate Watkins and Chris Summerfield.

The President thanked the Conference Secretary.
Any other business

The President thanked Patti Adank, the UCL Local Organiser, for all her hard work in arranging such a wonderful meeting.

Date, time and place of next meeting to be finalised and circulated later.

The meeting finished at approximately 5:50pm.