EPS

Experimental Psychology Society

READING MEETING

12-14 July 2017

Open exchange of new ideas is central to EPS meetings. To foster up-to-date discussion, presenters are mandated to report work that is not yet published. We ask that attendees respect this mandate. Please do not record or publish presented material (e.g. via Twitter or Facebook) without the presenter's permission. For explicit guidance on reporting at EPS meetings, please refer to the EPS handbook.

A scientific meeting will be held at the School of Psychology and Clinical Language Sciences, University of Reading, Harry Pitt Building & Agriculture Building, Earley Gate, Reading, RG6 6AL between 12 – 14 July 2017.

The local organisers are Patricia Riddell and Katie Gray.

Twenty Fourth EPS Prize Lecture
Wednesday 12th July, 6:00pm

Executive control of (impulsive) action
Professor Frederick Verbruggen, University of Exeter

Symposium – to accompany the 24th EPS Prize Lecture
Wednesday 12th July, 2:00pm

Advances in basic and applied cognitive control research
Organiser: Chris Chambers, Cardiff University

Symposium –
Wednesday 12th July, 1:00pm

Food for thought: Brain fueling and cognitive function
Organiser: Kaz Brandt, University of Roehampton

Fifteenth Mid-Career award
Thursday 13th July, 6:00pm

Writing systems, reading and language
Professor Kathy Rastle, Royal Holloway University of London

Symposium – to accompany the 15th Mid-Career Lecture
Thursday 13th July, 2:00pm

Convergent approaches to studying reading acquisition
Organiser: Matt Davis, MRC-CBU, Cambridge

Local organiser Symposium –
Friday 14th July, 9:30am

Social perception and its atypicalities
Organisers: Bhisma Chakrabarti and Katie Gray

Poster Session – drinks reception

This will be held in conjunction with the drinks reception on Wednesday evening at 7:00pm in the Agriculture Building. Delegates may put up posters from 11:00am and should take them down by the end of the session.

Platform Presentations

Sessions will be held in the Madjeski and Nike Lecture Theatres in the Agriculture Building. Both theatres have data projectors available for PowerPoint presentations. Presenters may provide their own laptops and connector leads, or bring USB keys for the on-site computers. Any queries about facilities in the theatres should be sent to the local organiser: Katie Gray (k.l.h.gray@reading.ac.uk)

Conference Dinner

The conference dinner will be held on Thursday 13th July at 8:00pm in the Meadow Suite, Park House, Whiteknights, Reading, RG6 6UA when a 2-course premium barbecue will be served.

A menu is enclosed for information, although delegates will be able to make their selections on the evening.

Payment in advance should be made via the University of Reading's online booking system https://registration.venuereading.com/societyconference no later than 30th June 2017.

Please address any payment queries to Katie Gray (k.l.h.gray@reading.ac.uk)

START OF PARALLEL SESSIONS

Session A

Madjeski Lecture Theatre

1:00 **Cai S Longman, Fraser Milton, Andy J Wills and Frederick Verbruggen**
(University of Exeter, Plymouth University and Ghent University, Belgium)
Instructions matter: Transfer of learned category-response and/or stimulus response associations is determined by instruction

1:30 **Fraser Milton, Kathryn Carpenter*, Charlotte Edmunds* and Andy Wills**
(University of Exeter and University of Plymouth)
Does deferred feedback sharply dissociate implicit and explicit category learning?

Symposium: Advances in basic applied cognitive control research
Organised by: Professor Chris Chambers

2:00 **Baptist Liefooghe** (Ghent University, Belgium)
Investigating the implementation of novel instructions by using instruction-based congruency effects

2:30 **Gordon Logan** (Vanderbilt University, USA)
Automatic control: The result of skill

3:00 Tea/coffee

3:30 **Ian McLaren (**University of Exeter)
Associatively-mediated inhibition: Basic processes and implications for interventions

4:00 **Natalia Lawrence** (University of Exeter)
Inhibiting impulses: Translating cognitive control research from the lab to life

4:30 **Chris Chambers** (Cardiff University)
Bringing large-scale open science to cognitive control research

End of symposium

5:00 EPS Business meeting

6:00 **Twenty fourth EPS Prize Lecture**
Professor Frederick Verbruggen (University of Exeter)
Executive control of (impulsive) action

7:00 POSTERS AND DRINKS RECEPTION – Posters will be displayed with drinks being served in the Agriculture Building.

Session B

Nike Lecture Theatre

Symposium: **Glucose facilitation effects on frontal and medial temporal lobe function**
Organised by: Dr Karen Brandt

1:00 **Lauren Owen** (University of Central Lancashire)
Fuel for the brain; Individual differences and energy substrates for enhanced cognitive function

1:30 **Sandra Sünram-Lea** (Lancaster University)
Last in, first out; Brain economy in times of limited resources

2:00 **Michael A Smith** (Northumbria University)
Facing diabetes: Face recognition deficits in older adults with type 2 diabetes

2:30 **Leigh Gibson** (University of Roehampton)
Cognitive deficits associated with obesity and diabetes: is poor glucoregulation responsible?

3:00 Tea/coffee

3:30 **Andrew Scholey** (Swinburne University of Technology, Australia)
Supply and demand in the ageing brain: Can a 'neuroeconomy' model explain glucose effects on neurocognition in younger and older adults?

End of symposium

4:00 **Frouke Hermens** (University of Lincoln)
When do arrows start to compete? A developmental mouse-tracking study

4:30 **Richard O'Connor*** (University of Hull) (Sponsor: David George)
How children explain their own performance on a non-verbal response false-belief task

Madjeski Lecture Theatre

5:00 EPS Business meeting

6:00 **Twenty fourth EPS Prize Lecture**
Professor Frederick Verbruggen (University of Exeter)
Executive control of (impulsive) action

7:00 POSTERS AND DRINKS RECEPTION – Posters will be displayed with drinks being served in the Agriculture Building.

Session A

Madjeski Lecture Theatre

9:00 **Zoe Woodhead*, Sheila Kerry*, Oscar Aguilar*, Alex Leff* and Jenny Crinion*** (University of Oxford and University College London) (Sponsor: Kevin Paterson)
Randomized trial of iReadMore word reading training and left IFG anodal tDCS in central alexia

9:30 **Rachael C Hulme* and Jennifer M Rodd** (University College London)
The testing effect in long-term retention from incidental and intentional vocabulary learning

10:00 **Emma James*, Gareth Gaskell and Lisa Henderson*** (University of York)
Matthew effects in word learning: does prior knowledge aid consolidation?

10:30 Tea/coffee

11:00 **Eleanor Luckcock*, Theo Marinis* and Carmel Houston-Price** (University of Reading Malaysia and University of Reading)
Word learning is affected by language experience and learning method

11:30 **Lydia Viñals*, Helen Blank, Jelena Mirković, Gareth Gaskell and Matthew H Davis** (MRC Cognition and Brain Sciences Unit, Cambridge, University of Cambridge, University Medical Center Hamburg-Eppendorf, Germany, York St John University and University of York)
Overnight changes in the representational structure of newly-learned inflections

12:00 **Jennifer Ashton*, Beth Jefferies, Gareth Gaskell** (University of York)
Sleep can benefit memory for trained associations but may not play a specific role in rule extraction

12:30 Lunch break

Session B

Nike Lecture Theatre

9:00 **Agnieszka W Kowalczyk* and James A Grange** (Keele University)
Cognitive Inhibition: The n-2 repetition cost and working memory capacity

9:30 **James A Grange and Agnieszka W Kowalczyk*** (Keele University)
The effect of ageing on inhibition in task switching when controlling for episodic retrieval

10:00 **Rachel Swainson, Laura Prosser*, Kostadin Karavasilev* and Aleksandra Romanczuk*** (University of Aberdeen)
Switch costs following cue-only trials remain after controlling for between-trial intervals and predictability

10:30 Tea/coffee

11:00 **Claudia C von Bastian* and Carla De Simoni*** (Bournemouth University and University of Zurich, Switzerland) (Sponsor: Peter Hills)
No evidence for effects of updating and binding training on working memory capacity and efficiency

11:30 **Chunliang Yang*, Rosalind Potts and David R Shanks** (University College London)
The forward testing effect on self-regulated study time allocation and metamemory monitoring

12:00 **C Philip Beaman, Maciej Hanczakowski* and Dylan M Jones** (University of Reading and Cardiff University)
Meta-memory in noise: Auditory distraction interferes with allocation and perception of study time

12:30 Lunch break

Session A

Madjeski Lecture Theatre

1:30 **Rebecca A Gilbert*, Matthew H Davis, M Gareth Gaskell and Jennifer M Rodd**
(University College London and MRC Cognition and Brain Sciences Unit, Cambridge)
Generalisation of recent word meaning experience across modalities: How we avoid barking up the wrong tree

Symposium: Convergent approaches to studying reading acquisition
Organised by: Dr Matt Davis (MRC-CBU, Cambridge)

2:00 **Michal Ben-Shachar** (Bar Ilan University, Israel)
Changes in children's cortical sensitivity and structural connectivity during literacy acquisition

2:30 **Matthew H Davis and Jo S H Taylor** (MRC-CBU, Cambridge and Royal Holloway University of London)
Linking functional and neural accounts of lexical processing using predictive coding

3:00 Tea/coffee

3:30 **Ram Frost** (Hebrew University, Jerusalem, Israel)
Statistical learning and writing systems: Learning to read a novel orthography

4:00 **Padraic Monaghan** (Lancaster University and MPI for Psycholinguistics, Nijmegen, Netherlands)
Computational modelling of reading throughout the lifespan

4:30 **Kate Nation** (University of Oxford)
Nurturing a lexical legacy: language experience and learning to read words

5:00 **Anna M Woollams, Isobel McMillan and Wael El-Deredy** (University of Manchester)
Stimulating reading of known and novel orthographies

End of symposium

6:00 **Fifteenth Mid-Career award**
Professor Kathy Rastle (Royal Holloway University of London)
Writing systems, reading and language

Session B

Nike Lecture Theatre

1:30 **Kay L Ritchie and Katie L H Gray** (University of Lincoln and University of Reading)
Familiar face dominance in binocular rivalry

2:00 **Clare Sutherland*, Xizi Liu*, Lingshan Zhang*, Yingtung Chu*, Julian Oldmeadow* and Andy Young** (University of York, University of Western Australia and Swinburne University of Technology, Australia) (Sponsor: Kevin Paterson)
Testing the universality of first impressions from faces using data-driven modelling

2:30 **Peter J Hills, Aimee Lee Roberts* and Daniel Dickinson*** (Bournemouth University and Anglia Ruskin University)
The effects of social pressure on face recognition

3:00 Tea/coffee

3:30 **Duncan Guest, Andrew Mackenzie*, Christina J Howard, Stephen Badham* and Louise Brown** (Nottingham Trent University and University of Strathclyde)
Number of objects and number of features influence the extent of age related differences in visual information processing

4:00 **Daniel T Smith and Neil Archibald*** (Durham University)
Oculomotor impairments are associated with deficits of covert attention and spatial short-term memory

4:30 **Dr David Pitcher*** (University of York) (Sponsor: Mike Burton)
Mapping the effects of transient cortical disruption across the brain: combining thetaburst TMS and fMRI

5:00 **Victoria Brunsdon*, Elisabeth Bradford* and Heather Ferguson** (University of Kent)
Mirror neuron activity in younger and older adults

6:00 **Fifteenth Mid-Career award**
Professor Kathy Rastle (Royal Holloway University of London)
Writing systems, reading and language

Session A

Madjeski Lecture Theatre

9:00 **Gavin Buckingham, Johnny Parr*, Greg Wood*, Sam Vine*, Pan Dimitriou* and Sarah Day*** (University of Exeter, Liverpool Hope University, Manchester Metropolitan University, Heriot-Watt University and University of Strathclyde)
The impact of using an upper-limb prosthesis on the perception of real and illusory weight differences

Symposium: Social perception and its atypicalities
Organised by: Bhisma Chakrabarti and Katie Gray

9:30 **Beatrice de Gelder** (Maastricht University)
Some important differences between facial and bodily expressions and why they matter

10:00 **David Perrett** (University of St Andrews)
Attachment style and preferences for perceived social traits in faces

10:30 Tea/coffee

11:00 **Brad Duchaine** (Dartmouth College, USA)
A cumulative account of the neural basis of developmental prosopagnosia

11:30 **Richard Cook** (City University London)
Holistic face processing in typical and atypical observers

12:00 **Bhismadev Chakrabarti** (University of Reading)
Reward driven modulation of the response to faces: Clues for and from autism

12:30 **Francesca Happe** (Kings College London)
How is autistic social processing affected by ageing?

End of symposium

END OF MEETING

Session B

Nike Lecture Theatre

9:00 **Martina Micai*, Mila Vulchanova* and David Saldaña** (University of Reading, Universidad de Sevilla, Spain and Norwegian University of Science and Technology, Norway)
Individuals with autism do not change reading strategies as a function of reading goals: A matter of planning

9:30 **Anastasia Ulicheva*, Mark Aronoff* and Kathleen Rastle** (Royal Holloway University of London and Stony Brook University, USA)
What do spellings of English suffixes tell us?

10:00 **Ehab W Hermena*, Eida J Juma*, Ascensión Pagán, Maryam AlJassmi*, Mercedes Sheen* and Timothy R Jordan** (Zayed University, Dubai, UAE and University of Oxford, Oxford)
Orthographic, morphological and semantic parafoveal processing in Arabic reading: Evidence from the boundary paradigm

10:30 Tea/coffee

11:00 **Holly Joseph** (University of Reading)
Predictors of incidental word learning during reading in monolingual and bilingual children: Evidence from eye movements

11:30 **Ascensión Pagán* and Kate Nation** (University of Oxford)
Learning new words when reading: effects of contextual diversity and temporal spacing

12:00 **Fang Liu* and Patrick C M Wong*** (University of Reading and Chinese University of Hong Kong, China) (Sponsor: Katie Gray)
Musical experience affects tone merging in Cantonese speakers: The relationship between perception and production

12:30 **Kelly Jakubowski*, Zaariyah Bashir*, Nicolas Farrugia* and Lauren Stewart** (Durham University, Goldsmiths University of London and IMT Atlantique, France)
Involuntary versus voluntary recall of musical memories: Comparing temporal accuracy and emotional responses

END OF MEETING

1. **Sumera Ahmed*, Tom Mercer, Danny Hinton* and Richard Darby*** (University of Wolverhampton)
   The impact of time and emotion on directed forgetting

2. **Klaudia B Ambroziak*, Elena Azañón and Matthew R Longo** (Birkbeck University of London)
   Body size adaptation for bodies and faces, but not across categories

3. **Gizem Arabaci* and Ben Parris** (Bournemouth University)
   The relationship between ADHD symptoms and daily-life and probe-caught spontaneous and deliberate mind wandering in community samples

4. **Stephanie Baines* and Imca Hensels*** (University of Manchester) (Sponsor: Ellen Poliakoff)
   The effect of evaluative conditioning on implicit associations and explicit choices of healthy and unhealthy foods

5. **Anna K Bobak*, Viktoria R Mileva* and Peter J B Hancock** (University of Stirling**)**
   The effects of image pixelation on face learning

6. **Emma Garcia*, Markus Bindemann and Robert A Johnston** (University of Kent)
   Helpful or harmful? Forensically relevant time delays and the construction of facial composites

7. **Hannah Tummon*, John Allen* and Markus Bindemann** (University of Kent)
   Unfamiliar face matching at a virtual reality airport

8. **Natalie W Gentry* and Markus Bindemann** (University of Kent)
   Example face pairs improve identity-matching in low-performing individuals

9. **Emily Crowe, Ingrid Van Tongeren, Christopher Kent and Alexander Holcombe** (University of Bristol and University of Sydney, Australia)
   Captured by movement: the effect of motion on transient attention

10. **Ashakee Mahabeer*, Robert De Vai*, Peter James Hills and Andrew Meso*** (Bournemouth University)
    Correlating endophenotypes of schizophrenia: sensory gating, smooth pursuit eye movements, attentional blink and schizotypal traits

11. **Federica Degno*, Chuanli Zang*, Otto Loberg*, Manman Zhang*, Nick Donnelly and Simon P Liversedge** (University of Southampton, Tianjin Normal University, China and University of Jyväskylä, Finland)
    An investigation of visual, orthographic and lexical processing during reading of sentences

12. **Sha Li*, Laurien Oliver-Mighten*, Lin Li*, Victoria McGowan*, Jingxin Wang* and Kevin B Paterson** (Tianjin Normal University, China and University of Leicester)
    Effects of subtle changes in text spacing on eye movements of young and older adult readers

13. **Ehab W Hermena*, Simon P Liversedge, Sana Bouamama* and Denis Drieghe** (Zayed University, UAE and University of Southampton)
    Orthographic and root frequency effects in Arabic: Evidence from eye movements and lexical decision

14. **Ehab W Hermena*, Hajar Aman-Key-Yekani*, Ascensión Pagán, Mercedes Sheen* and Timothy R Jordan** (Zayed University, Dubai, UAE and University of Oxford)
    Transposed letter effects in Persian: Evidence from a semantic categorization task

15. **Anna Maria Di Betta*, David Playfoot*, Jane Morgan and Marta Borowka*** (Sheffield Hallam University)
    Fighting like cats and pies: Competition between meanings in interlingual homograph processing

16. **Shihui Wu, Silvia Gennari and Lisa Henderson** (University of York)
    Individual differences predict performance in language production and comprehension

17. **Luke Fisher, Tom Mercer and Richard Darby** (University of Wolverhampton)
    Examining the influence of mind wandering and interest on recall within a retroactive interference context

18. **Alexandra L Georgescu* and Antonia Hamilton** (University College London)
    The role of congruency and timing for the social consequences of mimicry

19. **David Harris*, Sam Vine*, Mark Wilson*, John McGrath* and Gavin Buckingham** (University of Exeter and Royal Devon and Exeter Hospital)
    Observational learning of surgical skills on the daVinci surgical system

20. **Craig Hedge*, Georgina Powell*, Aline Bompas*, Solveiga Vivian-Griffiths* and Petroc Sumner** (Cardiff University)
    The costs of caution: How strategic changes influence the correlations between RT costs and error costs in choice RT tasks

21. **Ashleigh Johnstone* and Paloma Mari-Beffa** (Bangor University)
    The effects of martial arts training on attentional networks in typical adults

22. **Jonathan Jones*, Anna Adlam* and Fraser Milton** (University of Exeter)

The neural correlates of working memory training in children

23. **Louise-Ann Leyland*, Benedict Spencer*, Nick Beale*, Tim Jones* and Carien M van Reekum*** (University of Reading and Oxford Brookes University) (Sponsor: Katie Gray)
    Cycling as a way to improve cognitive function in older adults

24. **Jennifer McBride, Jaime Brown*, Konstantina Papatheocharis*, Chloe Middleton* and Paul Warren*** (University of Manchester)
    Training proactive motor control reduces gambling, but does not increase caution on other forms of decision making

25. **Chloe Newbury* and Padraic Monaghan** (Lancaster University)
    The interaction between sleep and valence on the processing of false memories

26. **William G Nicholson* and Cris Burgess*** (University of Exeter) (Sponsor: Frederick Verbruggen)
    Screeching to a halt: Inhibition training does not address drivers' risky behaviour at amber traffic lights

27. **Andrea Olguin*, Tristan A Bekinschtein* and Mirjana Bozic** (University of Cambridge)
    Type of interference modulates neural encoding of attended continuous speech

28. **Jade S Pickering*, Ellen Poliakoff, Iracema Leroi* and Jennifer McBride*** (University of Manchester)
    Continuous force measurement of response activation and inhibition in Parkinson's disease

29. **Christos Pliatsikas, João Verissimo*, Laura Babcock*, Mariel Pullman*, Dana Glei*, Maxine A Weinstein*, Noreen Goldman* and Michael T Ullman*** (University of Reading, University of Potsdam, Germany, Karolinska Institutet, Sweden, Icahn School of Medicine at Mount Sinai, USA, Georgetown University, USA and Princeton University, USA)
    Working memory in a large sample of older adults: Sex and education mediate the effects of ageing

30. **Laura Prosser* and Rachel Swainson (**University of Aberdeen)
    Investigating types of between-task conflict as drivers of backward inhibition

31. **Jasmine A L Raw*, Michiko Sakaki and Judi Ellis** (University of Reading)
    Memory for the 2016 EU Referendum: Flashbulb memories and emotion

32. **Sarwat Rehman*, Emma Threadgold*, Khadeeja Tul-Kubra* and Lauren Owen*** (University of Central Lancashire) (Sponsor: John Marsh)
    The effects of metabolic regulation on problem solving and quality of life

33. **John Shaw* and Padraic Monaghan** (Lancaster University)
    Sleep spindles protect against false memory effects as a consequence of sleep

34. **Sophie Sowden*, Caroline Catmur and Geoffrey Bird** (King's College London and University of Oxford)
    Lie detection: how autistic-like traits impact the ability to control competing representations of the self and others' opinions

35. **Emma Thompson*, Geoff Bird and Caroline Catmur** (King's College London)
    Validation of a new reaction time task targeting two 'Action Understanding' processes: Action identification and intention identification

36. **Nilgun Turkileri*, David T Field, Judi A Ellis and Michiko Sakaki** (University of Reading)
    Emotional arousal enhances memory-guided attention

37. **Yaqi Wang* and Silvia Gennari** (University of York)
    Memory of event duration

Instructions matter: Transfer of learned category-response and/or stimulus response associations is determined by instruction

Cai S Longman[1], Fraser Milton[1], Andy J Wills[2] and Frederick Verbruggen[1, 3]
[1] University of Exeter
[2] Plymouth University
[3] Ghent University, Belgium
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Although instructions often emphasise categories (e.g., healthy food → eat), psychologists often interpret learning in terms of stimulus-response (S-R) bindings with little attention being paid to the importance of category-response (C-R) bindings. In a new paradigm designed to investigate the early stages of instructed category learning and transfer of associations between contexts, participants were required to classify novel dot-patterns according to the instructions presented prior to each block. Each 'training' block was immediately followed by a 'transfer' block in which the stimuli and/or categories could be novel or repeated from training. When the instructions mentioned the relevant C-R bindings the evidence for transfer of learned C-R associations to novel stimuli was strong whereas the evidence for transfer of learned S-R associations to novel classifications was much weaker. When the instructions mentioned only the relevant S-R bindings, evidence of C-R transfer was weaker but evidence of S-R transfer was much stronger. Combined, these findings highlight not only the importance of a much neglected, yet critical, aspect of human cognition (C-R associations), but also the importance of framing instructions in such a way as to encourage learning (and transfer) of the relevant material.

Does deferred feedback sharply dissociate implicit and explicit category learning?

Fraser Milton[1], Kathryn Carpenter[1], Charlotte Edmunds[2] and Andy Wills[2]
[1] University of Exeter
[2] University of Plymouth
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Recently there has been intense debate about whether category learning is best described as the result of separable implicit and explicit systems or as due to a single explicit system. Perhaps the most influential dual-process account of category learning is the COVIS model (Ashby et al., 1998) which proposes that a procedurally-based implicit and a rule-based explicit system compete for control of the categorization decision. Recently, Smith et al. (2014) argued they provided some of the strongest evidence in support of COVIS when they showed that deferred feedback impaired an information-integration task, which is assumed to preferentially recruit the implicit system, but not a rule-based task, which is believed to engage the explicit system. In

four experiments, we examined the robustness of this result. Whilst we replicated Smith et al.'s original result, when we used a conjunctive rule-based structure rather than the unidimensional one Smith et al. used to equate the difficulty of the tasks we found that deferred feedback impaired not only the information-integration task but also the rule-based task. We conclude that the original dissociation reflects the differential difficulty of the tasks employed by Smith et al. rather than providing evidence for separate explicit and implicit learning systems.

Ashby, F. G., Alfonso-Reese, L. A, Turken, A. U., & Waldron, E. M. (1998). A neuropsychological theory of multiple systems in category learning. *Psychological Review, 105*, 442–481.

Smith, J. D., Boomer, J., Zakrzewski, A. C., Roeder, J. L., Church, B. A., & Ashby, F. G. (2014). Deferred Feedback Sharply Dissociates Implicit and Explicit Category Learning. *Psychological Science, 25*, 447–457.

Symposium: Advances in basic and applied cognitive control research

Investigating the implementation of novel instructions by using the instruction-based congruency effect

Baptist Liefooghe
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The ability to share and use verbal instructions is thought to separate humans from other animal species. Instructions can bypass trial-and-error learning and are omnipresent both in daily life as well as in psychological research. However, the mechanisms via which instructions influence behavior are still poorly understood. Psychology knows a long tradition of studies that focused on the role of practice or training in acquiring new skills or knowledge, but systematic studies into the role of verbal instructions remain relatively scarce. Nevertheless, in recent years, research started to focus on the implementation of novel instructions, which is believed to be a core function of cognitive control. A common finding in this field of research is that instructed stimulus-response mappings, that were not applied overtly before, can lead to automatic stimulus-response compatibility effects. A critical overview will be presented about the current status of our research on this effect and its usefulness in further understanding the implementation of novel instructions.

Automatic control: How experts act without thinking

Gordon Logan
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Experts act without thinking because their skill is hierarchical. A single conscious thought automatically produces a series of actions without top-down monitoring. I present a theory of automatic control in skilled typing, where thinking of a word automatically produces a series of keystrokes. The theory assumes that keystrokes are selected by context retrieval and updating. Context is generated by the typist's own actions, representing the goal (type DOGS) and the keys struck so far. Top-down control initiates typing by setting the goal but does not sequence keystrokes. The theory explains hierarchical control phenomena in skilled typing, including differential loads on higher and lower level processes, the importance of words, and poor explicit knowledge of key locations and finger mappings. The theory is fit to error corpora from 24 skilled typists, predicting error probabilities, magnitudes, and patterns. The theory extends to other sequential skills, like speaking, playing music, and serial recall.

Associatively-mediated inhibition: Basic processes and implications for interventions

Ian McLaren
University of Exeter
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In this presentation we consider three questions that bear on the application of associatively-mediated inhibition to interventions designed to address problems such as over-eating, alcohol abuse and gambling. The first is to what extent it makes any difference that inhibitory control training rely on associative rather than other cognitive processes? Our answer is that both types of process can contribute to an effect, and that based on associative processes is (quite naturally) less dependent on the beliefs of the individual at that moment. Our second question asks what is learned during the type of inhibition training that we use. In fact, we doubt that inhibition training typically produces inhibition as such. Instead, we argue that it results in an active excitatory linkage to a stop centre, which then influences responding. Our final question asks what it is that is effective about inhibition training as an intervention? One hypothesis is that it leads to devaluation of the trained stimuli that results in a less positive emotional reaction to them. This hypothesis is rejected, as we have evidence that it affects the conscious appraisal of a stimulus such that it is rated as more likely to lead to an unwanted outcome.

Inhibiting Impulses: Translating cognitive control research from the lab to life

Natalia Lawrence
University of Exeter
natalia.lawrence@exeter.ac.uk

This talk will summarise research suggesting that computerised tasks can be used to train response inhibition to foods resulting in reduced food intake and weight loss.

Results from controlled lab studies and large-scale real-world studies will be presented. I will briefly discuss the possible mechanisms underlying intervention effects (including automatic motor inhibition and reduced food reward value) and consider how we might be able to optimise cognitive control training for eating behaviour change.

Bringing large-scale open science to cognitive control research

Chris Chambers
Cardiff University
chambersc1@cardiff.ac.uk

Recent years have witnessed an evolving movement toward open science practices that seek to improve the transparency and reproducibility of published research. In psychology, the importance of transparency and reproducibility is no more salient than in applications of cognitive control training. In this talk I will discuss some of the limitations of small, closed, lab-based studies — studies that, until now, have dominated applied research in this field. Using examples from other areas of psychology, I will argue that we need to shift to real-world studies in large samples using smartphone- and internet-based interventions, and that to improve reproducibility, we need to adopt open science practices including study preregistration and public archiving of data, analysis code and digital study materials. I will discuss the Guardian Experiments initiative that will provide a media platform for supporting these objectives, including our upcoming ERC-funded randomised trial of cognitive control training in eating behaviour.

End of symposium

Symposium: Glucose facilitation effects on frontal and medial temporal lobe function

Fuel for the brain; Individual differences and energy substrates for enhanced cognitive function

Lauren Owen
University of Central Lancashire
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The neurochemical regulation of cognition has been a long-standing subject of interest to the scientific community, receiving further widespread interest during the 1980s, with the notion of "smart drugs" as cognition-enhancing agents. This initial optimism has since proved to be somewhat overestimated. However, evidence suggests that modest improvements engendered by several metabolic agents may prove to be effective in improving and conserving cognitive performance and brain aging. The picture that has begun to emerge is that individual differences in metabolic regulation

and situational factors may act as a modulator of the effectiveness of these agents. Research findings and two systematic reviews will be presented to describe the effects of Glucose, Creatine and Acetyl-L-Carnitine on cognitive functions. Data show that individual gluco-regulation and body composition have mediating effects on cognitive performance and facilitation by a glucose load. Creatine supplementation may be an effective moderator of cognitive performance but only in those who are energetically compromised. Acetyl-L carnitine has shown some mixed efficacy as a therapy for Alzheimer's Disease. The brain is the most metabolically active organ in the body and as such is particularly vulnerable to disruption of energy resources. Interventions that sustain energetic resources may have importance for improving neuronal dysfunction.

Last in, first out: Brain economy in times of limited resources

Sandra Sünram-Lea
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It has been argued that cognitive abilities that developed last ontogenetically are likely the first to become impaired when cognitive and/or physiological resources are compromised. In phylogeny as in ontogeny, the prefrontal cortex is a late developing region of the cortex. Late maturing areas of the dorso-lateral prefrontal cortex are primarily involved in higher executive functions. One crucial function of executive control is to enable self-control, i.e. the ability to inhibit automatic or habitual responses. Self-control requires effort, and completing two successive self-control tasks typically produces a temporary drop in performance in the second task. It has been suggested that self-control requires an extensive amount of energy, and when this energy is depleted, later self-control ability is adversely affected. In this talk, a series of experiments exploring the relationship between glucose availability and self-control performance using a neuro-cognitive approach will be presented. The data suggest that although frontal cortical areas are susceptible to limitations in fuel supply, level of motivation to perform a task can moderate the effect of impaired self-control performance following prior exertion. The results suggest that allocation of resources to limited-capacity systems is moderated by motivational factors. Putative underlying mechanisms regulating allocation of resources will be discussed.

Facing diabetes: Face recognition deficits in older adults with type 2 diabetes

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Older adults with type 2 diabetes (DM2) experience accelerated decline in some domains of cognition. However, much of the focus in the existing literature has been on verbal memory. In this talk, the findings from two studies will be presented which have

investigated face recognition performance in older adults with compromised glucoregulatory efficiency. In the first study, older adults with DM2 (> 60 years; *n* = 24) exhibited deficits on a face recognition task relative to 13 healthy older adults. In a further study, which aimed to explore the neurocognitive mechanisms associated with glucoregulatory-mediated face recognition deficits, older adults without diabetes were subjected to an oral glucose tolerance test. On a subsequent day, event-related potentials (ERPs) were obtained while participants completed an oddball task in which they were required to correctly identify infrequently presented, familiar target faces embedded within a sequence of frequently presented, unfamiliar foils. The findings indicated impaired attentional processing (a relatively larger P2 ERP component amplitude) in poorer glucoregulators, in comparison to those individuals with relatively better glucoregulatory efficiency. On this basis, it is suggested that older adults with compromised glucoregulatory efficiency experience deficits in face recognition, which are underpinned by problems with attentional processing.

Cognitive deficits associated with obesity and diabetes: is poor glucoregulation responsible?

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Considerable evidence substantiates cognitive deficits in both diabetes and obesity, and the increasingly high prevalence of these conditions emphasises the importance of understanding the underlying processes. The primary disorder of diabetes, also often present in obesity, is insulin resistance (IR) or failure, and poor regulation of blood glucose. Since the impact of glucoregulation on the brain is likely to depend substantially on insulin action, not simply glucose levels, indices of IR and glucoregulation are best measured by the Homeostasis Model Assessment method using fasting blood insulin and glucose to estimate pancreatic beta-cell function, insulin sensitivity and resistance. We assessed these indicators and other physiological variables in women (n=34; aged 24-45) and measured their cognitive function using computer-based tasks one hour after a 75-g glucose drink as part of an oral glucose tolerance test (OGTT). Lower beta cell activity and greater insulin sensitivity predicted better word recognition in a verbal memory test but not free word recall. By contrast, changes in blood glucose following the OGTT were not associated with performance in any test, whereas higher percentage body fat predicted only poorer word recall. The implications of these findings for models of glucoregulation and brain, particularly hippocampal, function will be discussed.

Supply and demand in the ageing brain: Can a 'neuroeconomy' model explain glucose effects on neurocognition in younger and older adults?

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The ageing brain undergoes a number of structural and functional changes which compromise the ability to effectively utilize its major metabolic fuels, oxygen and glucose. For example the ability to regulate blood glucose (reflected by relatively higher blood glucose levels) declines with ageing and is an important predictor of cognitive abilities. This relationship is particularly evident during conditions of cognitive demand. Additionally, more effortful processing is more susceptible to enhancement by glucose. The suggestion that mental effort reflects physiological utilization of metabolic resources according to a supply-and-demand 'neuroeconomy' is supported by behavioural studies. Recent neuroimaging experiments in our laboratory have tested this model by examining the impact of glucose administration on central activation, connectivity and neurochemistry. These reveal that, compared with placebo, glucose significantly increased functional connectivity between hippocampus and cerebellum in younger adults during encoding. Higher blood glucose was associated with increased cerebral metabolic rate of oxygen (CMRO2) suggesting that the latter may compensate for decreased supply of glucose. Quantification of a putative glucose peak using Magnetic Resonance Spectroscopy (MRS) revealed higher central values in older brains. The relationship between central glucose levels and mood and cognitive performance will be discussed in the context of a supply-and-demand model.

End of symposium

When do arrows start to compete? A developmental mouse-tracking study

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Recent work in adults has suggested that the strength of social and symbolic cues not presented at fixation (but allowing eye movements to the cue) may be determined less by their biological relevance and more by the distinctiveness of the shape of the cue. The present study examines whether these results extend to children, who may differ in their relative exposure to symbolic cues (arrows) compared to social cues. Children aged 3 to 11 were presented with congruent or incongruent pairs of cues (line drawings of gazing eyes, pointing hands, and arrows) and were asked to indicate the direction of the target cue (indicated at the start of the block) by moving the mouse towards the response box indicating its direction. Results show a similar advantage for arrows and pointing hands in young children as previously found in adults, suggesting that cue shape trumps biological relevance for cues away from fixation from an early age.

How children explain their own performance on a non-verbal response false-belief task

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Rubio-Fernandez and Geurts (2013) manipulated parameters of the standard false-belief task, including emphasising perspective-taking and using a non-verbal play-based response. These manipulations resulted in children predicting the actions of an agent with a false-belief at an earlier age than on the standard-FBT. This adapted-FBT may allow children to show explicit conceptual understanding of theory-of-mind that is otherwise masked by performance demands on the standard-FBT. Alternatively, the adapted-FBT might engage only implicit, not explicit, understanding. Asking children to verbally explain their non-verbal predictions would allow one to test these claims.

38 children (3-5 years) were tested on the adapted-FBT and a standard FBT task with both prediction and explanation questions. More children correctly predicted actions based on false-beliefs on the adapted-FBT than on the standard-FBT ($p = .008$). Children could verbally explain their predictions on the adapted-FBT. However, comparing the explanations of those children who failed the standard-FBT, but passed the adapted-FBT, to those passing both found that the former made more reference to locations and behaviours, but the latter made more reference to mental states ($p < .001$). These results indicate an explicit understanding underpins earlier success on the adapted-FBT, but this may not reflect full conceptual understanding of false-belief.

Rubio-Fernández, P., & Geurts, B. (2013). How to pass the false-belief task before your fourth birthday. *Psychological Science, 24*(1), 27-33.

Randomized trial of iReadMore word reading training and left IFG anodal tDCS in central alexia

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Despite the frequency and severity of reading impairments in post-stroke aphasia ('central alexia') there is a lack of evidence-based treatments. We tested a novel word reading training app, 'iReadMore', and anodal transcranial direct current stimulation of the left inferior frontal gyrus in 21 patients with chronic central alexia.

A baseline-controlled crossover design was used. Participants completed two 4-week blocks of iReadMore training, one with anodal stimulation and one with sham. Each block comprised 34 hours of iReadMore training and 11 stimulation sessions. The primary outcomes were reading ability for trained and untrained words. Secondary outcome measures included semantic word matching, sentence reading and text reading.

iReadMore training improved trained word reading accuracy by 8.7% (95% CI [6.0, 11.4]; Cohen's d = 1.38) but did not generalise to untrained words. Reading accuracy gains were maintained three-months after training cessation. Anodal tDCS (compared to sham), delivered concurrently with iReadMore, had an additive effect on reading accuracy of 2.6% (d = 0.37), both for trained and untrained words. Word reading and semantic matching reaction times also improved, but sentence or text reading did not.

In summary, iReadMore resulted in long-lasting improvements of trained word reading. Anodal stimulation facilitated learning and improved therapy generalisation.

The Testing Effect in long-term retention from incidental and intentional vocabulary learning

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Our previous research on learning new meanings for known words (e.g. learning that *'foam'* means a type of *'safe concealed within a piece of furniture'*) found remarkably little forgetting between immediate tests and delayed tests one day or even one week after training (Hulme, Barsky, & Rodd, 2016). The present study investigates whether testing participants immediately after training had contributed to this good long-term retention, and whether this 'Testing Effect' differs between incidental and intentional learning. Ninety-six participants learned new meanings for existing words incidentally through story reading, and intentionally through a definition learning task. They were then tested immediately on half the items (cued recall and recognition). After

24 hours accuracy was higher for items that had been tested immediately compared with those that had not. Interestingly, this Testing Effect was larger for incidental than intentional learning. These findings have important implications for word learning studies that compare memory between two test points, as the first test provides additional retrieval practice that boosts performance on the second test, and the strength of this effect varies depending on learning method. This research also emphasises the key role that testing can play in learning new vocabulary from storybooks in classroom settings.

Hulme, R. C., Barsky, D., and Rodd, J. M. (2016). *How easily can we learn new meanings for known words from stories?* Poster presented at the meeting of the Experimental Psychology Society, Oxford, UK.

Matthew effects in word learning: does prior knowledge aid consolidation?

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The "Matthew effect" describes how the performance gap between children with good and poor vocabulary widens throughout development (*the rich get richer*). Dual systems models of memory consolidation propose that prior knowledge facilitates the learning and integration of new information, suggesting one way in which a child with good vocabulary may benefit further during word learning. Indeed, recent research has shown that a child's existing vocabulary knowledge is associated with the learning and integration of a new word into memory. However, previous studies have not established the causal direction. To address whether existing knowledge supports new word learning, we taught participants novel words that varied in their orthographic "neighbourhood", and assessed memory performance immediately after learning, the next day, and one week later. At the immediate test, children and adults showed better memory performance for words with neighbours; however, this neighbour benefit was reduced in children but not adults after opportunities for consolidation. Further analyses on adults revealed that just one near neighbour was sufficient to boost word learning, and that this benefit was sensitive to individual differences in expressive vocabulary knowledge. Mechanisms supporting word learning across development will be discussed, alongside implications for the Matthew effect in vocabulary acquisition.

Word learning is affected by language experience and learning method

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Previous language experience can affect the development and use of language. This variation is important to consider in language learning situations, a key component of which is vocabulary acquisition. This study investigated whether experience with more languages leads to better novel word learning.

Participants were taught novel words in four training-testing blocks in which familiar or novel objects were presented in tandem with auditory or bimodal (auditory-visual) labels. Learning of the word-object associations was tested using a multiple-choice image selection task.

Results confirmed that participants learned the labels of familiar objects better than labels for novel objects. Participants also benefitted from bimodal presentation, but this effect was restricted to those speaking more than one Latin-alphabetic language, and the size of the advantage increased with the number of languages spoken. Performance on the bimodal trials was related to the number of languages participants spoke, but the number of Latin-alphabetic languages in which participants were literate was the best predictor of performance overall. The multilingual advantage in vocabulary learning therefore depends on both language experience, the way in which new words are learned, and the interaction between these.

Overnight changes in the representational structure of newly-learned inflections

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The number of stems an affix applies to (type frequency) and the number of times an affixed form occurs (token frequency) both influence the learning and generalisation of inflections, particularly in distinguishing regulars and irregulars. However, how these frequency measures are neurally represented remains unclear. According to the Complementary Learning Systems (CLS) account of learning and memory, the neocortex gradually extracts similarity structure among items during overnight consolidation. High type frequency may facilitate the emergence of componential structure among regulars whilst high token frequency may instead strengthen idiosyncratic representations of irregulars. To test these predictions, we trained participants on two sets of plural inflections containing high type frequency regulars and high token frequency irregulars on two successive days. We used Representational Similarity Analysis of fMRI data collected on the second day to show increased similarity structure among high type frequency regulars and reduced similarity structure among high token frequency irregulars in the left superior temporal gyrus following overnight consolidation. We suggest that, consistent with the CLS, an increase

in similarity structure among regulars sharing the same affix suggest a role for overnight consolidation in extracting similarity structure among separate but related items.

Sleep can benefit memory for trained associations but may not play a specific role in rule extraction

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Sleep may facilitate the extraction of associative regularities that occur across spatially and temporally separate events. In this study, we assessed participants' ability to extract complex regularities and to generalise this knowledge following a 12-hour consolidation delay containing wakefulness or sleep. We used a task in which participants were required to learn face-location associations, but manipulated the stimuli such that combinations of critical facial features predicted screen locations, providing a set of 'rules' that could be extracted across multiple memory episodes. We also included a probabilistic memory feature by associating each face-location pairing with a background context; for some locations this information was predictive of category membership and provided support during learning. Following the delay, participants showed a sleep-associated memory benefit for trained face-location associations. Interestingly, this benefit was specific to items that did not have supporting contextual information, suggesting probabilistic features during learning can modulate the effectiveness of sleep-based consolidation. Following the consolidation delay, both groups also demonstrated knowledge of the regularity structure by successfully applying the extracted rules to novel stimuli. However, there were no differential effects of sleep- or wake-based consolidation on generalisation, suggesting regularity extraction can develop across both time awake and asleep.

Cognitive Inhibition: The n-2 repetition cost and working memory capacity

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Task switching requires an ability to attend to relevant stimuli and ignore irrelevant stimuli, and to execute actions that are concordant with the current goal, processes which cognitive inhibition is thought to facilitate. Computerised task switching paradigms—involving sequential task switching—are used to assess cognitive inhibition via what is known as the n–2 repetition cost (Mayr & Keele, 2000); this cost reflects slower performance returning to a task performed recently (ABA sequence) compared to performance on a task that was not completed recently (CBA sequence). The n–2 repetition cost been used to measure individual differences in inhibitory control; however, its magnitude varies considerably between participants, but the source

of this variance is unknown. Research has suggested that cognitive inhibition may depend on working memory resources (Conway & Engle, 1994); therefore, the current study investigated the relationship between the n–2 repetition cost and working memory capacity (WMC). The n–2 repetition cost was assessed via an adapted task switching paradigm (Grange, Kowalczyk, & Loughlin, 2017), and WMC was assessed with three different measures (Operation, Rotation, and Symmetry spans; Foster et al., 2015). The results revealed that the n–2 repetition cost was not significantly correlated with WMC.

Conway, A. R., & Engle, R. W. (1994). Working memory and retrieval: A resource-dependent inhibition model. *Journal of Experimental Psychology: General*, *123*(4), 354–373. https://doi.org/10.1037//0096-3445.123.4.354

Foster, J. L., Shipstead, Z., Harrison, T. L., Hicks, K. L., Redick, T. S., & Engle, R. W. (2015). Shortened complex span tasks can reliably measure working memory capacity. *Memory & Cognition*, *43*(2), 226–36. https://doi.org/10.3758/s13421-014-0461-7

Grange, J. A., Kowalczyk, A. W., & Loughlin, R. O. (2017). The Effect of Episodic Retrieval on Inhibition in Task Switching. *Journal of Experimental Psychology: Human Perception and Performance*. Retrieved from http://dx.doi.org/10.1037/xhp0000411

Mayr, U., & Keele, S. (2000). Changing internal constraints on action: the role of backward inhibition. *Journal of Experimental Psychology: General*, *129*(1), 4–26. https://doi.org/http://dx.doi.org/10.1037/0096-3445.129.1.4

The effect of ageing on inhibition in task switching when controlling for episodic retrieval

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Inhibition in task switching is inferred from n–2 task 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. Despite inhibitory deficits being a core explanatory construct for age-related decline in cognition (Hasher & Zacks, 1988), studies have found no age-related difference in n–2 task repetition costs. However, recent work from our lab (Grange et al., 2017) has shown that extant measures of the n–2 task repetition cost are contaminated with episodic retrieval effects, which masquerade as inhibitory costs. The purpose of the current study was to revisit potential age-related differences in task inhibition using a paradigm which controls for episodic retrieval effects, thus providing a cleaner measure of task inhibition. We find equivalent n–2 task repetition costs in

response times for older adults and younger adults, but age-related differences on the n–2 task repetition cost in accuracy data. We discuss our results within the context of theories of task switching, and age-related differences in inhibitory control.

Grange, J.A., Kowalczyk, A.W., & O'Loughlin, R. (2017). The effect of episodic retrieval on inhibition in task switching. *Journal of Experimental Psychology: Human Perception & Performance.* Article in press. DOI:10.1037/xhp0000411

Hasher, L., & Zacks, R. T. (1988). Working memory, comprehension, and aging: A review and a new view. In G. H. Bower (Ed.), *The psychology of learning and motivation* (Vol. 22, pp. 193–225). New York, NY: Academic Press.

Switch costs following cue-only trials remain after controlling for between-trial intervals and predictability

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Until recently it seemed that the "switch cost" (poorer performance for switching between than for repeating tasks) was driven by selecting a response on the preceding trial. However, it is now clear from studies using "cue-only" trials that task-preparation alone can drive a subsequent switch cost (Lenartowicz et al., 2011; Swainson et al., 2017). In fact, this cost has appeared to be larger than that driven by (preparation plus) performance on "completed" trials. Here, we set out to control for a number of factors that may have led to this surprising result. In Experiment 1, we controlled the between-trial cue-cue interval to prevent it being consistently shorter following cue-only than following completed trials, and we removed the response-cue interval (following completed trials); in Experiment 2, we reduced the shortest preparation interval from 300ms to 0ms. Switch costs following preparation were equivalent to those following performance. In Experiment 3, we restructured the paradigm to equate the predictability of cue and target events. Switch costs were smaller following preparation than following performance, but still significant. We conclude that switch costs are probably affected by cue-cue intervals and event-predictability but that preparation-driven switch costs are robust after controlling for these factors.

Lenartowicz, A., Yeung, N., & Cohen, J. D. (2011). No-go trials can modulate switch cost by interfering with effects of task preparation. *Psychological Research*, *75*(1), 66-76.

Swainson, R., Martin, D., & Prosser, L. (2017). Task-switch costs subsequent to cue-only trials. *The Quarterly Journal of Experimental Psychology*, *70*(8), 1453-1470.

No evidence for effects of updating and binding training on working memory capacity and efficiency

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In this study, we aimed to disentangle working memory (WM) training effects on WM capacity and WM efficiency. Therefore, we evaluated not only near transfer to untrained, structurally different WM tasks and far transfer to closely related abilities (i.e., reasoning, processing speed, task switching, and inhibitory control), but also process-specific effects of updating and item-context binding training on three WM mechanisms (i.e., focus switching, removal of WM contents, and interference resolution). N = 196 young adults were randomly assigned to one of two experimental groups (updating or binding) or to an active control group practicing visual search tasks. Before and after five weeks of adaptive training, performance was assessed measuring each of the cognitive processes and abilities of interest with four tasks covering verbal-numerical and visual-spatial materials. All three training groups revealed evidence for an improvement on the tasks they practiced. However, we found consistent evidence for the absence of training-induced improvements across all ranges of transfer. The absence of any transfer indicates that neither WM capacity nor efficiency of specific WM mechanisms was improved during training.

The forward testing effect on self-regulated study time allocation and metamemory monitoring

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The forward testing effect describes the finding that testing of previously studied information potentiates learning and retention of new information. Here we asked whether interim testing boosts self-regulated study time allocation when learning new information and explored its effect on metamemory monitoring. Participants had unlimited time to study five lists of Euskara-English word pairs (Experiment 1) or four lists of face-name pairs (Experiment 2). In a No Interim Test group which was only tested on the final list, study time decreased across successive lists. In contrast, in an Interim Test group, which completed a recall test after each list, no such decrease was observed. Experiments 3 and 4 were designed to investigate the forward testing effect on metamemory monitoring and found that this effect is associated with metacognitive insight. Overall, the current study reveals that interim tests prevent the reduction of study time across lists and that people's metamemory monitoring is sensitive to the

forward benefit of interim testing. Moreover across all four experiments, the Interim Test group was less affected by proactive interference in the final list interim test than the No Interim Test group.

Meta-memory in noise: Auditory distraction interferes with allocation and perception of study time

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Even simple memory tasks involve a degree of judgment and strategic decision-making, based upon the perceived benefits of particular mnemonic strategies. The consequences of these metacognitive judgments for memory have been amply documented under experimental conditions that require participants to focus upon a task in the absence of distractors. Here, we consider the impact of less benign environmental conditions —specifically, the presence of distracting speech —upon the metacognitive aspects of memory. In multiple studies, distracting speech reliably disrupted free recall and, as indicated by Judgments of Learning, participants were aware of this effect. However, because participants did not adjust study time to counter these effects, the distraction effect was exaggerated relative to experimenter-imposed presentation rates. A further experiment suggests that this result was the consequence of distraction-induced disruption of time perception at encoding, rather than any deliberate strategy by the participants. The results are interpreted in terms of a limited self-regulation hypothesis and highlight the need to consider the impact of more challenging environments on metacognition generally.

Generalisation of recent word meaning experience across modalities: How we avoid barking up the wrong tree

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Research suggests that adults' lexical-semantic representations are dynamically updated in response to recent experience. For instance, encounters with ambiguous words (e.g. bark) in a particular meaning context (dog vs. tree) will bias their interpretation towards the same meaning after 20+ minutes (Rodd et al., 2013, 2016). Different loci for this priming effect within models of lexical-semantic processing lead to different predictions about whether priming is modality-specific or transfers between modalities. In two web-based experiments, we examined whether exposure to words in spoken sentences affects the later interpretation of written words, and vice versa. Ambiguous words were presented in a written or spoken sentence, or were unprimed. We tested interpretations of written or spoken words roughly 20 minutes later using word association (Experiment 1, N=78) and speeded semantic relatedness decisions (Experiment 2, N=181). We found that sentence-consistent meanings were retrieved more frequently and quickly after priming. This priming effect was significant and similar in magnitude for both unimodal and cross-modal conditions. These results indicate that recent experience with word meanings biases the later interpretation of these words in a modality-general way. This is consistent with a central semantic locus of word-meaning priming. Implications for models of word recognition will be discussed.

Rodd, J. M., Cai, Z. G., Betts, H. N., Hanby, B., Hutchinson, C., & Adler, A. (2016). The impact of recent and long-term experience on access to word meanings: Evidence from large-scale internet-based experiments. *Journal of Memory and Language, 87*, 16-37. http://doi.org/10.1016/j.jml.2015.10.006

Rodd, J. M., Lopez Cutrin, B., Kirsch, H., Millar, A., & Davis, M. H. (2013). Long-term priming of the meanings of ambiguous words. *Journal of Memory and Language, 68*(2), 180-198. http://doi.org/10.1016/j.jml.2012.08.002

Symposium: Convergent approaches to studying reading acquisition

Changes in children's cortical sensitivity and structural connectivity during literacy acquisition

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Literacy acquisition involves exposure to large amounts of print in a focused period of time. How does this environmental transition translate into changes in cortical circuits? We explored this question in a sample of typically developing school aged children, while they acquired fluent reading skills in English, their native language. Initially 7-11y, these children were followed longitudinally with annual measurements of reading-related skills, functional brain responses and structural connectivity, over a period of 3 years. This accelerated longitudinal design allowed us to assess individual change at the brain level and relate it to individual change in reading abilities. Using fMRI, we show that cortical sensitivity to written words in left occipitotemporal cortex increases during the early school years, and reaches adult level around age 12. Individual change in cortical sensitivity correlates with changes in sight word efficiency. Using diffusion MRI, we find that changes in structural properties of white matter pathways (arcuate fasciculus, ILF) predict performance on untimed measures of word and pseudoword reading. These findings will be discussed in the context of current understanding of the reading pathways. I will further discuss the applicability, advantages and shortcomings of longitudinal designs in the study of brain development and reading acquisition.

Linking functional and neural accounts of lexical processing using predictive coding

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Computational theories of lexical processing have proposed that Bayesian perceptual inference explains how word recognition is robust to sensory degradation and benefits from prior knowledge or context. Yet, it is unclear how Bayesian mechanisms can detect and learn new words since (by definition) their prior probability is zero. A second challenge is to explain the hierarchical organization of neural response differences between words and pseudowords. fMRI meta-analyses show additional responses to pseudowords in brain regions that process the visual/spoken form of words. Conversely, greater responses to words are observed in lexical/semantic regions. We previously explained these neural findings using engagement and effort heuristics, which combine to produce an inverted-u shape function that predicts brain activity from goodness of fit to orthographic/phonological and lexical/semantic representations. We here propose a unified predictive coding explanation of all these behavioural and neural observations. The computation and updating of prediction error provides a mechanism for Bayesian word recognition, detection of pseudowords and a computational measure that predicts the relative magnitude and locus of differential neural activity for words and pseudowords. We will explore the implications of this predictive coding theory for fMRI studies in which lexical processing is challenged by sensory degradation and

different tasks.

Statistical learning and writing systems: Learning to read a novel orthography

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Writing systems can be characterized by systematic co-occurrences of letter sequences, by correlations of in letter-to-sound mappings, and by correlations between form and semantic meaning through morphological structure. Proficient readers implicitly develop sensitivities to these statistical properties. While learning to read in L2, they acquire a new lexical system, mainly by picking up and assimilating a new set of statistical regularities. However, like any cognitive ability, there are individual differences in the sensitivity to the correlations in the environment. What drives then the variance in statistical learning? Is this variance related to ease or difficulty of learning to read a new orthography? Drawing on information theory we entertain the theoretical hypothesis that rate of novel information (entropy) per time unit predicts perception of regularities in the visual modality for a given individual. The theoretical implications for learning to read in different writing systems will be discussed.

Computational modelling of reading throughout the lifespan

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Computational models have been vitally important in defining our understanding of reading. The first full-blown implemented models, such as the dual-route cascaded model and the triangle model, were critical in providing explicit descriptions of the representations and processes involved in mapping written words onto their spoken and meaning forms, and the processing deficits that resulted in reading impairments. Since this pioneering work, computational models of reading have progressed in several constructive directions. I will review some recent modelling advances that demonstrate: (1) the influence of literacy on representations in the language processing system, and the varying effects of the world's distinct orthographies on these effects; (2) the nature of gradual, unfolding experience on learning to read, and the changing role of direct and indirect pathways in reading across the lifespan; and (3) the sources of individual differences in reading, and the contribution of environmental factors and aptitudes on reading acquisition.

Nurturing a lexical legacy: language experience and learning to read words

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The scientific study of reading has taught us much about the beginnings of reading in childhood. Similarly, there is a large evidence base charting the cognitive processes that characterise skilled word recognition in adults. Less understood is how children develop orthographic expertise. What factors are critical for children to move from novice to expert? This talk will outline the critical role of experience in this transition. Reading experience provides much more than repeated exposure to individual words in isolation. Words are experienced in meaningful language environments that capture events in the world. According to the lexical legacy perspective, outlined in this talk, this type of experience is important for word reading development. At its heart is the idea that reading provides exposure to words in many different contexts, episodes, and experiences which, over time, sum to a rich and nuanced database about their lexical history within an individual's experience. These encounters bring about local variation at the word level: a lexical legacy that is measurable during word reading behaviour, even in skilled adults. This framing also helps us understand how semantic variables influence word-level lexical processing in tasks such as lexical decision.

Stimulating reading of known and novel orthographies

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The left temporo-parietal cortex has been implicated in subword orthography to phonology translation. This area shows reduced structural integrity and functional activation in developmental dyslexia. We explored the impact of transcranial direct current stimulation designed to enhance processing in this region upon performance of skilled adult readers and those with developmental dyslexia. Anodal stimulation to left temporo-parietal cortex was combined with simultaneous cathodal stimulation of the right homologue, and the effects assessed relative to a sham control condition. When reading aloud regular words, exception words, and nonwords, it was reading accuracy of nonwords that was enhanced both in skilled readers and even more so in those with developmental dyslexia. We also explored the impact that stimulation had upon learning to read aloud a novel orthography. The standard consistency by frequency interaction emerged after training for skilled readers, but frequency effects were present irrespective of consistency amongst those with developmental dyslexia. Although stimulation did not exert an appreciable impact on the learning of skilled readers, it did improve performance in developmental dyslexia for low frequency consistent words, producing a consistency by frequency interaction. These results suggest that relateralising stimulation to the temporo-parietal cortex facilitates subword mapping amongst those with developmental dyslexia.

End of symposium

Familiar face dominance in binocular rivalry

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We know from a large body of research that there are differences between the ways familiar and unfamiliar faces are processed in the brain. To date, however, there has been only a limited exploration of how the high-level concept of our familiarity with a person may influence low-level processes such as visual awareness. This study investigates the effect of familiarity on the perceived dominance of face images by presenting familiar and unfamiliar faces in a binocular rivalry paradigm. Face/house rival pairs comprising a house and either a familiar or unfamiliar face are presented via a mirror stereoscope. The results of a within-subjects experiment (1⁄2 faces familiar to each participant) show that familiar faces are perceived as dominant for longer than unfamiliar faces, only when the images are presented in an upright orientation. Two further experiments will be discussed: a between subjects design (faces familiar to 1⁄2 participants); and a mixed design (unfamiliar, newly learned, famous, and personally familiar faces). This research has important implications for understanding how the visual brain processes familiar people, and how we learn new identities. This research is funded by a University of Lincoln College of Social Science research grant.

Testing the universality of first impressions from faces using data-driven modelling

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People form first impressions from facial appearance rapidly, and these impressions can have considerable social and economic consequences. Three dimensions can explain Western perceivers' impressions of Caucasian faces: approachability, youthful-attractiveness and dominance. These dimensions are theorized to relate to threat detection or sexual selection, making it likely that they are universal. We tested whether the same dimensions of facial impressions emerge across perceiver and face race for the first time, by building data-driven models of first impressions of Asian and Caucasian faces derived from Chinese and British perceivers' unconstrained judgments. We then cross-validated the dimensions in an experimental study. We found

strong evidence for common approachability and youthful-attractiveness dimensions across perceiver and face race, with some evidence of a third dimension akin to capability rather than dominance *per se*. The models explained ~75% of the variance in facial impressions. In general, the findings demonstrate substantial cross-cultural agreement in facial impressions, and especially on the most salient dimensions

The effects of social pressure on face recognition

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Face recognition is a dynamic and important skill. In the laboratory, it is typically tested under controlled conditions with no external interference or pressure, whereas in the real world, faces are recognised during interactions with other people and/or whilst being observed (in eyewitness scenarios, for example). Employing an old/new face recognition paradigm, in which participants saw faces that they believed they were interacting with or not and that they were being observed whilst viewing or not, we found that being observed, but not interacting with, had a detrimental effect on face recognition accuracy. In subsequent experiments, we found the effect of being observed during the learning of faces had a detrimental effect on face recognition accuracy, but being observed during test did not interfere with recognition. The effect of being observed affected the accuracy of upright own-ethnicity face recognition but not the recognition of inverted faces, other-ethnicity faces, nor objects. These results indicate that the learning of faces is affected by the mere presence of other people and are discussed within a framework of social pressure interfering with expert processing.

Number of objects and number of features influence the extent of age related differences in visual information processing

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Guest et al. (2015) used a time-accuracy-function (TAF) paradigm to estimate age related differences in the speed of visual information processing and found that this was reduced for older adults but only when multiple stimuli were present. However, this slowing may have been due to the number of objects, the number of relevant features or total amount of information in the displays. We disentangled these factors in two experiments that utilised the TAF procedure. In Experiment 1, four Gabor stimuli were always presented and participants were post-cued to report the orientation of one of

these. Either 1,2 or 4 objects were pre-cued with minimal age related slowing of processing for set size 1, but age related differences observed for larger set sizes. Experiment 2 examined the extent to which processing rate was influenced by the number of objects or features to be reported. Two, two feature stimuli were always presented with pre-cues as to the relevant features/objects. Age related differences in processing rate were observed that indicated that that it was neither the number of objects nor the number of features per se, but the similarity between features to be encoded that caused age related slowing in processing rate.

Oculomotor impairments are associated with deficits of covert attention and spatial short-term memory

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The mechanisms that control covert attention and spatial short term memory are tightly coupled with the eye-movement system. We have previously argued for a specific link between the ability to make normal eye-movements and the optimal functioning of exogenous attentional orienting and spatial short-term memory (Pearson, Ball, & Smith, 2014; Smith, Ball, & Ellison, 2014). One key piece of evidence for this link is a selective deficit of exogenous orienting along the vertical axis in Progressive Supranuclear Palsy (PSP), a degenerative neurological disease characterised by vertical paralysis of gaze (Rafal, Posner, Friedman, Inhoff, & Bernstein, 1988). In the current study we extended this work using visual search and the Corsi blocks task to test for selective, vertical deficits of covert attention and short-term memory in people with PSP. Patients had shorter memory spans and less efficient covert visual search when stimuli were presented along the vertical axis compared to the horizontal axis. Critically, this effect was not observed in age matched controls, or a group of patients with Parkinsons disease. These data are consistent with the proposal that an intact eye-movement system is required for optimal functioning of covert spatial attention and short-term spatial memory.

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Mapping the effects of transient cortical disruption across the brain: combining thetaburst TMS and fMRI

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Mapping the cortico-cortical connections of the functional brain networks that underpin human behaviour is a fundamental challenge for neuroscience. The next conceptual gains in this area will come from a greater understanding of the causal interactions across these brain networks. Targeting a cortical area with TMS, and measuring the disruptive effects across the brain with fMRI, allows researchers to do this a neurologically normal population. Results from these combined TMS/fMRI studies can be used to model the effects of traumatic brain injuries and brain disorders (e.g. autism) to improve understanding of how cortical disruption impacts the brain and behaviour. In my talk, I will present a series of studies in which I have combined thetaburst (TBS) TMS with fMRI to map the remote impact of disruption in the cortical network that underpins face perception in the human brain. These studies identify the causal connectivity between face-selective regions and how these regions are connected with remote brain regions that support other cognitive functions. Overall, the results demonstrate that combined TMS / fMRI studies offer a safe, and replicable, way to study face recognition in the human brain.

Mirror neuron activity in younger and older adults

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The human mirror neuron system (hMNS) may have an important role in social cognition, such as for understanding other's actions and intentions. In addition, difficulties in social cognition have been reported in healthy ageing. We therefore investigated the functioning of the hMNS in healthy ageing using mu suppression as an EEG marker of the hMNS. Younger and older adults completed a hand movement observation task. Initially, participants performed a 2-minute resting-state EEG as a reference period. Subsequently, participants watched different video clips (3s in duration) depicting either a static hand or various hand actions, such as locking a door or clicking fingers. For younger adults, we replicated previous findings of greater mu suppression during hand movement observation compared to static hand observation. Interestingly, we found that mu suppression during hand movement observation was significantly greater for older adults compared to younger adults. Additional analyses examined how mu suppression, and hence hMNS activity, is influenced by peoples' day-to-day social experiences.

The results suggest that the hMNS continues to specialise for social cognition with advancing age.

The impact of using an upper-limb prosthesis on the perception of real and illusory weight differences

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Following an amputation of a hand or arm, a prosthetic device will often be employed in an attempt to restore the user's ability to interact with objects. However, our hands are not only tools to manipulate our environment, but also allow us to experience various non-visible properties of objects such as centre of mass, temperature, and weight. Despite this, almost no research to date has examined how using a prosthetic hand influences our perception of manually-acquired object properties. To shed light on the perceptual consequences of prosthetic use, we first examined how a group of upper-limb amputee prosthetic users experienced real and illusory weight differences in the context of the size-weight illusion. Prosthetic users reported a markedly smaller size-weight illusion than controls, despite equivalent perception of real mass differences. We then examined heaviness perception in a group of non-amputees who used a myoelectric prosthetic simulator to lift the stimuli, again finding that the prosthetic users experienced illusory, but not real, weight differences as being weaker than controls. These findings highlight a surprising dissociation between the perception of real and illusory weight differences and offer insights into how tools are incorporated into our body schema.

Symposium: Social perception and its atypicalities

Some important differences between facial and bodily expressions and why they matter

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Voices, faces and whole body expressions are the major sources of affective information and the major triggers of adaptive action. There is evidence in the literature that the visual as well as the auditory system are tuned to preferential processing of these biologically basic signals. So far comparative studies have underscored the similarities between those three signaling systems, based on the notion that affective perception is rooted in abstract emotion concepts. This presentation will stress the importance of the differences and show how naturalistic experiments

including the use of virtual reality reveal relate the characteristic difference in how faces, voices and body expression are perceived.

Attachment style and preferences for perceived social traits in faces

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Psychological models of facial appearance suggest that dominance and trustworthiness are two of the most important dimensions influencing social judgments. Dominance in appearance reflects a masculine structure, whereas trustworthiness reflects a resting positive emotional demeanour. Many studies of attraction have focused on the importance of impact of facial masculinity yet the importance of trustworthiness in facial appearance for interpersonal attraction remains unexplored. We predicted that as individuals with insecure attachment are more mistrustful of others, they will prefer more trustworthy faces in comparison to securely attached individuals. We generated Caucasian 3D facial continua varying between low and high apparent trustworthiness. Heterosexual, Caucasian women manipulated 20 male faces to make them as attractive as possible within the range available. We compared the preferred appearance to attachment style measured used the Experiences in Close Relationship Scale. Women who scored highly in both anxious and avoidant attachment style showed a preference for more trustworthy looking male faces compared to women with a secure attachment style. Our findings indicate that differences attachment style affect attractiveness judgments: securely attached individuals need less positive expression to find faces attractive.

A cumulative account of the neural basis of developmental prosopagnosia

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Behrmann and colleagues have suggested developmental prosopagnosia results from a disconnection between face processing mechanisms in occipital and posterior temporal cortex and those in anterior temporal cortex. I will review evidence indicating deficits are often not restricted to anterior regions and then tentatively suggest a cumulative account of the neural abnormalities found in DP.

Holistic face processing in typical and atypical observers

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Holistic theories of face perception posit that local facial features are integrated into a unified representation for the purposes of efficient analysis and interpretation. I will discuss our research using the composite face illusion and a novel aperture task to explore holistic processing in typical observers and in those with Autism Spectrum Disorders and developmental prosopagnosia.

Reward driven modulation of the response to faces: Clues for and from Autism

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Social perception routinely involves looking at and responding to others' facial expressions of emotion. This process often elicits spontaneous facial mimicry, which is atypical in individuals with Autism Spectrum Conditions (ASC). In our studies using facial EMG, eye-tracking, fMRI, and EEG, we test the modulatory role of reward on spontaneous facial mimicry and related processes. The extent of this reward-driven modulation is weaker in individuals with higher levels of autism-related traits, on both sides of the clinical diagnostic boundary. I will review the evidence from these studies, and present a putative framework to understand responsivity to social stimuli in ASC.

How is autistic social processing affected by ageing?

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Social perception and processing, and specifically 'theory of mind' (ToM), has become a focus of interest in ageing research. Most studies suggest a decline in ToM task performance in ordinary adults as they grow old. This raises interesting questions about ageing effects in autism - a condition typically characterised by impaired ToM. Will already poor ToM become even worse as adults with autism age? Or might life-long compensation efforts lead to preserved ToM performance in old age in autism? I will present relevant recent data collected with Dr Esra Yarar.

End of symposium

Individuals with autism do not change reading strategies as a function of reading goals: A matter of planning

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The sources of reading comprehension difficulties in persons with autism spectrum disorder (ASD) are still open to discussion. We explored their ability to adapt reading strategies to different reading goals using eye-tracking technology. A group of participants with ASD read three stories under three different reading goals conditions: entertainment, study, and read fast and search information for a previously presented question. Results showed no group differences on accuracy in question answering. The control group read more slowly, made longer fixations and perceived to be more confident in question answering during reading for study compared to reading for entertainment. These differences between reading goals were not observed in the ASD group. The control group adopted, and was aware of the use of different reading strategies according to different reading goals. By contrast, the ASD group did not change their reading behavior according to the reading goal, showing less of a tendency to adopt deep-level processing strategies when necessary. Planning was the only executive component that predicted reading times in the ASD group. This pattern of behavior illustrates that reading comprehension problems in autism may be partially explained by difficulties in adjusting the reading behavior according to the task and in planning.

What do spellings of English suffixes tell us?

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Why are the endings of NERVOUS and BONUS spelled differently when they are pronounced in the same way? Recent work by Berg and Aronoff (2017) suggests that spellings of English suffixes convey information about syntactic properties of words i.e. grammatical classes that they belong to: adjectives end in -OUS, while nouns never end like this. Here we present the results of a large-scale computational linguistic analysis showing that most words that we read on a daily basis provide some orthographic cue to grammatical class.

The assignment of grammatical class is a fundamental problem that must be solved in language acquisition, comprehension, and production. Having discovered a high degree of regularity between suffix spelling and grammatical class, we then asked whether readers pick up this information in the absence of formal instruction, and use it when dealing with written language. We conducted a series of psychological experiments with novel words using spelling to dictation, eye-tracking during sentence reading, and classification tasks. We found that adults draw inferences about grammatical class of novel words based on their orthography, exploit these cues in their

spelling of nonwords, and also rapidly access this information in the context of natural sentence reading.

Orthographic, morphological and semantic parafoveal processing in Arabic reading: Evidence from the boundary paradigm

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Evidence clearly shows that skilled readers extract information about upcoming words: Parafoveal previews that share relevant information with the target word result in facilitation of target word processing once this target is fixated (e.g., Deutsch et al., 2000; Rayner, 2009; Schotter, 2013; Schotter et al., 2012). Using the boundary paradigm (Rayner, 1975), we investigated native Arabic readers' processing of orthographic, morphological, and semantic information available parafoveally. Target words were embedded in sentences, with one of the following preview conditions: (a) Identical; (b) Preview sharing root morpheme with the target; (c) Preview sharing form morpheme with the target; (d) Preview sharing all letters with the target, but the root letters were transposed creating a nonsense string with an unknown root; (e) Same as (d) but the root letter transposition created a new word with a known root; (f) Preview that is a synonym with the target; and finally (g) Unrelated previews. Results suggest that previews that share intact target roots (condition a), or all target letters (condition d) produce facilitation. In contrast, previews containing new known roots (condition e) result in increases in target processing time. The effects of pre-processing shared orthographic, morphological, and semantic information parafoveally will be discussed.

Predictors of incidental word learning during reading in monolingual and bilingual children: Evidence from eye movements

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In English, bilingual children tend to have poorer vocabularies than their monolingual peers, yet there is some evidence that they show an advantage in learning new words. This study examined the predictors of incidental word learning during reading in children who did and did not speak more than one language. 30 monolingual and 30 bilingual children read a series of sentences containing six presentations of unfamiliar words over two training sessions while their eye movements were monitored. Target words were embedded in semantically meaningful sentences. After exposure children were tested on their knowledge of the novel words and asked about their home

language environment. Reading accuracy and comprehension skills were also measured. Results showed a larger decrease in reading times over exposure for bilingual than monolingual children; and both groups showed good performance in offline tests of word learning. Children with better comprehension but not reading accuracy showed better learning at post-test. Preliminary analyses also indicate that speaking both English and (an) other language(s) at home was associated with more efficient learning in the bilingual group. Overall results are consistent with a role for both home language environment and comprehension skill in efficient and successful learning of new words through reading.

Learning new words when reading: effects of contextual diversity and temporal spacing

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We examined whether contextual diversity and spacing during reading experience influence new word learning as adults read sentences silently. Eye movements were recorded as adults read new words embedded in either neutral (testing phase) or meaningful sentences (exposure phase). Words were presented either in the same sentence repeated four times (low diversity) or in four different sentences (high diversity). Spacing was manipulated by presenting the sentences in a distributed or non-distributed episodes. During the exposure phase, words experienced in low diversity contexts had shorter fixation and reading times than words in experienced in varying contexts. Similarly, words experienced in a non-distributed manner received shorter fixation and reading times than words seen in distributed contexts. At test, fixation times on the new words were reduced relative to baseline for both early and late measures of processing. The interaction between diversity and spacing was significant for total time, such that words experienced in the low diversity condition and in a non-distributed manner resulted in longer total times compared to words experienced in varying and distributed contexts. These findings suggest that diversity and spacing promote word learning.

Musical experience affects tone merging in Cantonese speakers: The relationship between perception and production

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There is an ongoing sound change in Cantonese, with acoustically similar tone pairs merging into one category, such as the two rising tones (Tones 23 and 25), the two

low tones (Tones 22 and 21), and the two level tones (Tones 22 and 33). A possibility for the driving force of Cantonese tone merging may lie in listeners' misperception of these tones, due to their limited auditory acuity in differentiating inherently ambiguous speech signals. We tested this hypothesis by comparing 26 Cantonese-speaking musicians with 26 non-musicians on the discrimination and identification of the three merging tone pairs and one non-merging tone pair (Tones 25 and 55), as well as their production of these tones. Results indicate that musicians were better able to discriminate and identify the merging tones than non-musicians, while the two groups achieved similar performance on the non-merging tones. Acoustic analysis of the tone production data revealed that musicians produced more distinct pitch trajectories for the merging tones than non-musicians. These findings suggest that individual auditory processing variability may be a precursor to sound change, in terms of both production and perception, and musicianship may resist sound change that originates from misperception and mis-production of ambiguous speech signals.

Involuntary versus voluntary recall of musical memories: Comparing temporal accuracy and emotional responses

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Music research affords a unique opportunity for comparing involuntary and deliberate retrieval of the same memory. We compared recall accuracy and emotional responses between involuntary musical imagery (INMI, or 'earworms')—the spontaneous mental recall and repetition of a tune—versus deliberate recall as voluntary musical imagery (VMI). Twenty participants completed two 3-day tasks. In an INMI task, participants recorded information about INMI episodes as they occurred; in a VMI task participants were prompted via text message to deliberately imagine each tune they had previously experienced as INMI. In both tasks, the tempo of the imagined tunes was recorded by asking participants to tap to the musical beat while wearing an accelerometer. Additional information (e.g. tune name/ performer, emotional response) was recorded in a diary for each tune. Tempo recall was highly accurate for both INMI and VMI in comparison to the recorded version of canonical songs (median deviation from original tempo = 7.7% and 7.3% respectively), and recall accuracy did not significantly differ between the two retrieval modes. The results also revealed stronger emotional responses to INMI than VMI, which were moderated by features of the music (e.g. arousal ratings were positively influenced by INMI tempo but not VMI tempo).

The impact of time and emotion on directed forgetting

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There are many traditional theories of forgetting which reinforce the idea that memories are passively and unintentionally lost. However, evidence also indicates that forgetting can be an intentional, active process. The present study aimed to examine intentional forgetting by using the Directed Forgetting (DF) paradigm and emotionally valenced stimuli. The role of time and possible decay mechanisms were also explored. Participants viewed 96 words that were positive, neutral or negative in valence. Words were proceeded by a cue instructing participants to remember or forget each item, and a short delay (0.5s) or long delay (10s) followed each word. At the end of the presentation, participants were asked to recall all of the words regardless of cue. Results found a traditional DF effect, where the 'remember' items were recalled better than the 'forget' items. It was also found that both cues led to emotional items being remembered better than neutral items. Furthermore, the to-be-remembered positive words were more likely to be remembered than the to-be-remembered negative words, and negative items were forgotten rapidly over longer delays. A range of factors may be at play when people try to intentionally forget information.

Body size adaptation for bodies and faces, but not across categories

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Several studies showed that adaptation to thin bodies can bias perception of what an average body looks like [1, 2]. Here, in three experiments, we investigated whether similar aftereffects occur after adaptation to faces, and whether such adaptation transfers between faces and bodies.

In Experiment 1, on each trial participants had to decide whether the body they saw was thinner or fatter than average. Participants performed the task before and after adaptation to a thin body. Consistent with previous studies [1, 2], after adaptation participants judged subsequently presented bodies to be fatter than at pre-test. In Experiment 2, we used the same procedures but with faces as both adapting and test stimuli. We found that after adaptation to a gaunt face participants judged subsequently presented faces to be fatter than at pre-test.

In Experiment 3, we investigated whether body size aftereffects transfer between faces and bodies. Previous studies showed cross adaptation between faces and bodies for both identity [3] and gender [3, 4]. Here, we used similar procedures as in experiment 1 and 2, with bodies as test stimuli and faces as adaptors. Contrary to previous studies, we found no transfer from faces to bodies on the body size judgments.

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The relationship between ADHD symptoms and daily-life and probe-caught spontaneous and deliberate mind wandering in community samples

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Inattention is one of the core symptoms of Attention Deficit Hyperactivity Disorder (ADHD) together with hyperactivity and impulsivity (APA, 2013). Working memory is related to mind wandering (Kane & McVay, 2012), and, is a key feature of inattentive but not hyperactive/impulsive symptoms (Elisa et al., 2016). Therefore, it is possible that the positive relationship between ADHD and mind wandering (Seli et al., 2015) is driven by inattentive symptoms. We first found, in a survey study, that only spontaneous mind wandering was related to the symptoms of ADHD, and, spontaneous mind wandering was not unique to inattention. We then conducted an experimental study using the Sustained Attention to Response Task (SART) to measure spontaneous and deliberate mind wandering in two conditions: standard and easy. We found that inattention was related to spontaneous mind wandering only when the task was cognitively challenging enough (standard SART). However, hyperactivity and impulsivity were related to spontaneous mind wandering independent from the task difficulty. In conclusion, spontaneous mind wandering is a key characteristic of ADHD and is not unique to inattention. However, individuals with inattentive and hyperactive/impulsive symptoms may differ in the experiences of spontaneous mind wandering in relation to the demands of the primary task.

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The effect of evaluative conditioning on implicit associations and explicit choices of healthy and unhealthy foods

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External stimuli may be an important guiding factor in nutritional decision-making. Influencing food choice has been notoriously mixed in effectiveness (Hollands, Marteau & Prestwich, 2011; Lebens et al., 2011; Walsh & Kiviniemi, 2014). This study aimed to test the effect of evaluative conditioning (EC) on implicit associations and explicit choice of healthy and unhealthy foods. To increase statistical power to measure explicit choice, we replaced a single snack selection with a repeated-measures decision-making task EC paired images of healthy and unhealthy foods with happy or angry faces, with food-face pairing (healthy-happy/unhealthy-angry or healthy-angry/unhealthy-happy) manipulated between participants. Results showed a significant effect of EC on implicit associations, but not on food choice. There was, however, an indirect effect of EC on food choice, mediated by implicit associations. In addition, emotional eating moderated the effect of EC on implicit and explicit measures. EC had an effect on low emotional eaters only. High emotional eaters, in contrast, showed a significant effect of habitual fruit/veg intake on explicit choice. Results suggest food choice may be altered by conditioning implicit food evaluations in those low in emotional eating. Choices of high emotional eaters might instead be governed by habitual food choices.

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The effects of image pixelation on face learning

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Low resolution images obtained from closed-circuit television (CCTV) are often released in the case of missing or wanted persons. Specifically, Police Officers are briefed before commencing their duties with images of the most sought-for individuals using photographs of varying quality. While previous research has investigated the effect of pixelation on face matching and face recognition performance, it is unclear how well people can learn faces from degraded images. The current study examined face learning from images pixelated in varying degrees and high quality photographs. Recognition accuracy was close to, or below chance in all pixelated conditions, but faces learned in high quality were recognised reliably at 85% (Experiment 1). Interestingly, the recognition accuracy for the most degraded images (horizontal resolution of 15 pixels) could be somewhat improved by presenting all images in the same resolution, suggesting that participants may adopt a strategy to only memorise identities they subjectively think are possible to recognise later (i.e. those of higher quality). This study shows that learning identities from degraded images is ineffective and results in low recognition rates, but provides a potentially fruitful avenue for increasing the recognition accuracy for the most challenging photographs by learning the difficult faces in isolation.

Helpful or harmful? Forensically relevant time delays and the construction of facial composites

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In police investigations in which the perpetrator of a crime is unknown, a facial composite image can be constructed by an eyewitness and disseminated to the public to find potential suspects. These suspects can then be presented back to an eyewitness in a police line up to confirm whether or not they are the perpetrator. Available research suggests that composite construction can be both helpful and harmful for such subsequent person identifications, by either facilitating recognition performance or diminishing it. The present study examined which of these effects is observed over

delays that are forensically relevant for applied settings. In line with UK police guidelines, composite construction occurred 24 to 48 hours after viewing a target identity, and recognition performance was tested ten weeks after initial exposure. Recognition performance was not significantly different between composite constructors and a group of controls, who also attempted the person identification but did not construct a composite. These findings suggest that composite construction does not exert helpful or harmful effects on subsequent criminal identifications with delays that are appropriate for applied settings.

Unfamiliar face matching at a virtual reality airport

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Person identification at airports requires the matching of a passport photo to its bearer. In psychology, this process is studied with pairs of faces, which require identity match (same person shown) versus mismatch (two different persons) decisions. Extensive research demonstrates that performance in this task is error prone. However, a real life environment is more complex and difficult to control than simple visual displays. Virtual reality (VR) might provide a means of examining face matching under conditions that allow stimuli and environment to be controlled but also realistic. A series of experiments explored this possibility, by examining face matching with VR avatars derived from photographs of real people. An initial matching experiment of avatars versus photographs showed avatars captured the identity of the source image (Experiment 1), and can be matched to a different image of the same person to an above chance level (Experiment 2). Avatar matching also correlated with performance on established face matching tests, both for face-face (Experiment 3) and face-body comparisons (Experiment 4). These findings held when avatar identity matching was assessed in an immersive VR airport environment (Experiment 5). The potential of VR as a method for investigating face matching in complex environments is discussed.

Example face pairs improve identity-matching in low-performing individuals

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Unfamiliar face matching refers to the task of deciding whether two simultaneously-presented faces that are unknown to the viewer represent the same identity. This is a difficult task, even for passport officers, who perform such comparisons routinely in security settings. The current study investigated whether the provision of example face pairs, which are labelled clearly as identity matches and mismatches, can improve matching of a target face pair. Compared with a baseline

measure, the provision of examples did not improve accuracy at a group level. However, correlational analysis revealed that such an improvement was present in individuals whose matching accuracy was initially particularly low. This improvement was observed across three experiments, and generalised to new stimuli that had not been seen with examples.

Captured by movement: the effect of motion on transient attention

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Two components of covert attention have been proposed with distinct but overlapping time courses. Transient attention is primarily bottom-up and is captured by the sudden onset of stimuli, providing a relatively rapid performance enhancement. Sustained attention is a top-down mechanism that has a relatively slow performance enhancement. This study was the first to examine the ability of motion, an important indicator of animacy and causality which has superior capture effects over features such as luminance changes and colour (Al-Aidroos, Guo & Pratt, 2010), to capture transient attention. Using a spatial cuing paradigm, we manipulated stimulus onset asynchrony (SOA; the time between cue and target onset) and cue speed (moving or stationary) to examine the effect on performance in a brightness discrimination task. Experiment 1 showed that participants performed better in the stationary cue condition. Both cues revealed evidence for the rapid deployment of transient attention followed by a fall in performance thereafter. Experiment 2, which used a different motion cue, found no effect of speed. In contrast to Experiment 1, a rapid rise in performance followed by sustained performance was observed for both speeds. These results suggest that the type of movement cue influences the time course of transient attention.

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Correlating endophenotypes of schizophrenia: sensory gating, smooth pursuit eye movements, attentional blink and schzotypal traits

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Schizophrenia is a pervasive disorder that is associated with various neurocognitive deficits. A period of functional decline in neuropsychological measures of information processing occurs 1 – 5 years before the onset of psychotic symptoms.

These deficits can represent a signature of the disorder that reflect the action of genes that predispose an individual to the disorder (i.e., the endophenotype, Turetsky et al., 2007). This suggests that studying schizotypal traits (subclinical signs of schizophrenia, Ettinger et al., 2015) can be utilised as a strategy to understand the cognitive deficits in schizophrenia and may aid the early identification of those vulnerable to the disorder (Hazlett, et al., 2015). In this study, we correlated schizotypal traits (measured using the Schizotypal Personality Questionnaire, SPQ) with various key endophenotypes of the disorder: the ERP P50 sensory gating, smooth pursuit eye movement measures (initiation and prediction measures), and attentional blink. Significant correlations were found between these endophenotypes and the SPQ. Specifically, significant correlations were observed between specific endophenotypes and specific subtypes of schizotypy, indicating the endophenotypes may reflect different aspects of the disorder.

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An investigation of visual, orthographic and lexical processing during reading of sentences

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The neural correlates of visual, orthographic and lexical processes that occur during fixations in natural reading have received little experimental attention to date. The aim of this study was to provide an insight into the nature and time course of these processes by simultaneously recording participants' eye movements and EEG signal during a sentence reading experiment. We manipulated two target words embedded in each sentence for parafoveal preview and word frequency using the boundary paradigm. Before crossing the boundary, a preview of the identical target word, a string of letters, or a string of Xs was presented. After crossing the boundary, previews were replaced by

the targets which were high or low frequency words. Eye movements were analysed for pre-target and target words and fixation-related potentials (FRPs) time-locked to fixation onsets of pre-target and target words were analysed within a time-window of 250ms. Preliminary analyses show effects of frequency and preview in the eye movement data and corresponding FRP effects are considered for the target regions. We interpret our findings in relation to visual and linguistic foveal and parafoveal processes that unfold within the duration of first fixations on critical words within sentences.

Effects of subtle changes in text spacing on eye movements of young and older adult readers

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Research has investigated the benefits of subtle changes in inter-letter and inter-word spacing on reading processes for skilled young adult readers (Slattery et al., 2016) and developing readers with and without dyslexia (Zorzi et al., 2012). Subtle increases in text spacing are assumed to offset effects of visual crowding. However, studies have not investigated if such benefits are observed for older adult readers, although effects of visual crowding are thought to be greater in older age. Accordingly, the present research investigated effects of subtle changes in normal inter-letter and inter-word spacing on the eye movements of skilled young adult (18-32 years) and older adult (65+ years) readers for sentences containing a target word of high or low lexical frequency. Typical patterns of age-related reading difficulty were observed. However, no benefits of increased text spacing were observed for either age-group, although normal reading processes were disrupted more for the older than younger adults when spacing was decreased relative to normal. The findings show that neither skilled young or older adult reader benefit from subtle increases in text spacing, and that older adults are less resilient to subtle decreases in text spacing that disrupt normal word shape or produce increased visual crowding.

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Transposed letter effects in Persian: Evidence from a semantic categorization task

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Persian belongs to the Indo-Iranian branch of Indo-European languages and is read from right to left. Using a multi-word display paradigm that resembled the procedure developed by Brysbaert (1995), we presented native Persian readers with three context-setting words (e.g., drink containers: پیاله *cup*, بطری *bottle*, پارچ *pitcher*). On the same line, a fourth (target) word (e.g., لیوان *mug*) appeared on the far left. Target words were presented either spelled correctly, or with transposed (لیاون) or substituted (لیلرن) internal letters. The context-setting words either belonged to the same semantic category as the target (the example above), or did not (e.g., clothes: دستکش *gloves*, شلوار *pants*, جوراب *socks*). All words were masked prior and subsequent to being fixated (e.g., once the reader's eye moved on to the next word). Controlling the display and masking of all words was done using an eye tracker, with programed invisible boundaries triggering the display changes. The readers' task was to determine if the target word is semantically related to the preceding three words. The results from response time, accuracy, and fixation duration measures, indicate that Persian readers show transposed letter effects, particularly when the target string is preceded by a semantically-congruent context.

Orthographic and root frequency effects in Arabic: Evidence from eye movements and lexical decision

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One of the most studied effects in the reading literature is that of word frequency. Semitic words (e.g., in Arabic or Hebrew) contain roots that indicate the core meaning to which the word belongs. The effects of the frequency of these roots on reading as measured by eye movements is much less understood. In a series of experiments, we investigated and replicated word frequency effects in Arabic: Eye movement measures showed the expected facilitation for high- over low-frequency target words embedded in sentences (Experiment 1). The same was found in response time and accuracy in a lexical decision task (Experiment 3a). Using target words that were matched on overall orthographic frequency and other important variables, but that contained either high or low frequency roots, we found no significant influence of root frequency on eye movement measures during sentence reading (Experiment 2). Using

the same target words in a lexical decision task (Experiment 3b), we did obtain a significant effect for root frequency, but it was qualified by a significant interaction with letter string lexicality. The results suggest that compared to overall word orthographic frequency, the frequency of Semitic roots has a more subtle, albeit important, influence on word processing measures.

Fighting like cats and pies: Competition between meanings in interlingual homograph processing

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The dominant view of the bilingual lexicon is that native (L1) and non-native (L2) words are stored in an integrated manner and accessed non-selectively (e.g., Dijkstra & Van Heuven, 2002). However, to communicate effectively, bilinguals must choose words from one language selectively depending on context. We investigated inhibition and interference between languages in proficient Polish-English bilinguals using a Semantic Relatedness Judgement Task involving pairs of English words. In critical pairs one of the words was an interlingual homograph (IH; same orthography but different meaning across languages). Of particular interest was the extent to which the degree of orthographic overlap between the IH's two readings influences activation. This was explored by comparing identical (PIES, meaning "dog" in Polish) and similar IHs (CARAVAN, similar to the Polish word KARAWAN, meaning "hearse"). Findings replicated previous results with slower RTs and more errors if the IH was paired with a word related to its L1 meaning. Interestingly, this effect was greater for similar (CARAVAN-FUNERAL) than for identical IHs (PIES-CAT). We, therefore, conclude that L1 interference and inhibition can still be evident when bilinguals are predominantly exposed to their L2 and that orthographic overlap across languages can influence the level of L1 activation.

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Individual differences predict performance in language production and comprehension

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Previous studies suggest that the animacy of the head noun in relative clauses modulates the processing cost in comprehension, and utterance choice in production. Specifically, animate-head active phrases (e.g. the girl that the woman is hugging) are

more difficult to comprehend and are rare in production, as compared to passive phrases (e.g. the girl that is being hugged by the woman). It has been proposed that conceptual similarity between noun phrases plays a role in production and comprehension: speakers and comprehenders experience greater semantic interference/inhibition when encountering highly similar entities, leading to difficulty. This proposal predicts that an individual's inhibition skills should correlate with performance in production and comprehension. This study investigated this prediction, and also examined the influence of other cognitive abilities that have been previously identified to modulate language skills, e.g. vocabulary, working memory and reading exposure. In the study, 67 adults completed two picture-based tasks measuring relative clause comprehension and production, with 8 tasks assessing other cognitive skills. The results found that both inhibition and vocabulary are key determinants of successful comprehension and production, suggesting shared mechanisms underlying sentence comprehension and production.

Examining the influence of mind wandering and interest on recall within a retroactive interference context

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Retroactive interference (RI) occurs when the recollection of previously learned information is hindered by new or distracting information. The aim of this study was to uncover potential factors which increase a memory's resistance to RI, increasing learning potential. The study focused on two variables that have been shown to influence recall scores: interest and mind wandering. When interest is high, recall is increased, while higher mind wandering hinders successful recall. Participants (N = 121) were shown a list of 20 random facts and rated the interest of each fact individually. At three points, mind wandering (task-unrelated thought) was also measured. The fact presentation was followed by either a 5-minute period of waiting (control) or spot the difference tasks (interference) and then free recall. This was repeated with the opposing task with another list of 20 facts. Results show that 1) RI becomes more prevalent in reducing recall scores when an initial memory task has been completed, potentially highlighting a fatigue effect; 2) Mind wandering was prevalent throughout both control and interference conditions and was associated with reduced recall; 3) Interest in the facts predicted recall, but only when RI occurred. These results present a more complex view of RI.

The role of congruency and timing for the social consequences of mimicry

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The aim of the current project is to develop a better understanding of the consequences of mimicry, by investigating the effect of the two factors congruency and timing.

The experiment had a within-participants design, in which all participants interact in a picture description task with four ostensible interaction partners, who were programmed to move according to the experimental condition: (1) congruent and fast, (2) congruent and slow, (3) incongruently and fast, and (4) incongruent and slow. Dependent variables are explicit ratings of social judgments, and the frequency of choosing their advice in a virtual maze task.

Results suggest that while congruency is important to achieve positive consequences of mimicry in explicit social judgments, timing seems to modulate its effects: Partners who move congruently are judged more favorably than those who move incongruently in the slow condition, not the fast. On the other hand, only a trend for a main effect of timing was found for the frequency of advice taking. This suggests that for an implicit measure of trust, congruency seems to be irrelevant but that a delay of the partner's movement tends to be more important for both explicit and implicit social measures.

Observational learning of surgical skills on the daVinci surgical system

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The use of observational learning has established benefits for skill acquisition across a variety of domains, and is particularly crucial for learning skills where trial-and-error practice is not viable. Here, in the context of learning skills on the remotely-operated daVinci surgical system, we investigated what style of observed context could lead to the most robust skill gains.

150 medical students with no previous surgical experience were randomly assigned to one of five learning conditions: expert model, novice model, mixed novice/expert, 3D expert or control. The effect of observation on learning the primary task, retaining skills after a one-week interval and transferring learned skills to a novel task were assessed through time to completion, incidence of errors, and accelerometery data.

Significant improvements in time to completion and number of errors were seen across conditions, with learning on the primary task related to changes in accelerometry measures (mean accelerations, entropy). Initial findings suggest that observing error-strewn and expert models provide similar benefits for learning and retention of surgical skills.

The costs of caution: How strategic changes influence the correlations between RT costs and error costs in choice RT tasks

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Many tasks in psychology require individuals to make rapid decisions between competing response options (e.g. Stroop, lexical decision). Performance is traditionally measured by differences in response time (RT) or error rates between conditions. From an individual differences perspective, the choice of whether to use RT costs or error costs is not trivial, as we show in a meta-analysis that the two measures often do not correlate. We consider this in the framework of evidence accumulation models, in which RT and accuracy reflect both an individual's ability to select the appropriate response, as well as how much evidence they require to make a decision. Based on this framework, we tested two predictions about how individual differences in 'response caution' can moderate the correlation between RT costs and error costs. First, we observed a more positive correlation when task instructions emphasised speed compared to instructing participants to be both fast and accurate. Second, we observed a more positive correlation in a Simon task when congruent and incongruent trials were intermixed within blocks compared to when they were performed in separate blocks. We caution against interpreting RT costs or error costs in isolation as 'pure' measures of cognitive constructs.

The effects of martial arts training on attentional networks in typical adults

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Alongside mindfulness and aerobic exercise, taking part in Martial Arts (MA) has been shown to improve executive functions within children (Diamond, 2012). However, little research has investigated these effects in typical adults, and even less has used accepted measures of cognitive control. In the experiment presented today, we use the Attention Network Task (Fan, McCandliss, Sommer, Raz, & Posner, 2000) to assess three attentional networks (alert, orienting, and executive) in participants with no MA experience, and participants with at least two years of experience in the sport. A previous pilot showed some of these indexes heavily mediated by both age and BMI, so we followed this up by matching MA and no-MA groups in these variables, among others, in a new study. Results showed that MA experience improved the alert index compared to those who do not have MA experience. Perhaps more interestingly, a strong correlation between the index of the alert network and the number of years of MA experience has emerged, suggesting that it is this experience with MA that improves the

functioning of the alert networks in a cumulative way throughout their training.

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The neural correlates of working memory training in children

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Working memory training has received a great deal of scientific interest for its potential to enhance general cognitive functioning and children's academic achievement. Meta-analyses have demonstrated that training reliably improves working memory (WM), and evidence from neuroimaging studies support the notion that this is a result of functional and structural changes in the brain. However, findings have been inconsistent, and only a few neuroimaging studies have investigated WM training in children; meaning that it is difficult to draw conclusions about neural mechanisms that underlie this purported effect. The current study aimed to investigate whether WM training is associated with functional changes in brain regions implicated in the WM network. Fifty typically developing children aged 10-13 years were randomly allocated to Cogmed WM training or non-adaptive WM training. Before and after training, children completed two WM tasks during functional Magnetic Resonance Imaging (fMRI) and a battery of eight WM tasks outside of the scanner. Cogmed significantly increased WM capacity and activity within the bilateral middle frontal gyrus, relative to non-adaptive training. These results indicate that Cogmed increases performance on WM tasks, and is associated with functional changes in the WM network.

Cycling as a way to improve cognitive function in older adults

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Cycling within laboratory conditions can improve cognitive function in older adults (Kamijo et al., 2009), likely due to increased cardiovascular activity stimulating cerebrovascular blood flow. Cycling in the natural environment provides stimulation,

with enriched environments proving to protect against spatial cognition and working memory deficits (Lores-Arnaiz et al., 2006). We investigated the effect of cycling for 8 weeks in the natural environment on cognitive function and psychological wellbeing of older adults (over 50 years old). Pre- and post-intervention scores on a battery of tasks were compared for participants on a pedal cycle, an electrically-assisted 'e-bike', and those not cycling. Results (*N*=94; trials ongoing) indicated that there was a significant improvement in accuracy on executive function tasks after riding a pedal or e-bike compared to controls. A beneficial effect for the *e-bike* group was found for verbal fluency scores, suggesting improvements in updating ability. Little change was apparent in memory performance, spatial cognition and vigilance after cycling. These results indicate that cycling, even with less physical exertion and lower cardiovascular health benefit through use of e-bikes, can improve executive function in older adults. Implications of these initial results for improving mobility and independence in older adults will be discussed.

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Training proactive motor control reduces gambling, but does not increase caution on other forms of decision making

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Verbruggen, Adams and Chambers (2012) have shown that pro-active motor control affects subsequent risky decision making (gambling behaviour), and suggested that there might be a link between control systems at different cognitive levels. Here, we sought to further test this possibility by examining the effects of training pro-active motor control on other forms of decision-making. 47 healthy undergraduate participants were trained on either a stop signal task or control (double response) task for 30 minutes before completing tasks designed to test different types of decision-making: (i) a Gambling task (risky decision-making, we used the same task as Verbruggen et al., 2012), (ii) a Simon task (measuring motor impulsivity/conflict resolution); and (iii) a Conjunction fallacy task (Linda problems). We also measured trait impulsivity using the Barrett Impulsiveness scale. Preliminary analyses suggest that while we replicate

Verbruggen et al.'s original findings showing that training motor cautiousness led to increased cautiousness on a gambling task (p = .027), we found no reliable effect of the training task on performance on any of the other forms of decision-making we tested (all p's >.1). Implications for the role of impulsivity and inhibitory control in different kinds of judgement and decision making are discussed.

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The interaction between sleep and valence on the processing of false memories

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In previous studies using the Deese-Roediger-McDermott (DRM) paradigm, participants view lists of semantically related words, and during testing are more likely to falsely remember words related to the lists that were previously unseen. Memory, and false memories in particular, tend to be enhanced by sleep (Payne et al., 2009), and the emotionality of the to-be-remembered material (Brainerd, Stein, Silveira, Rohenkohl, & Reyna, 2008). We investigated the combined effect of sleep and emotionality on false memory formation. Experiment 1 tested recognition of words from emotional (positive and negative) and neutral DRM lists after a 12-hour period containing sleep or wake. In Experiment 2 participants received training and testing with no delay, to rule-out the possibility that effects could be due to time-of-day. There was a strong effect of emotionality on memory, with greater veridical and false memories for emotional than neutral words. However, sleep particularly enhanced veridical memory of negative compared to neutral words, whereas wake led to more veridical and false memories for positive words. Thus, wake promotes greater spread of activation of positive than neutral memories, and sleep is more likely to result in memory for negative information, with implications for the way emotional memories are consolidated during sleep.

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Screeching to a halt: Inhibition training does not address drivers' risky behaviour at amber traffic lights

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We investigated whether response inhibition training could improve driving behaviour. In two studies, involving 98 participants with driving experience, we applied stop-change training to encourage stopping at amber traffic lights. The laboratory-based exercise simulated UK traffic light signals. The experimental group training included stop-change trials where participants responded to a change of 'lights' from green to amber. Control one also received stop-change trials but the lights changed from green to purple. For controls two and three there was no stop-change training with these trials replaced with amber or purple lights respectively. All participants undertook a driving game pre- and post-training where the number of stops at amber traffic lights were recorded. Bayesian analysis supported the null hypothesis: inhibition training did not affect stopping to amber traffic lights. A Bayesian analysis also found strong evidence that stops at amber traffic lights declined between the two driving games. This may have been because there was no penalty for crossing amber lights in the games and so participants learnt this contingency. This learning effect arguably mimics the development of real-world behaviour and indicates that in its current form the training was unable to counteract the association between amber traffic lights and 'go'.

Type of interference modulates neural encoding of attended continuous speech

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Directing attention to a single speaker in a multi-talker environment is an everyday occurrence. We investigated how this top-down mechanism modulates the neural tracking of attended continuous speech in the presence of different types of auditory interference. Participants were instructed to attend to a narrative in English presented to one ear, while ignoring interference presented to the other ear. Four different types of interference were presented: a different narrative in English, a narrative in a language unknown to the listeners (Spanish), a non-linguistic acoustic interference (Musical Rain), and no interference. Speech envelopes for attended and non-attended streams were cross-correlated with the neural activity as recorded by a 128-channel EEG system and corrected for multiple comparisons using cluster based permutation tests. Across conditions, data showed significantly more neural encoding of the attended compared to the unattended stream, with strongest entrainment to attended speech observed in the no interference condition. Comparisons between conditions showed that non-intelligible competitors (Musical Rain and Spanish) caused earlier interference but weaker encoding of the attended steam, while English caused late interference and strongest encoding of the attended steam. These results suggest that intelligibility of the interfering stream significantly modulates attentional encoding of attended continuous speech.

Cherry, E. C. (1953). Some experiments on the recognition of speech with one and with two ears. *Journal of the Acoustical Society of America*, 25, 975–979.

Ding, N., & Simon, J. Z. (2012). Neural coding of continuous speech in auditory cortex during monaural and dichotic listening. *Journal of Neurophysiology*, *107*(1), 78–89.

Horton, C., D'Zmura, M., & Srinivasan, R. (2013). Suppression of competing speech through entrainment of cortical oscillations. *Journal of Neurophysiology*, *109*(12), 3082–93.

Power, A. J., Foxe, J. J., Forde, E. J., Reilly, R. B., & Lalor, E. C. (2012). At what time is the cocktail party? A late locus of selective attention to natural speech. *European Journal of Neuroscience*, *35*(February), 1497–1503.

Continuous force measurement of response activation and inhibition in Parkinson's disease

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Studies examining response inhibition and control in Parkinson's disease (PD) have yielded mixed findings. The discrepancy may be explained by an early functional deficit where the behavioural deficits are not visible until later in the disease (Baglio et al., 2011; Vriend et al., 2015). We compared performance in people with mild to moderate PD with a healthy control group on two tasks that incorporate response inhibition (Stop Signal task and Simon task). In addition to measuring the time taken to make a manual button press, we also measured continuous response force to provide a more sensitive measure of response activation.

Although our button-press data suggest no reliable differences in inhibitory control between PD patients and controls on either task, preliminary analysis of continuous response force yields visible "partial" errors on trials requiring response inhibition, which are not captured by the button-press data. Response force measurement, recorded continuously and independently in both hands, could be particularly well-suited to measuring response activation and inhibition in patient groups. Additionally, the variable findings reported in the literature may result from button-press measures being insufficiently sensitive to detect early effects of PD on response inhibition

Baglio, F., Blasi, V., Falini, A., Farina, E., Mantovani, F., Olivotto, F., Bozzali, M. (2011). Functional brain changes in early Parkinson's disease during motor response and motor inhibition. *Neurobiology of Aging*, 32(1), 115–124.

Vriend, C., Gerrits, N. J. H. M., Berendse, H. W., Veltman, D. J., van den Heuvel, O. A., & van der Werf, Y. D. (2015). Failure of stop and go in de novo Parkinson's disease—a functional magnetic resonance imaging study. *Neurobiology of Aging*, *36*(1), 470–475.

Working memory in a large sample of older adults: Sex and education mediate the effects of ageing

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The effects of ageing in the working memory (WM) abilities in healthy individuals are a well-documented effect, in that the older the individuals get the more limited their WM ability becomes. Further research has revealed another two major factors that affect WM capacity; (a) Sex, with females underperforming males in specific periods in their life, and (b) Education, with higher education predicting better WM abilities. The complex interactions between the factors Age, Sex and Education have not been systematically studied, especially with respect to their effects in very old age. The present study looks at the combined effect of these factors on the WM abilities of a large group (n=649) of older Taiwanese participants, aged 58-98, using a numerical *n*-back task. Our results confirmed that age has detrimental effects on WM, while education is highly beneficial. Importantly, sex interacted with both age and education: while males outperformed females in postmenopausal ages and with low educational levels only, older and highly educated females and males did not significantly differ. These results further clarify the effects of age, sex and education on WM capacity, suggesting that increased education in females is an important factor counteracting the natural effects of ageing on cognition.

Investigating types of between-task conflict as drivers of backward inhibition

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A "conflict-monitoring mechanism" has been proposed to trigger backward

inhibition (BI), the mechanism suggested to account for the "*N*-2 repetition cost", whereby performance is poorer for switching back to a recently completed task, ABA, than for switching to an alternative task, CBA. We predicted that reducing the degree to which task-features were shared across tasks would reduce between-task conflict and therefore also the *N*-2 repetition cost. Across four studies we investigated the effects on the *N*-2 repetition cost of shared: targets (trivalent, univalent); responses (overlapping, separate); and response effectors (1 finger, 2 fingers).

As with previous research (Sdoia & Ferlazzo, 2008) we found that using univalent instead of trivalent targets eliminated the *N*-2 repetition cost, supporting the conflict-monitoring proposal. However, two other findings did not match our predictions. Unlike previous research (Gade & Koch, 2007) we found that using separate responses for each task significantly increased the size of the *N*-2 repetition cost. In addition, using two fingers rather than one significantly increased the size of the *N*-2 repetition cost. Thus, in some situations at least there must be other drivers of BI than simply the degree of between-task conflict.

Gade, M., & Koch, I. (2007). The influence of overlapping response sets on task inhibition. *Memory & Cognition*, *35*(4), 603–609. http://doi.org/10.3758/BF03193298

Sdoia, S., & Ferlazzo, F. (2008). Stimulus-Related Inhibition of Task Set During Task Switching. *Experimental Psychology*, *55*(5), 322–327. http://doi.org/10.1027/1618-3169.55.5.322

Memory for the 2016 EU Referendum: Flashbulb memories and emotion

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Flashbulb memories (FBMs) are vivid memories of surprising, consequential and/or emotionally-arousing events like President Kennedy's assassination (Brown & Kulik, 1977) and Margaret Thatcher's resignation (Conway et al., 1994). However, most research on FBMs has focused on memories for negative events even though positive events are thought to elicit FBMs too (Hirst and Phelps, 2016). In the current study, we recruited residents from the UK and US to address the effects of positive and negative emotions on FBMs for the UK's EU Referendum held in 2016. Participants' initial memory for the event was assessed one week after the referendum results and then again 3 months later. The study allowed us to examine an event that yielded both positive and negative emotions depending on participants' voting choice i.e. *'Leave'* versus '*Remain*'. Our results show that UK residents, irrespective of their voting choice, reported more vivid memories three months after the referendum along with greater levels of recollection confidence compared to US residents. In addition, stronger emotional reactions reported in the initial survey predicted more vivid memories at

follow-up across participants. Overall, our results suggest that FBMs are formed for emotional events irrespective of whether the events are positive or negative.

Brown, R., & Kulik, J. (1977). Flashbulb memories. *Cognition*, *5*(1), 73-99.

Conway, M. A., Anderson, S. J., Larsen, S. F., Donnelly, C. M., McDaniel, M. A., McClelland, A. G., ... & Logie, R. H. (1994). The formation of flashbulb memories. *Memory & Cognition*, *22*(3), 326-343.

Hirst, W., & Phelps, E. A. (2016). Flashbulb memories. *Current directions in psychological science*, *25*(1), 36-41.

Hirst, W., Phelps, E. A., Meksin, R., Vaidya, C. J., Johnson, M. K., Mitchell, K. J., ... & Mather, M. (2015). A ten-year follow-up of a study of memory for the attack of September 11, 2001: Flashbulb memories and memories for flashbulb events. *Journal of Experimental Psychology: General*, *144*(3), 604.

The effects of metabolic regulation on problem solving and quality of life

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Impairment of cognitive functioning has been consistently identified in overweight and insulin resistant individuals compared to normal range counterparts. However to our knowledge, no study has examined the modulation of problem solving by metabolic function. Additionally, both weight specific health–related quality of life measures and non-specific *generalised* quality of life measure have been used to establish an impact of weight on quality of life. The aims of the present study were to examine whether metabolic impairment differentially modulates insight verses non-insight problem solving performance and quality of life outcomes.

In the current study 40 individuals were recruited and underwent an Oral Glucose Tolerance Test (OGTT), markers of metabolic function were measured (fat and muscle mass, waste-hip ratio, basal metabolic rate, glucose tolerance) and participants completed 4 problem solving tasks (Compound Remote Associate Tasks, Pigs in Pens Problem, Anagrams and the Tower of Hanoi) and two quality of life measures (IWQOL-Lite and SF-36).

The findings report the effects of metabolic dysregulation and body composition on problem solving and quality of life. These findings are discussed in terms of existing literature demonstrating a mediating effect of metabolic function on cognition and quality of life.

Sleep spindles protect against false memory effects as a consequence of sleep

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Sleep promotes false memories: After presenting participants with lists of related words, sleeping before recalling these words results in a greater acceptance of words that were unseen but related in theme to these words. However, the left hemisphere (LH) seems to be particularly resilient to influences of false memories, with sleep furthermore increasing veridical memory in the LH. In the current study, we tested these false memory and lateralisation effects in a nap study, relating behaviour to sleep stages. Participants viewed lists of theme-related words then stayed awake or slept for 2 hours, with those sleeping monitored with Polysomnography. Recognition of words was then tested by presenting previously seen, unseen, or unseen but related (lure) words. The sleep group falsely recognising more lure words than the wake group, and sleep also boosted word recognition in the LH compared to the wake group. We found that, though there was an overall effect of sleep in promoting false memories, sleep spindles were protective against false memories, which is consistent with theories of spindle activity promoting integration of recent experiences in the hippocampus with long-term store of vocabulary in the LH neocortex.

Lie detection: how autistic-like traits impact the ability to control competing representations of the self and others' opinions

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Autism Spectrum Disorder (ASD) is increasingly considered as a disorder of top-down control or modulation of social behaviour (Cook et al., 2012; Wang & Hamilton, 2012). One candidate mechanism is the control of competing representations of the 'self' and the 'other', coined 'self-other control' (Sowden & Shah, 2014). In the present study, 60 participants (22 with ASD) completed a newly developed lie detection task as an index of self-other control (Sowden et al., 2015), probing its relationship with autistic-like traits (measured by the Autism Spectrum Quotient; AQ). Participants' opinions on a number of topics were first obtained, after which they judged the veracity of other people's opinion statements. Self-other consistency effects on this task are indicative of a poorer ability to detect truths and lies when the opinions of the self and the other are inconsistent, than when consistent, with one another: the self-opinion must be inhibited, and the opinion of the other person enhanced, for successful performance. increased AQ scores were significantly related to increased self-other consistency effects (r = .434, p = .001). Thus, increased autistic-like traits are associated with an

impaired ability to control the competing representations of the opinions of the self and other.

Cook, J., Barbalat, G., & Blakemore, S.J. (2012). Top-down modulation of the perception of other people in schizophrenia and autism. *Frontiers in Human Neuroscience*, *6*, 175

Sowden, S., & Shah, P. (2014). Self-other control: a candidate mechanism for social cognitive function. *Frontiers in Human Neuroscience*, *8*, 789.

Sowden, S., Wright, G. R., Banissy, M. J., Catmur, C., & Bird, G. (2015). Transcranial current stimulation of the temporoparietal junction improves lie detection. *Current Biology*, *25*, 2447-2451.

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Validation of a new reaction time task targeting two 'Action Understanding' processes: Action identification and intention identification

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Since their discovery, researchers have claimed that mirror neurons are involved in 'action understanding' (Gallese et al., 1996). However, controversy over the definition of this process (Hickok, 2009) has led to mixed findings regarding whether 'action understanding' is a distinct psychological process, and if so, whether it is supported by mirror neurons (Umilta et al., 2001; Spunt & Adolphs, 2014). Furthermore, previous 'action understanding' tasks have lacked well-controlled stimuli (Press & Cook, 2015), confounded by factors such as the level of abstraction of the stimulus labels (Spunt et al., 2016). The present study, therefore, sought to design a new task, which targets two definitions of action understanding – action identification and intention identification – in two separate conditions, to produce individual measures of these processes. Stimuli were matched on a range of variables, including concreteness ratings of the stimulus labels, across the two conditions. Reaction times were faster for action identification than intention identification, with the pattern of results suggesting that this was not due to a speed-accuracy tradeoff. We suggest that this task is a valid measure of two distinct 'action understanding' processes and can be used in future studies to explore associations between these processes and their neural underpinnings.

Gallese, V., Fadiga, L., Fogassi, L., & Rizzolatti, G. (1996). Action recognition in the premotor cortex. *Brain*, *119*(2), 593–609.

Hickok, G. (2009). Eight Problems for the Mirror Neuron Theory of Action Understanding in Monkeys and Humans. *Journal of Cognitive Neuroscience, 21*(7), 1229–1243.

Press, C., & Cook, R. (2015). Beyond action-specific simulation: Domain-general motor contributions to perception. *Trends in Cognitive Sciences, 19*(4), 176–178.

Spunt, R. P., & Adolphs, R. (2014). Validating the Why/How Contrast for Functional MRI Studies of Theory of Mind. *Neuroimage*, 99: 301–311.

Spunt, R. P., Kemmerer, D., & Adolphs, R. (2016). The Neural Basis of Conceptualizing the Same Action at Different Levels of Abstraction. *Social Cognitive and Affective Neuroscience*, 11 (7): 1141–1151.

Umiltà, M. A., Kohler, E., Gallese, V., Fogassi, L., Fadiga, L., Keysers, C., & Rizzolatti, G. (2001). I know what you are doing: A neurophysiological study. *Neuron, 31*(1), 155–165.

Emotional arousal enhances memory-guided attention

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Our long-term memory determines information's priority (Hutchinson & Turk-Browne, 2012) and guides spatial attention (Summerfield et al., 2006). However, it is unclear how emotion interacts with long-term memory in guiding attention. Across two experiments, the current study addressed this question. Participants completed two sessions in consecutive days. First, they were asked to learn the locations of a target embedded within scenes. In half of the trials, scenes included the target (valid-memory), whereas there was no target in the other half (neutral-memory). Second session included a fear-conditioned (CS+) or a non-arousing tone (CS-), followed by a scene. In some trials, participants saw scenes from the valid-memory condition, whereas in other trials, they saw scenes from the neutral-memory condition. Participants indicated whether each scene included the target or not. Across two experiments, we found that emotional arousal induced by CS+ facilitates detection of the target when individuals have a valid location memory. Recent research reveals that emotional arousal has different effects on cognition depending on information's priority by bottom-up saliency and top-down goal (Mather & Sutherland, 2011). Our results extend these findings suggesting that emotional arousal not only interacts with bottom-up saliency and top-down goal, but also interacts with long-term memory in modulating attention.

Hutchinson, J. B., & Turk-Browne, N. B. (2012). Memory-guided attention: Control from multiple memory systems. *Trends in cognitive sciences, 16*(12), 576-579.

Mather, M., & Sutherland, M. R. (2011). Arousal-biased competition in perception and memory. *Perspectives on Psychological Science*, *6*(2), 114-133.

Summerfield, J. J., Lepsien, J., Gitelman, D. R., Mesulam, M. M., & Nobre, A. C. (2006). Orienting attention based on long-term memory experience. *Neuron, 49*(6), 905-916.

Memory of event duration

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How do we remember and represent the duration of familiar past events? Here, we address the question -- whether an event's remembered duration is related to the amount of information recalled about it.

In two experiments, participants studied 21 cartoon-like animations varying in duration from 3 to 9 seconds for a subsequent memory test. After exposure to all animations, we asked participants to mentally reproduce the duration of each animation, and verbally recalled what happened in them. During exposure, participants saw the animations once (Exp. 1) or three times (Exp. 2).

Results indicated that the length of reproduced duration increased with the actual clock duration and people tend to overestimate the longer animations and underestimate the shorter ones.

Moreover, we found that the length of reproduced duration positively correlated with the amount of remembered information. In addition, with more remembered information about an animation, the reproduced duration was more accurate.

This study shade light on the underlying mechanisms of memory of event duration. It is suggested that the recollection of duration can be inaccurate and duration representation can be partially determined by the amount of information recalled.

Accommodation

60 en-suite rooms on campus have been set aside for the conference at a cost of £73.20 for bed and breakfast including VAT. These will be reserved on a first-come, first served basis, and bookings should be made using the University of Reading online booking system: https://registration.venuereading.com/societyconference no later than 30th June 2017.

N.B. If applying for a Grindley Grant please note that the maximum payable for accommodation per night is £60.00.

Any queries regarding your booking should be made to the local organiser: Katie Gray (k.l.h.gray@reading.ac.uk)

Below is a list of hotels and guest houses in and around Reading. Please note that these are not necessarily within walking distance of the University and are not recommendations. You should check the website and prices before making your booking :

Hotel Name	Website	Booking Contact Number
Beech House Hotel	http://www.beechhousehotel.com/	0118 959 1901
Best Western Plus Reading Moat House	https://www.bestwestern.co.uk/hotels/	0844 387 6244
Bow Guest House	http://www.bowguesthouse.co.uk/	0118 959 8279
Bull Inn	http://www.bullinnsonning.co.uk/	0118 969 3901
Crown Lodge Guest House	http://www.crownlodgereading.com/	0118 956 9014
Crowne Plaza Reading Hotel	https://www.ihg.com/crowneplaza/hotels/gb/en/reading/reauk/	0118 925 9988
Great Expectations - RelaxInnz	http://www.greatexpectations.relaxinnz.co.uk/	0118 950 3925
Hillingdon Prince Hotel	http://www.hillingdonprince.co.uk/	0118 931 1311
Hilton Reading	http://www3.hilton.com/en/hotels/united-kingdom/hilton-reading	0118 916 9000
Holiday Inn Reading M4, Jct 10	https://www.ihg.com/holidayinn/hotels/gb/en/reading/	0118 944 0444
Holiday Inn Reading M4, Jct 11	http://www.hireadingsouthhotel.co.uk/	0871 702 9067

Hotel Ibis Reading Centre	http://www.accorhotels.com/gb/hotel-5431-ibis-reading-centre-new-ibis-rooms/index.shtml	0118 953 3500
Malmaison Reading	https://www.malmaison.com/locations/reading/	0118 334 1331
Mercure George Hotel	http://www.accorhotels.com/gb/hotel-7317-mercure-george-hotel-reading/	0118 957 3445
Millenium Medejski Hotel	https://www.millenniumhotels.com/en/reading/millennium-madejski-hotel-reading	0118 925 3500
Novotel Reading Centre	http://www.accorhotels.com/gb/hotel-5432-novotel-reading-centre/	0118 952 2600
Parkside International Hotel	http://www.parksideinternationalhotel.com/	0118 959 0564
Pentahotel Reading	https://www.pentahotels.com/en/hotels/llrph-reading/	0118 958 6222
Rainbows Lodge Hotel and Serviced Apartments	https://www.thebookingbutton.co.uk/properties/	0118 958 8140
The Abbey House Hotel	http://www.theabbeyhousehotel.co.uk/	0118 959 0549
The Bath Hotel	http://www.thebathhotel.com/	0118 957 2019
The Forbury Roseate	http://www.roseatehotels.com/	0118 952 7770
The French Horn	http://www.thefrenchhorn.co.uk/	0118 969 2204
The Great House at Sonning	http://www.greathouseatsonning.co.uk/	0118 969 2277
The Lawn Hotel	http://lawnhotelreading.co.uk/	0118 959 0342
The Pheasant Inn, Winnersh	http://www.the-pheasant-hotel.co.uk/	0118 978 4529
Tudor Place, Winnersh	http://www.tudorplace.co.uk/	0118 978 5007

See also dedicated hotel booking websites,

e.g. http://www.trivago.co.uk/

http://www.booking.com/hotels

https://www.expedia.co.uk/hotels

Cafes and Restaurants on campus – https://www.reading.ac.uk/about/visit-us.aspx

- ☐ Dol.cHe Vita - Modern espresso bar offering speciality coffees and a range of sandwiches and snacks.
- ☐ Cafe Libro - Serving Matthew Algie Fairtrade coffee which supports the Rain Forest Alliance & Coffee Kids.
- ☐ HBS Cafe - Quality is our top priority. Offering a range of loose leaf tea and freshly made speciality coffee.
- ☐ Eat at SportsPark - Fully licensed café, serving Eros speciality coffees and hot and cold snack items.
- ☐ Eat at HumSS - Offering freshly-baked hot food such as Pies, Jacket Potatoes and Panini's.
- ☐ Eat at Agriculture - Offering a range of quality hot drinks, sandwiches & hot food.
- ☐ Blandford's & Fine Dining - A la carte restaurant situated within Park House open to staff and members and the public.
- ☐ Eat & Drink London Road - Modern food court and bar open to students, staff and members of the public.
- ☐ Eat at Square - Modern food court located in the centre of the Whiteknights campus.
- ☐ Park Eat - Large and modern food court and bar open to students, staff and members of the public.
- ☐ Eat Northcourt - Residential food hall open to all students, staff and members of the public.

Off campus

- ☐ The Queen's Head – Local pub close to university, good selection of beer, typical pub food alongside South East Asian inspired food. http://www.readingpubcompany.com/menus.html
- ☐ The Three Tuns – Traditional pub close to university. https://www.threetunsreading.com/
- ☐ London Street Brasserie – Award winning restaurant in the town centre. http://www.londonstbrasserie.co.uk/
- ☐ House of Flavours – Excellent Indian restaurant. http://house-of-flavours.co.uk/
- ☐ Bel and the Dragon – Waterfront restaurant. http://belandthedragon-reading.co.uk/
- ☐ Many other restaurants in The Oracle. https://www.theoracle.com/dining

Travel

- **By rail**

Reading train station is a mainline station and is easily accessible from most other places in the UK.

There are direct rail links from many major cities, including Birmingham, Manchester, Glasgow, Cardiff, Bristol and Exeter as well as a number of routes through London.

Travelling from London

If you are travelling from or via London, the quickest route to take is from London Paddington Station. Trains from Paddington to Reading run approximately every 15-20 minutes throughout the day and the average journey time is around 30 minutes.

Find out more at the National Rail website: http://www.nationalrail.co.uk/

- **By car**

The Whiteknights and London Road campuses in Reading are approximately 1.5 miles from the M4 motorway. The Greenlands campus is close to Henley.

Sat nav postcode for Shinfield Road and Pepper Lane entrances – RG6 6UR

Sat nav postcode for Earley Gate entrance – RG6 7BE

Sat nav postcode for London Road campus – RG1 5AQ

Sat nav postcode for Greenlands campus – RG9 3AU

Parking

Visitors to the campus Monday – Friday between 8:00am and 5:00pm should be aware that parking needs to be pre-arranged and that a parking permit must be displayed. For further information please email reception@reading.ac.uk or phone +44 (0) 118 378 7307

- **By bus**

Getting to Whiteknights campus from the centre of Reading is easy. Bus stops can be found outside the train station. The single bus journey will cost around £1.90 (return £3.60). You will need the exact money as buses do not give change.

To Whiteknights campus (Sheffield Road), numbers 9, 21, 21a

To Whiteknights campus (Earley Gate), numbers 17, 19a, 19b, 19c

To London Road campus, numbers 9, 21

- **By air**

Reading is well connected to both London Heathrow and London Gatwick airports.

London Heathrow

A direct bus service runs between Heathrow airport and Reading station. Buses run every 30 minutes during the day and the journey takes around 40 minutes.

London Gatwick

A direct train service runs between Gatwick airport and Reading station. Trains run once an hour during the day and take around 75 minutes.

Places to visit

Reading is a large town on the Thames and Kennet rivers in southern England. It's known for the annual Reading Festival, an outdoor rock music event. Shops and riverside restaurants dot the town centre.

- Basildon Park – a National Trust owned property and Grade 1 listed building. https://www.nationaltrust.org.uk/basildon-park
- Reading Abbey – a large ruined abbey founded by Henry1 in 1121. The ruins lie beside Forbury Gardens, a Victorian formal garden. http://www.readingabbey.org.uk/
- Museum of Berkshire Aviation – a small aviation museum. http://museumofberkshireaviation.co.uk/
- Cole Museum of Zoology – a university museum located at the University of Reading. https://www.reading.ac.uk/colemuseum/
- Museum of English Rural Life – a museum dedicated to recording the changing face of farming and the countryside in England. http://www.reading.ac.uk/TheMERL
- Reading Museum – a museum of the history of the town of Reading. The Museum contains exhibits on the town's history and displays a Victorian replica of the Bayeux Tapestry. http://www.readingmuseum.org.uk/
- Marwell Zoo – owned by Marwell Wildlife a world renowned action oriented charity, leading conservation programmes in the UK and Africa. This 140-acre zoo is home to an incredible range of exotic and endangered species, including giraffes, penguins, tigers, meerkats, snow leopards, cheetahs, hippos and rhinos plus loads more. https://www.marwell.org.uk/zoo/
- Stanlake Park Wine Estate – award winning English wine. https://stanlakepark.com/

  Plenty of very pretty walks in Reading and surrounding countryside. http://www.walkinginberks.co.uk/reading.php

EPS Conference Dinner

This year a barbecue will take the place of the usual conference dinner and this will be held on Thursday 11th July at 8:00pm on campus in the Meadow Suite, Park House, Whiteknights, Reading, RG6 6UA.

The cost will be £28.00 per person for a 2-course premium barbecue with local beers and ciders and including wine.

Postgraduates may attend the dinner for a subsidised cost of £14.00; in this instance the Booking must be accompanied by a statement from an EPS member confirming Postgraduate status.

A menu is shown below, but delegates will be able to make their selections on the day. Payment in advance should be made via the University of Reading's online booking system: https://registration.venuereading.com/societyconference no later than 30th June 2017.

Main
Peppered rump steak
Marinated chicken drumsticks in honey and wholegrain mustard
Local pork sausage
Mediterranean vegetables in garlic butter cooked in a foil envelope (v)
Vegan burger (v, gf, vg)
Selection of seasonal salads (v)
Dessert
Summer fruit salad (v)
Baked vanilla cheesecake (v)

EPS
Experimental Psychology Society

The Fifteenth Mid-Career Award Lecture

will be delivered by

Professor Kathy Rastle

Royal Holloway University of London

Writing systems, reading and language

6.00pm, Thursday 13th July 2017

Madjeski Lecture Theatre
Agriculture Building
University of Reading
Reading

The lecture will be open to the public

EPS
Experimental Psychology Society

The Twenty Fourth EPS Prize Lecture

will be delivered by

Professor Frederick Verbruggen

University of Exeter

Executive control of (impulsive) action

6.00pm, Wednesday 12th July 2017

Madjeski Lecture Theatre
Agriculture Building
University of Reading
Reading

The lecture will be open to the public

Membership Proposal Form

(also available at: http://www.eps.ac.uk/index.php/applying-to-join

Please use BLACK ink

Title: **Age:**

First Name: **Last Name:**

Full current professional address

Email

Telephone

Degrees

Date	Degree	Class	University

Experience

Dates	Post

Current research interests

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

Publications (at least two examples of senior authored and peer reviewed: published articles, not "in press")

Online access to QJEP is available to all EPS members via the EPS website, which provides authentication for access to Journal content. Members who wish to receive a hard copy of the Journal should contact the EPS administrator – eps@lancaster.ac.uk.

Signature of applicant Date

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 (print name) Seconder (print name)

Signature Signature

Email address: Email address:

EPS
Experimental Psychology Society

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.

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Experimental Psychology Society

EXPERIMENTAL PSYCHOLOGY SOCIETY

July Meeting, 12th – 14th July 2017

The programme for the July meeting is enclosed with this mailing. Booking for accommodation (there are 60 en-suite rooms available on campus) and/or the Conference dinner should be made no later than 30th June 2017 via the University of Reading website: https://registration.venuereading.com/societyconference.

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.

The programme also includes:

Thursday 13th July 6:00pm Fifteenth Mid-Career Award Lecture:

Writing systems, reading and language
Professor Kathy Rastle (Royal Holloway University of London)

Wednesday 12th July 6:00pm Twenty Fourth EPS Prize Lecture:

Executive control of (impulsive) action
Professor Frederick Verbruggen (University of Exeter)

Wednesday 12th July 2:00pm Symposium:

Advances in basic and applied cognitive control research
Organised by Professor Chris Chambers (Cardiff University)

Wednesday 12th July 1:00pm Symposium:

Food for thought: Brain fueling and cognitive function
Organised by Dr Karen Brandt (University of Roehampton)

Thursday 13th July 2:00pm Symposium:

Convergent approaches to studying reading acquisition
Organised by Dr Matt Davis(MRC-CBU, Cambridge)

Friday 14th July 9:30am Symposium:

Social perception and its atypicalities
Organised by Professor Bhisma Chakrabarti and Dr Katie Gray

London meeting, January 2018

The portals for submissions to this meeting will open on the website on 4th September 2017.

The meeting will include the 46th Bartlett Lecture by Professor Stephen Monsell plus an accompanying symposium organised by Dr Aureliu Lavric.

The local organiser is Patti Adank.

Dr John Towse
Hon Secretary

E|P|S
Experimental Psychology Society

EXPERIMENTAL PSYCHOLOGY SOCIETY

The Business meeting will be held at 5:00pm on Wednesday 12th July in the Madjeski Lecture Theatre , Agriculture Building, University of Reading.

AGENDA

16/15	Minutes of the Business Meeting held at Queen's University, Belfast on Tuesday 11th April 2017.
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

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Experimental Psychology Society

EXPERIMENTAL PSYCHOLOGY SOCIETY

A Business meeting was held in Lecture Theatre OG/110 in the School of Psychology, David Keir building, Queen's University, Belfast at 5:30pm on Tuesday 11th April, 2017.

MINUTES

There were 16 members present at the meeting and the meeting was therefore not quorate.

17/16 Minutes of the 69th Annual General Meeting held at University College London on Thursday 5th January were agreed and approved. These had been included within the Belfast meeting book.

17/17 Matters arising

There were no matters arising.

17/18 Hon Secretary's Report

A brief report was presented. The Hon Sec expressed his thanks to everyone involved in this meeting. He noted that the portal for the next meeting, in Reading was already open, and encouraged members with presentations to consider submissions. The Hon Sec reminded members that Study Visit and Small Grant applications are not restricted geographically to the UK. Study Visits in particular can involve early career researchers from the UK gaining research experience nationally and internationally, but also involve international young scholars visiting institutions in the UK. The EPS welcomes applications that help nurture research in developing countries. He also emphasised that the EPS particularly welcomes Small Grant applications from early career researchers. The Hon Sec broadly outlined plans to develop a Carers Fund to support members attending and presenting at meetings.

17/19 Hon Treasurer's Report

The Hon Treasurer outlined the current financial position of the Society. The Hon Treasurer outlined where balances are held across Society accounts, and key sources of expenditure, including Grindley Grant awards, grant awards, meeting costs and expenditure on Society business (both administrative and editorial). A member commented on the financial position, and suggested that EPS might be able to support postgraduate studentships. The Hon Treasurer welcomed this suggestion, whilst noting its expense – even with our healthy finances, studentships might quickly deplete our reserves.

17/20 QJEP Editor's Report

The Editor reminded the meeting that we are undergoing transition between publishers. We

continue to work with our current publishers, whilst developing plans for the new contract. This has led to a lot of correspondence and activity behind the scenes, to ensure the Journal itself works well for authors and readers. The Editor is pleased to note that the submission rate to QJEP is very healthy, and early indications are that submission activity is on the increase. There is good support for the QJEP from the new team of Associate Editors.

17/21 Arrangements for future meetings

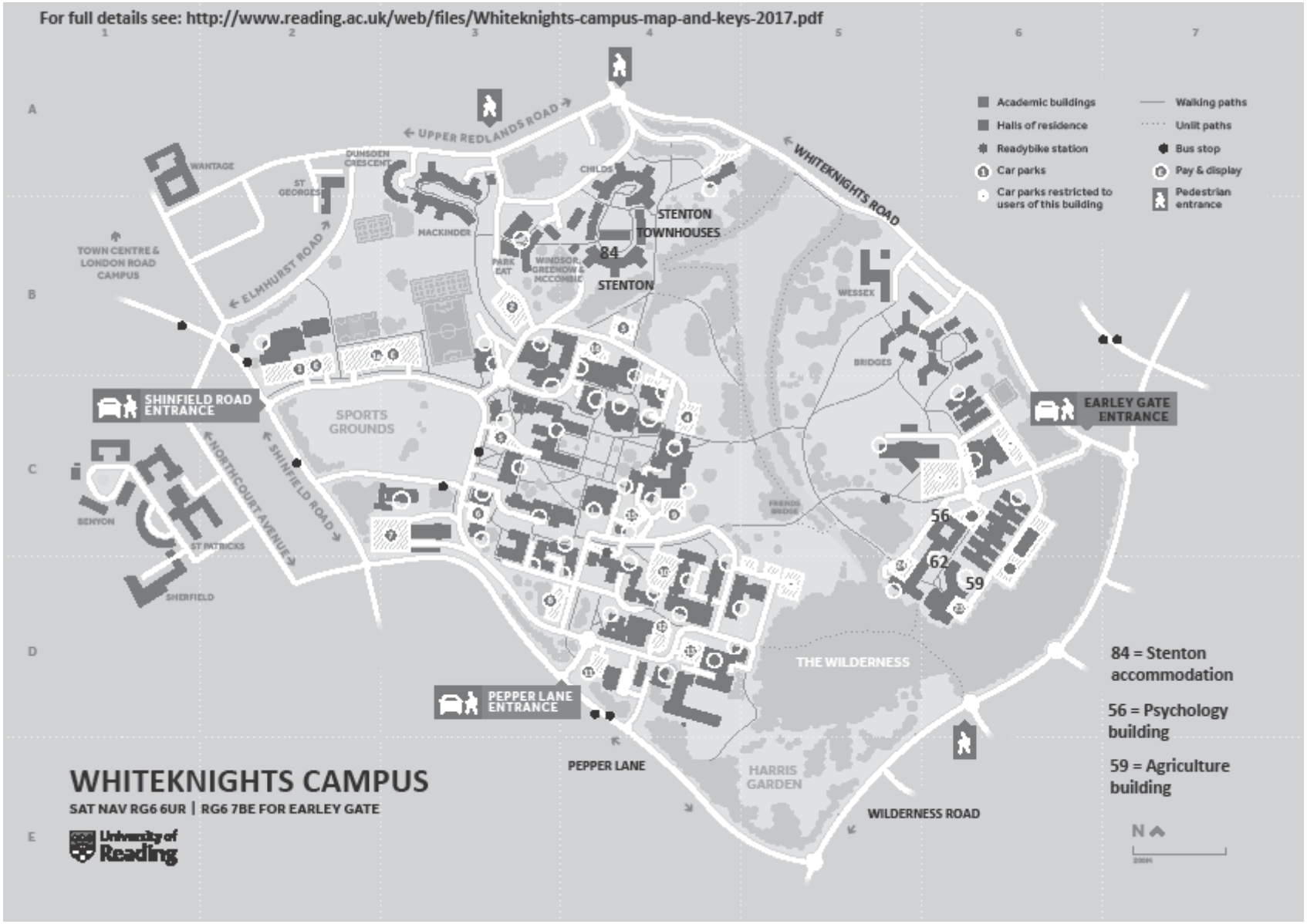
The Conference Secretary again noted our thanks to the local organiser and her team for an excellent meeting. Looking forward, he expected the Reading meeting to be popular, with excellent symposia, and prize talks and considerable interest in individual contributions. The subsequent meeting will be our regular London meeting in January.

17/22 Any other business

None

Date, time and place of next meeting.

The next meeting is to be held in Reading in July 2017, details to be confirmed in the business programme.


For full details see: http://www.reading.ac.uk/web/files/Whiteknights-campus-map-and-keys-2017.pdf
Academic buildings
Halls of residence
Readybike station
Car parks
Car parks restricted to users of this building
Walking paths
Unlit paths
Bus stop
Pay & display
Pedestrian entrance
UPPER REDLANDS ROAD
WHITEKNIGHTS ROAD
ELMHURST ROAD
NORTHCOURT AVENUE
SHINFIELD ROAD
WANTAGE
DUNSDEN CRESCENT
ST GEORGES
MACKINDER
CHILDS
STENTON TOWNHOUSES
84
STENTON
PARK EAT
WINDSOR, GREENOW & MCCOMBIE
WESSEX
BRIDGES
TOWN CENTRE & LONDON ROAD CAMPUS
SHINFIELD ROAD ENTRANCE
SPORTS GROUNDS
EARLEY GATE ENTRANCE
FRIENDS BRIDGE
56
62
59
BENYON
ST PATRICKS
SHERFIELD
THE WILDERNESS
PEPPER LANE ENTRANCE
PEPPER LANE
HARRIS GARDEN
WILDERNESS ROAD
84 = Stenton accommodation
56 = Psychology building
59 = Agriculture building
N
200m
WHITEKNIGHTS CAMPUS
SAT NAV RG6 6UR | RG6 7BE FOR EARLEY GATE
University of Reading