

**EPS**

Experimental  
Psychology  
Society

# LONDON MEETING

3 - 4 January 2019



*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 Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, London, WC1H 0AP, between 3 - 4 January 2019.

The local organiser is James Bisby.

### **Seventeenth Mid-Career award**

*Thursday 3rd January, 6:00pm*

New and old ideas about the neural basis of semantic cognition

Professor Matthew Lambon Ralph, University of Cambridge

### **Symposium to accompany the 17th Mid-Career award**

*Thursday 3rd January, 1:30pm- 5:00pm*

The neural basis of semantic cognition

Organiser: Dr Beth Jefferies, University of York

### **Local organiser symposium**

*Friday 4th January, 9:00am- 12:30pm*

Memory consolidation and its modulation

Organiser: Dr James Bisby, University College London

### **Poster session and drinks reception**

Posters will be displayed in conjunction with the drinks reception:

- Thursday evening at 7:00pm in Room 305, with drinks being served in the Common Room 308. Delegates may put up posters from 5:00pm and should take them down by the end of the session.

### **Platform presentations**

Sessions will be held in the Ground Floor and Lower Ground Floor Lecture Theatres. 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, James Bisby ([j.bisby@ucl.ac.uk](mailto:j.bisby@ucl.ac.uk)).

### **Conference Dinner**

The conference dinner will be held on Thursday 3rd January at 8:15pm in Pescatori, which is just a 10-15 minute walk from the meeting rooms. The restaurant address is 57 Charlotte Street, London, W1T 4PD.

Delegates need to complete the online booking form below and make the electronic payment using a credit or debit card. Please complete all required information to ensure your place and menu choices at the dinner. Once booked, the system will generate an automatic receipt to your email address.

The standard dinner cost for EPS members is £37.00 this year. Please note that postgraduates can book at a reduced fee of £18.50, but must provide evidence of their postgraduate status by emailing a letter from their supervisor (or a direct email from the supervisor) to the London organiser James Bisby [j.bisby@ucl.ac.uk](mailto:j.bisby@ucl.ac.uk).

**<http://tinyurl.com/y8gg8gn4>**

*No cash payments or cheques accepted as these cannot be processed and no place at the Dinner can be secured.*

The portal to book your meal will close on 15th December and late admissions cannot be accommodated.

- Places are limited and will be reserved on a first come/first served basis.
- Please indicate, when making your booking, if you have any dietary requirements and the restaurant will be informed.

Contact James Bisby ([j.bisby@ucl.ac.uk](mailto:j.bisby@ucl.ac.uk)) with any questions or suggestions, but email UCL online store if anything is unclear about the booking process ([uclonlinestore@ucl.ac.uk](mailto:uclonlinestore@ucl.ac.uk)).

START OF PARALLEL SESSIONS

Session A

**Lower Ground Floor Lecture Theatre**

- 9:00**        **Hans Rutger Bosker\*** (Max Planck Institute for Psycholinguistics, The Netherlands)  
(Sponsor: Antje S Meyer)  
Both attended and unattended contexts influence speech perception to the same degree
- 9:30**        **Shirley-Ann Rueschemeyer\*** (University of York) (Sponsor: Gareth Gaskell)  
Tracking the perspective of other listeners during language comprehension
- 10:00**       **Bingjiang Lyu\*, Alex Clarke, Hun Choi\* and Lorraine K Tyler** (University of  
Cambridge)  
Flexible meaning: the neuromodulation of noun meaning by a prior verb
- 10:30**       **Tea / coffee**
- 11:00**       **Markus F Damian and Qingqing Qu\*** (University of Bristol and Chinese Academy of  
Sciences, Beijing, China)  
Orthography affects spoken production in both native and second-language speakers:  
Evidence from Chinese
- 11:30**       **Mahmoud Medhat Elsherif\*, Linda Ruth Wheeldon and Steven Frisson** (University  
of Birmingham and University of Agder, Norway)  
Lexical and phonological precision for word and pseudoword recognition in skilled  
readers
- 12:00**       **Merel C Wolf\*, Alastair C Smith\*, Caroline F Rowland\* and Antje S Meyer** (Max  
Planck Institute for Psycholinguistics, The Netherlands and University of Liverpool)  
Effects of modality on learning novel word - picture associations
- 12:30**       **Lunch**

START OF PARALLEL SESSIONS

Session B

**Ground Floor Lecture Theatre**

- 9:00**      **David Greeno\***, **Dylan Jones** and **Bill Macken** (Cardiff University)  
The questionable role of phonological neighbourhood density in verbal short-term memory (vSTM)
- 9:30**      **Shraddha Kaur\***, **Dennis Norris** and **Susan Gathercole** (University of Cambridge)  
Working memory updating as dynamic changes in cognitive demand during running span
- 10:00**     **Elisa Cooper\***, **Andrea Greve\*** and **Richard N Henson** (University of Cambridge)  
Little evidence for successful Fast Mapping (FM) in adults
- 10:30**     **Tea / coffee**
- 11:00**     **Alexander J Kaula\*** and **Richard N Henson** (University of Cambridge)  
Priming effects on subsequent associative memory: Testing resources accounts
- 11:30**     **Andrea Greve\***, **Elisa Cooper\***, **Roni Tibon\*** and **Rik Henson** (University of Cambridge)  
Knowledge enhances memory for congruent and incongruent events, but in different ways
- 12:00**     **Jörn Alexander Quent\*** and **Richard N Henson** (University of Cambridge)  
U-shaped relationship between object-location expectancy and memory performance in an immersive reality environment
- 12:30**     **Lunch**

Session A

**Lower Ground Floor Lecture Theatre**

**Symposium: The neural basis of semantic cognition**

Organiser: Beth Jefferies (University of York)

- 1:30**      **Karalyn Patterson** (University of Cambridge)  
Apart from knowing that a camel has a hump (or two) and what the word *complicated* means: what is semantic memory useful for?
- 2:00**      **Bruno Rossion and Angélique Volfart** (Université de Lorraine, France)  
Objective evidence for integrated face-name representations in the human brain
- 2:30**      **Timothy T Rogers\*** (University of Wisconsin-Madison, USA)  
A deep, distributed, and dynamic code for animacy in human ventral anterior temporal cortex
- 3:00**      **Tea / coffee**
- 3:30**      **Paul Hoffman\*** (University of Edinburgh)  
Age-related changes in semantic cognition and their effects on coherent speech production
- 4:00**      **Stefano F Cappa\*** (Institute for Advanced Studies, Italy)  
“Semantic aphasia”: one or many?
- 4:30**      **Beth Jefferies** (University of York)  
Knowing about objects and their associations: Neural dissociations reflect semantic coherence and control

**End of symposium**

- 5:00**      **Lower Ground Floor Lecture Theatre - Annual General Meeting**

**17<sup>th</sup> Mid-Career Award Lecture**

**Lower Ground Floor Lecture Theatre -**

**6:00**            **Professor Matthew Lambon Ralph** (University of Cambridge)  
New and old ideas about the neural basis of semantic cognition

**7:00**            **Posters and drinks reception**

Posters displayed in Room 305, with drinks served in Room 308 (Common Room)

**8:15**            **Conference dinner at Pescatori**

Session B

**Ground Floor Lecture Theatre**

- 1:30**      **Sophie M Hardy\***, **Linda Wheeldon** and **Katrien Segaert\*** (University of Birmingham and University of Agder, Norway)  
Structural priming is determined by global syntax rather than internal phrase structure: Evidence from young and older adults
- 2:00**      **Louisa Lawrie\***, **Margaret Jackson** and **Louise Phillips** (University of Aberdeen)  
The effects of age and context on emotion perception
- 2:30**      **Liat Levita\*** and **Sam Linton\*** (University of Sheffield) (Sponsor: Elizabeth Milne)  
Early visual responses to learned danger signals during adolescence
- 3:00**      **Tea / coffee**
- 3:30**      **Elizabeth Kirk\*** and **Catherine Preston** (Anglia Ruskin University and University of York)  
Changing bodies, changing minds: Flexibility of body representation across development
- 4:00**      **Yik Nam Florence Leung\*** and **Fang Liu** (University of Reading)  
Facial emotion recognition is facilitated by song but not by speech in Autism Spectrum Disorder
- 4:30**      **Caitlin Dawson\***, **Florence Leung\*** and **Fang Liu** (University of Reading)  
Intonation discrimination and imitation in Autism Spectrum Disorders (ASD)
- 5:00**      **Lower Ground Floor Lecture Theatre - Annual General Meeting**

**17<sup>th</sup> Mid-Career Award Lecture**

**Lower Ground Floor Lecture Theatre -**

**6:00**            **Professor Matthew Lambon Ralph** (University of Cambridge)  
New and old ideas about the neural basis of semantic cognition

**7:00**            **Posters and drinks reception**  
Posters displayed in Room 305, with drinks served in Room 308 (Common Room)

**8:15**            **Conference dinner at Pescatori**

Session A

**Lower Ground Floor Lecture Theatre**

**Symposium: Memory consolidation and its manipulation**

Organiser: James Bisby (University College London)

- 9:00**      **Aya Ben-Yakov\* and Rik Henson** (University of Cambridge)  
When is an episodic memory formed?
- 9:30**      **Matthias Gruber\*** (Cardiff University)  
Post-learning rest prioritizes hippocampus-dependent memory for salient events
- 10:00**     **Lone D Horlyck\*, James A Bisby, John A King\* and Neil Burgess** (University of Copenhagen, University of Southern Denmark and University College London)  
Post-event processing of traumatic material and its contribution to deliberate memory and intrusive thoughts
- 10:30**     **Tea / coffee**
- 11:00**     **Scott A Cairney\*, Anna á Váli Guttesen\*, Nicole El Marj\* and Bernhard P Staresina\*** (University of York and University of Birmingham)  
Memory reprocessing during sleep spindles supports overnight consolidation
- 11:30**     **Thomas Schreiner\*, Tobias Staudig\*, Björn Rasch\*, Bernhard Staresina\*, Christian F Doeller\* and Ole Jensen\*** (University of Birmingham, Radboud University, The Netherlands, Norwegian University of Science and Technology, Norway, Max Planck Institute for Human Cognitive and Brain Sciences, Germany, University of Fribourg, Switzerland and Cedars-Sinai Medical Center, USA)  
Identifying memory reactivations during sleep using MEG
- 12:00**     **Gordon Feld\*** (Institute for Advanced Study, Germany)  
Beyond paired associates – a graph-network based memory task for sleep research
- End of symposium**
- 12:30**     **Lunch**

Session B

**Ground Floor Lecture Theatre**

- 9:00**      **Hui Yu\* and Rosie Buck\*** (De Montfort University) (Sponsor: Mark Scase)  
Situation-variable and habitual usage of reappraisal and suppression in relationship with well-being
- 9:30**      **Lisbeth Ku\*** (De Montfort University) (Sponsor: Mark Scase)  
Intrinsically there for you: Effects of intrinsic life values on helping behavior
- 10:00**      **Eleonore Batteux\*, Eamonn Ferguson\* and Richard Tunney** (University of Nottingham and Aston University)  
The effects of frame and outcome magnitude on financial and medical surrogate risk preferences
- 10:30**      **Tea / coffee**
- 11:00**      **Marie Juanchich, Amelie Gourdon–Kanhukamwe\*, Anine Riege\* and Miroslav Sirota** (University of Essex and Kingston Business School)  
Framing with words – do we learn from experience?
- 11:30**      **Elisabeth Parés-Pujolràs\*, Matthias Schultze-Kraft\*, Karla Matic\*, Patrick Haggard and John-Dylan Haynes\*** (University College London and Humboldt University, Berlin)  
Do we know what we are about to do? A brain-computer interface study of intention awareness
- 12:00**      **Mark Haggard and Kasia Doniec\*** (University of Cambridge)  
Butter too thinly spread? Strategy remedies for non-replication and related ills
- 12:30**      **Lunch**

Session A

**Lower Ground Floor Lecture Theatre**

- 1:30**      **Magdalena W Sliwinska\* and David Pitcher\*** (University of York) (Sponsor: Jennifer Rodd)  
TMS demonstrates that both right and left superior temporal sulci are important for facial expression recognition
- 2:00**      **Joan Liu-Shuang\*, Genevieve L Quek\*, Valérie Goffaux\* and Bruno Rossion** (University of Louvain, Belgium, Radboud University, The Netherlands, Maastricht University, The Netherlands and Université de Lorraine, France)  
Ultra-coarse, single-glance human face detection in a dynamic visual stream
- 2:30**      **Stefan R Schweinberger and Stella J Faerber\*** (Friedrich Schiller University, Jena, Germany)  
Two ERP components which selectively reflect distance-to-norm in face space and activation of identity-specific representations of known faces
- 3:00**      **Tea / coffee**
- 3:30**      **Katharina Limbach\*, Marlena L Itz\*, Stefan R Schweinberger, Alexandra D Jentsch\*, Lidija Romanova\* and Jürgen M Kaufmann\*** (Friedrich Schiller University, Germany and Ruhr University, Germany)  
Neurocognitive assessment of a training program for poor face recognisers using shape and texture caricatures
- 4:00**      **Verena G Skuk\*, Romi Zäske, Franziska Martin\* and Stefan R Schweinberger** (Friedrich Schiller University, Germany and Jena University Hospital, Germany)  
Effects of anti-voice adaptation on voice recognition in naturalistic speech: Evidence for norm-based representations of personally familiar voices
- 4:30**      **Nadine Lavan\* and Carolyn McGettigan\*** (University College London and Royal Holloway University of London) (Sponsor: Joanne Taylor)  
Are averages meaningful when learning individual voice identities?
- 5:00**      **End of meeting**

Session B

**Ground Floor Lecture Theatre**

- 1:30**      **Masataka Nakayama\* and David C Plaut\*** (Kyoto University, Japan and Carnegie Mellon University, USA) (Sponsor: Satoru Saito)  
A hippocampal model of rapid sequence learning applied to repetition effects in immediate serial recall
- 2:00**      **Ben R Newell, Mike E Le Pelley and Robert M Nosofsky\*** (UNSW Sydney, Australia and Indiana University, USA)  
Reversing the dissociation caused by deferred feedback in category learning: The limits of multiple systems
- 2:30**      **Stuart G Spicer\*, Peter M Jones, Chris J Mitchell\* and Andy J Wills** (University of Plymouth)  
Is human causal learning driven by uncertainty?
- 3:00**      **Tea / coffee**
- 3:30**      **Timothy J Andrews, David D Coggan\*, Sanah Ali\*, Afrodite Giannkopoulou\* and Burcu Goz\*** (University of York)  
Category-selective patterns of response to objects with the same image properties, but from different categories
- 4:00**      **Charlotte E R Edmunds, Andy J Wills and Fraser Milton** (University of Plymouth and University of Exeter)  
Recognition performance after rule-based and information-integration categorization
- 4:30**      **Rebecca L Jackson, Timothy T Rogers\* and Matthew A Lambon Ralph** (University of Cambridge and University of Wisconsin-Madison, USA)  
Controlled semantic cognition necessitates a deep multimodal hub
- 5:00**      **End of meeting**

1. **Tirso Gonzalez Alam\***, **Charlotte Murphy\***, **Jonathan Smallwood\*** and **Elizabeth Jefferies** (University of York)  
Exploring the role of meaning in response inhibition
2. **Lucilla Lanzoni\***, **Daniela Ravasio\***, **Hannah Thompson**, **Jonathan Smallwood\*** and **Elizabeth Jefferies** (University of York, University of Bergamo, Italy and University of Surrey)  
Exploring the contribution of the DMN to the integration of semantic information
3. **Xiuyi Wang\***, **Elizabeth Jefferies**, **Boris C Bernhardt\*** and **Jonathan Smallwood\*** (University of York and McGill University, Canada)  
Graded constraints in semantic cognition: How do we retrieve knowledge in a flexible way?
4. **Eva D Poort\*** and **Jennifer M Rodd** (University College London)  
Towards a distributed connectionist account of cognates and interlingual homographs: Evidence from semantic relatedness tasks
5. **Meichao Zhang\***, **Nicola Savill\***, **Daniel S Margulies\***, **Jonathan Smallwood\*** and **Elizabeth Jefferies** (University of York, York St John University and Institut du cerveau et de la moelle épinière, France)  
Individual differences in reading comprehension and off-task thought relate to perceptually-coupled and decoupled cognition
6. **Christina Ralph-Nearman\*** and **Ruth Filik** (Laureate Institute for Brain Research, USA and University of Nottingham)  
Implicit expectations about character behaviour are associated with eating disorder symptomatology and body mass index in males: Evidence from eye movements during reading
7. **Ralph Pawling\***, **Felicity Wolohan** and **Steven Tipper** (Liverpool John Moores University, Edge Hill University and University of York)  
Pupil size changes influence lasting person perceptions
8. **Tian Ye\***, **Stephen M Fleming\*** and **Antonia Hamilton** (University College London)  
Spontaneous attribution of beliefs in adults
9. **Celina I von Eiff\***, **Verena G Skuk\***, **Romi Zäske**, **Christine Wulf\***, **Sascha Frühholz\***, **Ute Feuer\***, **Orlando Guntinas-Lichius\*** and **Stefan R Schweinberger** (Friedrich Schiller University Jena, Germany, Jena University Hospital, Germany, University of Zurich, Switzerland and Cochlear Implant Rehabilitation Centre Thuringia Erfurt, Germany)

Perception of emotional expression in voices by cochlear implant users: A parameter-specific voice morphing approach

10. **Milena Dzhelyova\***, **Giulia Dormal\***, **Corentin Jacques\***, **Caroline Michel\***, **Christine Schiltz\*** and **Bruno Rossion** (Université catholique de Louvain, Belgium, University of Luxembourg and Université de Lorraine, France)  
High test-retest reliability of a neural index of rapid automatic discrimination of unfamiliar individual faces
11. **Aliette Lochy\***, **Christine Schiltz\*** and **Bruno Rossion** (University of Luxembourg, Université de Louvain, Belgium and Université de Lorraine, France)  
Lateralization for faces in prereaders depends on the perceptual processing level: An EEG fast periodic visual stimulation study
12. **Kerri M Bailey\***, **Bruno L Giordano\***, **Amanda L Kaas\*** and **Fraser W Smith\*** (University of East Anglia, CNRS and Aix Marseille Université, France and Maastricht University, The Netherlands) (Sponsor: Stephanie Rossit)  
Decoding the sound of hand-object interactions in primary somatosensory cortex
13. **Chris R H Brown\***, **Theodora Duka\***, **Nick Berggren\*** and **Sophie Forster** (University of Sussex and Birkbeck University of London)  
Testing a goal-driven account of involuntary attentional capture by motivationally salient stimuli
14. **Deimante Kavaliauskaite\***, **Nathaniel Daw\*** and **Deborah Talmi** (University of Manchester and Princeton University, USA)  
In for a pound, in for a penny: When reward does not enhance memory
15. **Nicholas Lange\***, **Christopher J Berry** and **Timothy J Hollins** (University of Plymouth)  
Linking repetition priming, recognition, and source memory: a single-system model
16. **Rory W Spanton\*** and **Christopher J Berry** (University of Plymouth)  
The unequal variance signal-detection model of recognition memory: Tests of the encoding variability hypothesis
17. **Ashleigh Johnstone\*** and **Paloma Marí-Beffa** (Bangor University)  
Distraction or caution: The influence of attention on post-error slowing
18. **Maria Gallagher\***, **Ross Dowsett\*** and **Elisa Raffaella Ferrè** (Royal Holloway University of London)  
Virtual reality modulates vestibular evoked potentials

- 19.** **Iqra Arshad\***, **Maria Gallagher\*** and **Elisa Raffaella Ferre** (Royal Holloway University of London)  
Perceiving the gravitational vertical in 3D space

Both attended and unattended contexts influence speech perception to the same degree

Hans Rutger Bosker  
Max Planck Institute for Psycholinguistics, The Netherlands  
[hansrutger.bosker@mpi.nl](mailto:hansrutger.bosker@mpi.nl)

Often, listening to a talker also involves ignoring the speech of other talkers ('cocktail party' phenomenon). Although cognitively demanding, we are generally quite successful at ignoring competing speech streams in multi-talker situations. However, the present study demonstrates that acoustic context effects are immune to such attentional modulation.

This study focused on duration-based context effects, presenting ambiguous target sounds after slow vs. fast contexts. Dutch listeners categorized target sounds with a reduced word-initial syllable (e.g., ambiguous between *gegaan* "gone" vs. *gaan* "to go"). In Control Experiments 1-2, participants were observed to miss the reduced syllable when the target sound was preceded by a slow context sentence, reflecting the expected duration-based context effect. In dichotic Experiments 3-5, two different context talkers were presented to the participants' two ears. The speech rate of both attended and unattended talkers was found to equally influence target categorization, regardless of whether the attended context was in the same or different voice than the target, and even when participants could watch the attended talker speak.

These results demonstrate that acoustic context effects are robust against attentional modulation, suggesting that these effects largely operate at a level in the auditory processing hierarchy that precedes attentional stream segregation.

Tracking the perspective of other listeners during language comprehension

Shirley-Ann Rueschemeyer  
University of York  
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Humans are constantly engaged in social interactions, many of which are supported by some form of language use. Natural language use in communicative settings involves both understanding a language system, and understanding something about the social background of one's conversational partners. In this talk, I will present the results of a recent neuroimaging study in which we demonstrate that listeners are attuned to background information about other listeners during language comprehension (see also Rueschemeyer et al., 2015; Westley et al., 2017). Accessing social as well as linguistic information activates neural networks involved in both language processing and mentalizing. This is in line with previous studies showing an interaction between these networks during the processing of pragmatically difficult language stimuli (e.g., van Ackeren et al., 2012, 2014). Interestingly, we show that connectivity between language and mentalizing networks is enhanced when the perspective of co-listeners diverges, providing insight into how these two high level cognitive systems work in concert to support social, communicative language processing.

Flexible meaning: the neuromodulation of noun meaning by a prior verb

Bingjiang Lyu, Alex Clarke, Hun Choi and Lorraine K Tyler  
University of Cambridge  
[bl444@csl.psychol.cam.ac.uk](mailto:bl444@csl.psychol.cam.ac.uk)

During the incremental interpretation of spoken language each word that is heard plays a dual role – it is integrated into the ongoing sentential context and places constraints on upcoming words. In this study we focus on how verbs constrain the semantics of upcoming words by investigating the neural processes that underpin the generation of a verb’s semantic constraints and how they modulate the semantics of an upcoming direct object noun (DO). We recorded participants’ brain activity using simultaneous EEG and MEG while they were listening to sentences of the form “subject noun phrase + verb + DO noun”. Using a state-of-the-art corpus-based topic modelling algorithm, both verb semantic constraints and DO noun semantics were represented as probability distributions over 200 semantic topics. Differences in these distributions are then tested against the brain data using representational similarity analysis. The results demonstrate that the verb places constraints on the category of upcoming DO nouns, and only those properties of the noun that are consistent with verb semantic constraints are activated. This process involves the interaction between left BA45 and pMTG, with the left pMTG continuously showing bottom-up effects, and the left BA45 only responding intermittently at key moments throughout the noun.

Orthography affects spoken production in both native and second-language speakers:  
Evidence from Chinese

Markus F Damian<sup>1</sup> and Qingqing Qu<sup>2</sup>  
<sup>1</sup> University of Bristol  
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For literate individuals, does the spoken production of language involve access to orthographic codes? Previous research has rendered mixed results, with a few positive findings contrasting with a range of null findings. In the current experiments, we chose spoken Mandarin as the target language in order to better dissociate sound from spelling. Mandarin speakers named coloured line drawings of common objects with adjective-noun phrases (e.g., /lan2/ /hua1ping2/, “blue vase”). Adjectives and nouns were semantically and phonologically unrelated on all trials, but on critical trials they shared an orthographic radical. In two experiments, this resulted in a significant facilitatory effect on naming latencies, showing that speakers involuntarily activated orthographic codes. In a third experiment, we explored whether this was also the case for speakers operating in their second language. Tibetan-Chinese individuals carried out the experiment in Mandarin Chinese, their second language, and we found a comparable orthographic effect as in the native speakers. We conclude that orthographic information is activated in spoken word production regardless of whether the response language is native or non-native.

Lexical and phonological precision for word and pseudoword recognition in skilled readers

Mahmoud Medhat Elsherif<sup>1</sup>, Linda Ruth Wheeldon<sup>1,2</sup> and Steven Frisson<sup>1</sup>

<sup>1</sup> University of Birmingham

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According to the Lexical Quality Hypothesis1 (LQH), people with more precise lexical representations recognise words faster and more accurately than people with poorer quality lexical representations due to better discrimination between words. One measure to investigate the LQH is neighbourhood density (NHD). Better spellers show inhibitory form priming for dense orthographic neighbourhoods and facilitatory priming for sparse orthographic neighbourhoods, while poorer spellers only show facilitatory priming<sup>2</sup>. This advantage has been attributed to spelling, an orthographic behaviour<sup>3</sup>, but orthographic and phonological abilities tend to be confounded. Research investigating the LQH rarely, if ever, includes measures of phonological processing. We used a masked form priming lexical decision task and collected individual difference measures which were inputted in a principal component analysis. Replicating existing findings<sup>2</sup>, word targets with sparse neighbourhoods showed facilitatory neighbourhood priming and the size of the priming effect increased with the component of phonological precision. The opposite was found for word targets with dense neighbourhoods. For pseudoword targets with sparse neighbourhoods, the size of the priming effect increased with the component of print exposure. The opposite was found for pseudowords with dense neighbourhoods. The findings support the LQH and highlight the importance of phonology in processing visually presented words.

Perfetti, C. (2007). Reading ability: Lexical quality to comprehension. *Scientific Studies of Reading, 11*(4), 357-383.

Andrews, S., & Hersch, J. (2010). Lexical precision in skilled readers: Individual differences in masked neighbor priming. *Journal of Experimental Psychology: General, 139*(2), 299-318.

Burt, J. S., & Tate, H. (2002). Does a reading lexicon provide orthographic representations for spelling? *Journal of Memory and Language, 46*(3), 518-543.

Effects of modality on learning novel word - picture associations

Merel C Wolf<sup>1</sup>, Alastair C Smith<sup>1</sup>, Caroline F Rowland<sup>1,2</sup> and Antje S Meyer<sup>1</sup>

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It is unknown whether modality affects the efficiency with which we learn novel word forms and their meanings. In this study, 60 participants were trained on 24 pseudowords, each paired with a pictorial meaning (novel object). Following a 20 minute filler task participants were tested on their ability to identify the picture-word form pairs on which they were trained when presented amongst foils. Word forms were presented in either their written or spoken form, with exposure to the written form equal to the speech duration of the spoken form. The between subjects design generated four participant groups 1) written training, written test; 2) written training, spoken test; 3) spoken training, written test; 4) spoken training, spoken test. Our results show a written training advantage: participants trained on written words were more accurate on the matching task. An ongoing follow-up experiment tests whether the written advantage is caused by additional time with the full word form, given that words can be read faster than the time taken for the spoken form to unfold. To test this, in training, written words were presented with sufficient time for participants to read, yet maximally half the duration of the spoken form in experiment 1.

The questionable role of phonological neighbourhood density in verbal short-term memory (vSTM)

David Greeno, Dylan Jones and Bill Macken  
Cardiff University  
[greenodj@cardiff.ac.uk](mailto:greenodj@cardiff.ac.uk)

Phonological neighbourhood density (PND) refers to the number of words that can be derived from a given word by changing just one phoneme. Performance in verbal short-term memory (vSTM) tasks (e.g. serial-recall/reconstruction) is usually better when to-be-remembered words are from dense phonological neighbourhoods. This is used as evidence of short-term storage being supported by networks of long-term lexico-phonological knowledge. Experiment 1 examined visual and auditory serial-recall of 6-item sequences drawn from a 48-word pool of either dense or sparse PND. Auditory presentation of dense neighbourhood items increases processing times and reduces identification accuracy, so any dense PND recall advantage should be attenuated compared to visual presentation. However, an equivalent advantage for dense neighbourhood words occurred irrespective of modality. Experiment 2 used 12-item word pools of dense or sparse PND. Small word pools purportedly reduce reliance on long-term memory (task becomes a test of order, rather than item, memory) and, relative to Experiment 1, an attenuation of the dense PND advantage was expected. However, serial-recall was better for sparse neighbourhood words. Results suggest that PND does not have a robust and general effect in vSTM. We critically discuss the concept of PND and what role, if any, it plays in vSTM.

Working memory updating as dynamic changes in cognitive demand during running span

Shraddha Kaur, Dennis Norris and Susan Gathercole  
University of Cambridge  
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Running span is a task that requires the recall of the last  $n$  items from a list of unknown length. Participants use either active updating or passive listening to perform the task, but underlying mechanisms remain unspecified. Here, we examined the time course of resource demands during task performance, hypothesising that a high executive demand would be associated with running span but only during a-priori identified updating events. Experiment 1 employed a divided attention paradigm, tracking cognitive demand on a millisecond basis during three memory tasks. Running span exhibited the highest demand across tasks, with localised bursts in executive activity time-locked to a time-window  $\sim 1000$ ms following item onset, from  $n+1$ th position. Experiment 2 replicated this demand profile, and showed that it was sensitive to input rate. The brief surges in demand characteristic of updating were found when items were presented at slow, but not fast, rate. In Experiment 3, we administered self-paced running span instructing participants to employ different strategies. Active updating was associated with longer inter-item delays, particularly position  $n+1$  onward, compared with passive listening. Together, the experiments illustrated updating as a demanding, executive process with a specific temporal profile that facilitates a continuous change in the recall set.

#### Little evidence for successful Fast Mapping (FM) in adults

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A leading memory theory proposes that new information is quickly acquired by the hippocampus and gradually consolidated, with the neocortex then responsible for longer-term storage. Therefore, a report by Sharon et al. (2011) of successful learning with a “Fast Mapping” (FM) paradigm in adults with amnesia and hippocampal damage was notable. FM is an incidental learning paradigm, inspired by infants’ vocabulary acquisition, which is hypothesised to allow rapid, cortical-based memory formation. However, we have repeatedly fail to find evidence of a learning advantage under FM: in individuals with amnesia, and in healthy younger and older adults, using explicit measures. More recently, Coutanche and Thompson-Schill (2014) reported evidence in healthy young adults of greater same-day learning under FM than EE using an implicit measure of lexical integration. Again however, we failed to replicate this result. In fact, we found the opposite pattern, namely lexical facilitation of reaction times, which we are currently re-testing. Thus while there has been a growing theoretical and practical interest in FM, we conclude that the evidence for FM in adults is weak, and restraint is needed before assuming the phenomenon exists.

#### Priming effects on subsequent associative memory: Testing resources accounts

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Previous work has shown that priming improves subsequent episodic memory, i.e., memory for the context in which an item is presented is improved if that item had been seen previously. We previously attributed this “effect of Priming on Subsequent Memory” (PSM) to a sharpening of the perceptual/conceptual representation of an item, which improves its associability with an (arbitrary) background context, by virtue of increasing prediction error (Greve et al, 2017). However, an alternative explanation is that priming reduces the attention needed to process an item, leaving more residual attentional resources to encode its context. We report three experiments that tested this alternative, resource-based hypothesis, based on the assumption that reducing the overall attentional resources would reduce the size of the PSM. In no experiment did we find a significant interaction between attentional load and PSM, failing to provide empirical support for a resource account. However, further computational modelling revealed that a resource account is not, in fact, inconsistent with our data, and indeed, with a simple assumption about sigmoidal resource-performance functions, the model can explain just about any pattern of interaction. This work demonstrates the difficulty of refuting resource accounts of memory encoding.

Knowledge enhances memory for congruent and incongruent events, but in different ways

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Events that conform to our expectations, i.e., are congruent with our world knowledge or schemas, are better remembered than unrelated events. Yet events that conflict with schemas can also be remembered better. Here I present four behavioural experiments to examine this apparent paradox (Greve et al., in press). Schemas were established by training ordinal relationships between randomly-paired objects, while event memory was tested for the number of objects on each trial. Our data reveal better memory for both congruent and incongruent trials, relative to unrelated trials, producing memory performance that was a “U-shaped” function of congruency, in line with predictions of the SLIMM (‘Schema-Linked Interactions between Medial prefrontal and Medial temporal region’) framework (van Kesteren et al, 2012). The congruency advantage but not incongruency advantage was mediated by post-encoding processes, while the incongruency advantage, but not congruency advantage, emerged even if the information probed by the memory test was irrelevant to the schema. Overall, our data provide evidence that schemas augment event memory in multiple ways, depending on the match between novel and existing information.

Greve, A., Cooper, E., Tibon, R. & Henson, R.N. (in press). Knowledge is power: prior knowledge aids memory for both congruent and incongruent events, but in different ways. *Journal of Experimental Psychology: General*.

Van Kesteren, M.T.R., Ruiters, D.J., Fernández, G. & Henson, R.N. (2012). How schema and novelty augment memory formation. *Trends in Neurosciences*, 35, 211-219

U-shaped relationship between object-location expectancy and memory performance in an immersive reality environment

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The literature on schema and memory suggests that schema-congruency and schema-incongruency can benefit memory performance. A recent study (Greve et al, in press) confirmed this, by finding that memory was as a U-shaped function of congruency, with best memory for highly congruent (expected) or highly incongruent (unexpected) events. However this paradigm used simple, experimentally-acquired rules, which may not generalise to the richer and well-established schemas, such as what objects to expect in a kitchen. To test for this generalisation, we ran a series of immersive virtual reality experiments, in which participants explored a virtual kitchen containing various objects at different locations with respect to the kitchen furniture. The expectancy of finding each object at that location varied parametrically based collected ratings. As predicted (see <https://osf.io/4sw2t/>), we replicated the U-shaped function of object-location memory (recognition and recall) as a function of the expectancy each object's location. Furthermore, there was preliminary evidence that the two extremes of this continuum were supported by different types of memory (Remember responses for unexpected and Know responses for expected locations). The results are interpreted in terms of a neuroscientific model called SLIMM (schema-linked inter-actions between medial prefrontal and medial temporal regions; van Kesteren et al, 2012).

Greve, A., Cooper, E., Tibon, R. & Henson, R.N. (in press). Knowledge is power: prior knowledge aids memory for both congruent and incongruent events, but in different ways. *Journal of Experimental Psychology: General*.

Van Kesteren, M.T.R., Ruiter, D.J., Fernández, G. & Henson, R.N. (2012). How schema and novelty augment memory formation. *Trends in Neurosciences*, 35, 211-219

Symposium –

**The neural basis of semantic cognition**

Organised by Beth Jefferies

Apart from knowing that a camel has a hump (or two) and what the word *complicated* means: what is semantic memory useful for?

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Until the pioneering work of Elizabeth Warrington and Endel Tulving in the 1970s, few researchers knew or thought that semantic memory might be a separable, measurable brain system/function. Now we all believe that, but are also a little wiser about brain networks and the fact that no cognitive capacity or brain system is an island, entire of itself. In this talk, I shall try to summarise some of what we have learned in recent decades about connections, in the brain and in observable behaviour, between semantic memory and other aspects of cognition: working memory, episodic memory, perception, language, object use, etc. Matt Lambon Ralph, in whose honour this symposium has been organised, is a principal contributor to advances in this expanding field of research.

Objective evidence for integrated face-name representations in the human brain

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Are faces and names integrated into a common semantic representation in the human brain? To answer this question, we recorded scalp EEG in participants (n=12) exposed to randomly alternating pictures and written names of a famous identity at a fast rate (4Hz) (condition *Face Name*). Face or name identity changed every 7 stimuli (0.571Hz). Within a few minutes of recordings, significant electrophysiological responses were found exactly at 0.571Hz and harmonics in the frequency domain, pointing to integrated representations of faces and names. Experiment 2 (n=20) included a *Face Only* condition in which the names were replaced by other famous names, and a *Name Only* condition (with faces replaced). Reduced responses were found at 0.571Hz in both conditions. Notably, the sum of amplitudes in these conditions did not account for EEG amplitude in the *Face Name* condition. Experiment 2 was tested in 7 patients implanted with intracerebral electrodes for clinical purposes. Several electrode contacts showed significant ‘pure’ responses in the *Face Name* condition, all in the left ventral anterior temporal lobe (vATL). These observations provide direct evidence for integrated face-name representations in the human brain, with a predominant locus in the left vATL.

A deep, distributed, and dynamic code for animacy in human ventral anterior temporal cortex

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Semantic representations are often viewed as arising from the propagation of activation upward through a feature hierarchy, beginning with simple perceptual features, moving through intermediate modality-specific features, and ending with highly abstract semantic features or categories. In this talk I will consider an alternative view under which semantic representations arise from settling processes within a deep, distributed and dynamic cortical network. In simulations with artificial neural networks I show that feature-based approaches to neurophysiology and brain imaging can produce highly misleading conclusions if semantic representations really are deep, distributed, and dynamic—but that multivariate pattern classification techniques can be used to establish a “signature” that identifies such representations. I then show that the identifying signature is observed in ECoG data collected from human ventral temporal cortex while participants named line drawings of familiar animals and objects. The results suggest that animacy information arises in ventral temporal lobe within 100ms, but that the code changes dramatically over time in anterior regions while remaining consistent in more posterior areas. The result explains why semantic information can rarely be decoded from vATL using fMRI or EEG/MEG, and challenges the view that semantic representations are encoded over independent feature detectors.

Age-related changes in semantic cognition and their effects on coherent speech production

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I will present three linked studies that provide new insights into the effects of healthy ageing on semantic abilities and their consequences for natural speech. In the first study, we found that older people had more detailed semantic knowledge than young people but were less skilled at semantic selection, defined as the ability to select the most relevant aspects of their knowledge for the current task while avoiding interference from irrelevant concepts. In the second study, we found that this semantic selection deficit has negative consequences for natural speech production. There is considerable evidence that the coherence of speech tends to decline in later life: older people more frequently say things that are unrelated to the topic under discussion. We found that these age-related changes in coherence were explained by (a) older people’s reduced ability to select task-relevant semantic information and (b) their more detailed semantic knowledge. Finally, using fMRI we found that when older adults produced highly coherent speech, they displayed increased activation in inferior prefrontal regions implicated in semantic selection processes. Taken together, these results provide converging evidence that the regulation of content during speech production depends on semantic selection processes recruited across a wide range of tasks.

“Semantic aphasia”: One or many?

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The diagnostic label “semantic aphasia” has been recently re-introduced in the neurolinguistic literature to describe the semantic impairment, which can be observed in stroke patients, and to differentiate it from the semantic disorder of neurodegenerative conditions, such as the semantic variant of primary progressive aphasia (Jefferies et al., 2006; Thompson et al., 2018). An important implication of this position is the consideration of the possible role of lesion nature, in addition to lesion site, in the causation of cognitive deficits after brain damage. The same term has been used by previous authors, including historical authorities in the field of aphasia studies, to describe several patterns of linguistic and non-linguistic dysfunction. An analysis of these clinical cases indicates some core features, which may support the notion of shared physiopathological mechanisms.

Jefferies E, Lambon Ralph MA. Semantic impairment in stroke aphasia versus semantic dementia: a case-series comparison, *Brain*, 2006, vol. 129 (pg. 2132-47)

Thompson, H.E., Almaghyuli, A., Noonan, K.A., Barak, O., Lambon Ralph, M.A. and Jefferies, E., 2018. The contribution of executive control to semantic cognition: Convergent evidence from semantic aphasia and executive dysfunction. *Journal of neuropsychology*.

Knowing about objects and their associations: Neural dissociations reflect semantic coherence and control

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Semantic memory encompasses knowledge of specific objects and their associations. Dual Hub theory suggests these aspects of knowledge are represented in anterior temporal (ATL) and temporoparietal areas respectively. Alternatively, this dissociation might reflect the properties of neural networks that underpin semantic cognition. Semantic processing emerges from the flexible interaction of regions allied to the default mode network and a semantic control network. Semantic retrieval in ATL might be strengthened when ongoing conceptual activation is coherent with new inputs, both for taxonomically-related items that share physical features, and strongly associated concepts. This could reflect a role for default mode regions in coherent meaningful combinations, consistent with contemporary accounts that suggest this network is situated at the top of an information-integration hierarchy. In contrast, for semantic control regions such as pMTG, there is a stronger response to weak vs. strong semantic associations, and for tasks tapping event knowledge. Events are inherently flexible, depending on the context: semantic control regions might shape retrieval so that it focuses on currently-relevant knowledge. In contrast, semantic retrieval for specific objects is constrained by their concrete

features, potentially minimising recruitment of the semantic control network.

## **End of symposium**

### Structural priming is determined by global syntax rather than internal phrase structure: Evidence from young and older adults

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Structural priming provides evidence that speakers recruit abstract representations of syntactic structures during language processing. What is less clear is whether syntactic representations are highly abstract (i.e., only encompasses the global structure) or whether they are specified for internal properties, such as constituent phrasal structure. In Experiment 1, young and older adults described transitive verb targets that contained the plural morphology of the patient role (“The horse is chasing the frogs/ The frogs are being chased by the horse”). We manipulated whether the patient role of the preceding prime contained the same plural phrasal structure (“The king is punching the builders/ The builders are being punched by the king”) or a coordinate noun phrase (“The king is punching the pirate and the builder/ The pirate and the builder are being punched by the king”). Participants were equally more likely to produce a passive target following a passive prime for both prime phrase types. In Experiment 2, we repeated the task but manipulated the prime phrasal structure of the agent role. We again found that structural priming was unaffected by prime phrase type. This demonstrates that global, not internal, syntactic structure determines syntactic choices in young and older adults.

### The effects of age and context on emotion perception

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Emotion perception is usually assessed by displaying static faces and asking participants to provide a label to describe each expression: older adults are typically less accurate at this than young adults. However, this task lacks context: in reality, we are presented with contextual cues from multiple modalities. The experiments reported here investigated age differences in decoding emotions from multi-modal stimuli. We also assessed joint effects of context and cognition on age differences in emotion perception. Younger and older adults performed three emotion tasks of varying contextual richness. No age differences in the ability to label static faces were established. Older adults were worse than young at recognising emotions from silent dynamic video clips. Working memory for facial identities correlated with the ability to label dynamic faces but did not explain age differences. Conversely, older adults outperformed young in a contextually rich multi-modal film task. These age effects were partially explained by age

differences in vocabulary. Study 2 investigated whether vocal information influenced emotion perception. Both age groups were better at decoding emotions from stimuli that presented visual and vocal cues. Cognitive processes involved in performing emotion perception tasks and the level of context provided influence age effects in emotion perception.

### Early visual responses to learned danger signals during adolescence

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Adolescence is a sensitive period for the development of high levels of anxiety and anxiety disorders. It has been suggested that this vulnerability could result from a blunted ability to extinguish conditioned fear responses to stimuli that no longer predict harm. To investigate this, perceptual event-related potentials, the P1 and N1, were recorded from male and female adolescents (13-14 years) and adults (25-26 years) while they completed a differential Pavlovian fear conditioning task. During acquisition, only adolescent males showed significant potentiation of the P1 component in response to the CS+ compared to CS-, which was extinguished during the extinction phase. At the level of the N1, both male and female adolescents, but not adults, showed greater visual N1 responses to the CS+ compared to CS- during both acquisition and extinction. Notably, both adolescents and adults exhibited successful acquisition of conditioned fear responses as measured by contingency awareness and evaluative valence CSs ratings, albeit with adolescents taking longer to learn the CS+/CS- contingencies. Together, our findings provide initial evidence for age- and gender- dependent differences in value-related encoding of danger in perceptual areas, and suggest that implicit and explicit constructs of fear learning mature at different rates.

### Changing bodies, changing minds: Flexibility of body representation across development

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Adult body representations are flexible and we can adapt readily to changes in the perceived size and shape of our bodies. Such body awareness is based on bottom-up multisensory integration and top-down cognitive processes. Rapid changes that occur during childhood may require greater flexibility to maintain a stable percept of self. Whilst the majority of research examining the development of body representations in childhood focuses on bottom-up multisensory integration, here we describe a series of experiments examining the maturation of top-down contributions to body awareness. In Experiment 1 we administered the rubber hand illusion with child and adult sized fake hands to children aged 5-17 (N = 219) and adults (N = 109). Children reported faster illusion onset than adults for both hand sizes and stronger illusions than adults for the small fake hand, with illusion strength related to age but not actual

hand size. In Experiment 2 we tested a primate hand illusion with children (N = 85) and adults (N = 43). Children had a stronger illusion for the primate hand compared to adults. These results highlight developmental changes in the flexibility of body representations, helping us understand how the brain adapts to bodily changes during childhood.

### Facial emotion recognition is facilitated by song but not by speech in Autism Spectrum Disorder

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Lifelong impairments in emotion processing are a hallmark symptom of autism spectrum disorder (ASD), especially in terms of recognition of emotions in facial expressions and affective speech prosody, but less so for music.

Emotional cues are often conveyed via multiple sources in a simultaneous manner with visual and auditory information influencing one another. The current study investigates the extent to which emotional content conveyed in speech and song can facilitate emotion recognition in faces and face-like objects in ASD.

Under a cross-modal affective priming paradigm, participants identified emotions in faces or face-like objects (targets) after hearing a spoken/sung word (primes) with either congruent or incongruent emotions. They also completed simple emotion recognition tasks in faces, face-like objects, speech, song in the absence of priming.

Preliminary data obtained from 10 individuals with ASD and 3 typically-developing controls showed no group differences in the simple emotion recognition tasks. Nevertheless, emotions conveyed in song but not speech showed priming effects on facial emotion recognition in ASD, whereas controls' performance was primed by both speech and song. These findings suggest the importance of developing and fine-tuning capacities to decode and integrate modality-specific emotional cues for successful emotion recognition in ASD.

### Intonation discrimination and imitation in Autism Spectrum Disorders (ASD)

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Individuals with autism spectrum disorders (ASD) often show communication difficulty, particularly parsing pragmatic meaning from linguistic pitch, such as the rise at the end of a question, and have been noted to produce unusual-sounding intonation. This is despite often showing enhanced low-level pitch processing and musical ability. This study investigated the link between intonation processing, pitch processing, and musicality in ASD.

16 people with ASD and 5 people with typical development (TD) completed intonation discrimination and imitation tasks, a pitch threshold task and Montreal Battery for Evaluation of Amusia (MBEA). Preliminary data show that the TD group had significantly greater accuracy

in identifying questions versus statements, correctly imitating statement and question pitch glide direction, and discriminating between complex-tone analogues of statements and questions, but the groups performed equally discriminating between statements and questions in natural speech. For both groups, nonspeech discrimination was significantly more accurate than speech discrimination. Both groups' performance on the discrimination tasks and identification accuracy was correlated with pitch thresholds and MBEA, with greater effect for the ASD group.

Identifying the relationship between factors like musicality and low-level pitch processing and pragmatic use of pitch in language is important for understanding the communicative difficulty in ASD.

Symposium –

**Memory consolidation and its manipulation**

Organised by James Bisby

When is an episodic memory formed?

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Real life experience is continuous, yet when reminiscing about the past, we remember discrete events. How does this transpire? Event Segmentation Theory suggests that people naturally segment ongoing experience into events at moments when predictions about the immediate future are violated. These transitions between events (event boundaries) have been suggested to drive episodic encoding. Using functional magnetic resonance imaging (fMRI), we set out to reveal whether event boundaries indeed drive encoding, focusing on the hippocampus. Employing short film clips as memoranda, we found that hippocampal activity time-locked to the offset of events, but not their onset or duration, is linked to subsequent memory, potentially reflecting the encoding of a bound representation to long-term memory. However, while brief film clips mimic several aspects of real-life, they are still discrete events. To determine whether event boundaries drive hippocampal activity – a marker of episodic encoding – in ongoing experience, we analysed brain activity of participants who viewed continuous, naturalistic films, finding that the hippocampus responded both reliably and specifically to shifts between scenes. Taken together, these results suggest that during encoding of a continuous experience, event boundaries drive hippocampal processing, potentially supporting the transformation of the continuous stream of information into distinct episodic representations.

Post-learning rest prioritizes hippocampus-dependent memory for salient events

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Reward motivation is known to modulate memory encoding, and this effect depends on interactions between the substantia nigra/ ventral tegmental area complex (SN/VTA) and the hippocampus. It is unknown, however, whether these interactions influence offline neural activity in the human brain that is thought to promote memory consolidation. Here, we used functional magnetic resonance imaging (fMRI) to test the effect of reward motivation on post-learning neural dynamics and subsequent memory for objects that were learned in high- or low-reward motivation contexts. We found that post-learning increases in resting-state functional connectivity between the SN/VTA and hippocampus predicted preferential retention of objects that were learned in high-reward contexts. In addition, multivariate pattern classification revealed that hippocampal representations of high-reward contexts were preferentially reactivated during post-learning rest, and the number of hippocampal reactivations was

predictive of preferential retention of items learned in high-reward contexts. These findings indicate that reward motivation alters offline post-learning dynamics between the SN/VTA and hippocampus, providing novel evidence for a potential mechanism by which reward could influence memory consolidation.

### Memory reprocessing during sleep spindles supports overnight consolidation

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How are brief encounters transformed into lasting memories? Previous research has established the role of non-rapid eye movement (NREM) sleep with its electrophysiological signature of sleep spindles, for memory consolidation. Related work has demonstrated that memory traces can be strengthened during sleep via the delivery of auditory cues; a technique known as targeted memory reactivation (TMR). It remains unclear, however, whether TMR triggers the brain's endogenous, spindle-mediated consolidation mechanisms, and whether those mechanisms in turn mediate effective reprocessing of mnemonic information. We devised a novel paradigm in which associative memories (adjective-object and adjective-scene pairs) were selectively cued during a post-learning nap, successfully stabilizing next-day retention relative to non-cued memories. First, we found that, compared to novel control adjectives, memory cues evoked an increase in fast spindles. Critically, during the time window of cue-induced spindle activity, the memory category linked to the verbal cue (object or scene) could be reliably decoded, with the fidelity of this decoding predicting the behavioral consolidation benefits of TMR. These findings provide evidence for a memory reprocessing function of sleep spindles in service of overnight consolidation.

### Post-event processing of traumatic material and its contribution to deliberate memory and intrusive thoughts

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Following an event, offline processing is believed to facilitate consolidation and memory integration. Factors influencing these processes following trauma might lead to the development of memory intrusions, as seen in posttraumatic stress disorder. A dual representation theory proposes that intrusions arise due to weakened deliberate contextual processing and strengthened affective/perceptual processing, leading to vivid yet fragmented memories that involuntarily intrude. Enhancing post-encoding processing could facilitate contextual

representations and reduce intrusions. In contrast, general facilitation accounts propose a unitary view in which emotion strengthens all aspects of memory predicting that facilitation of post-encoding processing will increase intrusions and deliberate memory. We investigated brief wakeful rest following viewing of negative video clips on subsequent intrusive and deliberate memory. Wakeful rest reduced intrusion frequency but did not affect deliberate memory. In an fMRI experiment, deliberate memory was associated with greater activity in entorhinal cortex and hippocampus whilst intrusions were predicted by increases in amygdala activity. We also found a post-encoding increase in hippocampal activity at video-clip offset that predicted deliberate memory, which was attenuated for clips that later intruded. Findings highlight the importance of post-encoding processing in the consolidation of traumatic material and intrusion development, supporting a dual representation account.

#### Identifying memory reactivations during sleep using MEG

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It is widely accepted that re-exposure to memory cues during sleep reactivates memories, thereby improving later memory performance. But the neuronal mechanisms coordinating reactivation-related mnemonic information, especially on a local level, are essentially unknown. In this MEG study we set out to elucidate the neuronal dynamics driving reactivation processes during sleep. Participants learned word-picture pairs, with the pictures being presented in a lateralized fashion. This manipulation was meant to elicit distinct neural activation, as evidenced in lateralized alpha desynchronization during encoding and successful retrieval. During subsequent NREM sleep participants were re-exposed to a subset of the prior learned words, to trigger reactivation of the associated memories. In line with previous findings memory cueing during sleep lead to improved memory performance. Moreover, memory cues presented during sleep elicited lateralized activity in the theta and sleep spindle range, specifically involving cortical areas that were engaged in the initial learning and retrieval. Our results indicate that oscillatory activity in both the theta and sleep spindle range are tightly linked to memory reactivation, mirroring the local reprocessing of memories during sleep.

#### Beyond paired associates – a graph-network based memory task for sleep research

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Strong evidence has accumulated that sleep benefits the consolidation of declarative memory. Putatively, during sleep, memory traces that were encoded during wake learning are replayed during sleep, which strengthens their neuronal connections. In this regard, my work has focused on deciphering the neuroplastic processes of this strengthening. However, progress has been slow and findings have sometimes been contradictory, which can at least in part be attributed to the very simple declarative task of word-pair learning that has been used for most of these studies. To accelerate the research into neuroplastic processes of sleep-dependent memory consolidation, I have developed a declarative memory task that requires learning of images forming a complex network of associations. After participants learn this task, they perform an orthogonal attention task with the same images, while their brain activity is measured in an MRI scanner. Representational similarity analysis of these data shows that the similarity of images in voxel space from a hippocampal region of interest corresponds to the ground truth of distances within the learned network. This new approach thus allows a more direct evaluation of the memory traces that are putatively transformed during sleep and has the potential to revolutionize sleep and memory research.

### **End of symposium**

#### Situation-variable and habitual usage of reappraisal and suppression in relationship with well-being

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Habitual use of cognitive reappraisal has been found to be associated with increased well-being, whereas habitual usage of expressive suppression linked to reduced well-being. More recent research has recognised that being flexible in the use of emotion regulation strategy might be more important for well-being. The current study used a within-subject repeated measure design, in particular, eight vignettes to assess participants' self-reported emotion regulation usage in different situations, and examined the relationship between the habitual and situational-variable usage of reappraisal and suppression and well-being. One hundred and five university students participated in this study. Findings showed that the habitual usage of reappraisal was positively associated with well-being, while the habitual usage of suppression was negatively associated with well-being, but the variability of using reappraisal or suppression in different situations was not associated with well-being. This indicated that the flexibility of using some particular strategies in different situations is not associated with subjective well-being. In addition, the potential of using a mathematical model in testing the mechanism of emotion regulation is discussed.

#### Intrinsically there for you: Effects of intrinsic life values on helping behaviour

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While the higher-order life values proposed by Self-determination theory (SDT) are closely related to individual well-being, the effects of these values on altruism, an important component of societal well-being, remains unexplored. Five studies examined the potential relationship SDT values may have with helping behaviour. Studies 1 (N=691) and 2 (N=478) surveyed the general public in Macao. Intrinsic life values were positively correlated with self-reported helping behaviour (Study 1), and intention to donate to charities in a windfall scenario (Study 2). Study 3 measured actual donation among a student sample (N=156), and found a positive relationship between intrinsic values and amount of money donated to a local charity. Studies 4 and 5 experimentally primed intrinsic life goals. Compared to control groups who did not receive value manipulation (n=50 in Study 4 and n=37 in Study 5), participants who were primed of intrinsic life values (n=54 in Study 4 and n=43 in Study 5) were more likely to agree to participate in a helping task (Study 4), spent more time on the helping task (Study 4), and donated more money to a charity (Study 5).

#### The effects of frame and outcome magnitude on financial and medical surrogate risk preferences

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Research findings show that we often make different decisions for others than ourselves, but they have not been consistent across decision domains. This would follow from the diversity of contexts in which surrogate decisions take place. We suggest that these discrepancies are partly due to differences in decision frame and outcome magnitude across studies. We therefore experimentally investigated the effects of frame and outcome magnitude on self-other differences in risk-taking in the financial and medical domain. For both financial gains and medical losses, any self-other differences with small outcomes were magnified with large outcomes. However, there were no self-other differences for financial losses or medical gains. For financial decisions involving small wins, we found self-other differences with real outcomes but not with hypothetical outcomes. These findings demonstrate the impact of the significance of the outcome on self-other differences, thereby highlighting the need for studies that investigate surrogate decision-making in real-world contexts. Finally, the diverging effect of frame between decision domains reinforces their differences and calls for more work to understand why they arise.

#### Framing with words – do we learn from experience?

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Verbal probabilities generate a form of framing called directionality (e.g., a small chance vs. unlikely), which has been shown to impact decision. However, the effect has only been shown with decisions based on descriptions in which participants had little knowledge. In three preregistered experiments ([goo.gl/LJJD8e](http://goo.gl/LJJD8e)), we tested the directionality effect in a shooting task, in which participants saw the suspect and could experience the outcome of their decisions. In the three experiments, participants first read a prediction (e.g., it is likely that the suspect has a gun) and were then shown the suspect (with a gun or not). Participants had 1 second to decide to shoot or not and receive some feedback. The probability of the suspect having a gun was calibrated onto the probability conveyed in the prediction. Participants made 48 shooting decisions in a 4 (probability magnitude: 28%, 34%, 60%, 80%) x 2 (directionality: positive vs. negative) x 6 (trials) design. Experiment 2 and 3 extended Experiment 1 by testing whether providing less decision-making information (by blurring the image of the suspect) or withholding performance feedback would increase the use of directionality. We will present the results of the experiments and discuss the implications of our findings.

Do we know what we are about to do? A brain-computer interface study of intention awareness

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The EEG readiness potential (RP) has consistently been identified as neural correlate of voluntary action. It remains unclear, however, whether the RP is associated with the conscious experience of intending to act. Participants performed self-paced voluntary footpedal presses, which were occasionally interrupted by GO (“Press now”) or STOP (“Don’t press”) probes. Probes were followed by an additional prompt regarding conscious intention: “Were you about to move when you saw the probe?”. Probes were triggered by a real-time algorithm that detected whether RP was either present or absent. We found that the presence of RP preceding the probe increased the reported frequency of conscious intention, relative to absence of RP preceding the probe, but only for probes that occurred in the final 300 ms before action onset. Thus, awareness of intention in voluntary action involves a process that accompanies motor preparation. This process can contribute to awareness prospectively, prior to action itself. We also found that reports of conscious intention were equally likely when the probe had instructed participants to act (GO-probe), or to withhold action (STOP-probe), suggesting that the retrospective effect of overt action on awareness of intention may be minimal.

Butter too thinly spread? Strategy remedies for non-replication and related ills

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Remedies for the ‘Replication crisis’ prescribing protocol pre-registration do not target specific major pathologies such as undeclared and unadjusted multiple testing. Benjamin et al’s (2018) radical shock-therapy (stipulating  $p=0.005$  for ‘new findings’) usefully reduces false-positives, but has harmful side-effects (high effort-cost, more false-negatives). Both approaches fail to treat the misunderstanding of p-values in isolation as truth proxies. Our recommended strategy involves active budget management of degrees-of-freedom. Design then use of a dataset should declare scientific value-goals (precision/reliability, control, generalisability, etc.) for the set of research questions, a, prioritising if necessary, and optimise a set of informative sweet-spots across the relevant ratios: df effect/df error. Within such a strategy, available overall df are distributed towards the stated goals, eg narrower confidence intervals around particular effect sizes, or making a null finding informative. Goals can also be separately optimised through multiple consistent analyses (reporting all!), but emphasising stable pervasive structure in the dataset, not seeking one qualifying p-value. We give a checklist of practical options for alternative analyses, using real examples. The widely quoted rule-of-10 (1 variable for 10 observations in multivariate analysis) should be expressed as model df, to cover multi-category variables, and is too lax; we advocate 1:25.

Benjamin DE et al (2017) | Redefine Statistical Significance. *Nature Human Behaviour*.  
[DOI.10.1038/s41562-017-0189-z](https://doi.org/10.1038/s41562-017-0189-z)

TMS demonstrates that both right and left superior temporal sulci are important for facial expression recognition

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Hemispheric asymmetries characterise all major neural functions and are still among the least understood organizational principles of the brain. It is commonly believed that the right posterior superior temporal sulcus (pSTS) is more important for processing facial expressions than its left homologue. We tested this right hemispheric lateralisation using fMRI and TMS.

In the fMRI study, participants watched videos of faces in the scanner to enable us to functionally localise face-responsive regions in pSTS and compare robustness of pSTS activation across hemispheres. Results showed bilaterally increased response to facial expressions in pSTS and greater response in the right pSTS than left pSTS.

The causal involvement of pSTS in processing facial expressions was then investigated using TMS. TMS was delivered to either right or left pSTS, while participants performed a facial expression recognition task or object recognition task. Results showed that TMS over right and left pSTS impaired facial expression recognition, and this effect was greater and more consistent in the right pSTS than left pSTS. TMS did not affect object recognition.

These results support the concept of right hemispheric dominance of face expression recognition but also stress that computations performed in the left hemisphere are necessary for optimum task performance.

Ultra-coarse, single-glance human face detection in a dynamic visual stream

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Effective human interaction depends on our ability to rapidly detect faces in dynamic visual environments. Here we asked how basic units of visual information (spatial frequencies, or SF) contribute to this fundamental brain function. Human observers viewed initially blurry, unrecognizable natural object images presented at a fast 12 Hz rate and parametrically increasing in SF content over the course of one minute. By inserting highly variable natural face images as every 8th stimulus we captured an objective neural index of face detection in participants' electroencephalogram (EEG) at exactly 1.5 Hz. This face-selective signal emerged over the right occipito-temporal cortex at <5 cycles/image, suggesting that the brain can – at a single glance – discriminate faces from multiple unsegmented object categories using only very coarse visual information. Local features (e.g., eyes) are not yet discernable at this threshold,

indicating that fast face detection critically relies on global facial configuration. Interestingly, the face-selective neural response continued to increase with additional higher SF content until saturation around  $>50$  cycles/image, potentially supporting higher-level recognition functions (e.g., facial identity recognition).

Two ERP components which selectively reflect distance-to-norm in face space and activation of identity-specific representations of known faces

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Norm-based face space (nMDFS) models predict that perceived typicality decreases with distance to the norm. Accordingly, an original face and its corresponding anti-face (deviating in exactly opposite direction from the norm) should have equivalent typicalities, and varying distance-to-norm (DTN) should have equivalent effects on typicality for unfamiliar faces and their anti-faces. Here we reasoned that familiar faces deviate from this pattern due to the special nature of their mental representations. We investigated event-related brain potentials (ERPs) to familiar and unfamiliar faces and their anti-faces with different DTN ( $\pm 0.33$ ,  $\pm 0.66$ , and  $\pm 0.99$ ). Across DTN, rated typicality was highest for original familiar faces, with the expected gradual decrease of typicality with increasing DTN for all other faces. Pronounced DTN effects in the occipitotemporal P200 ERP reflected graded amplitude reductions for higher DTN, for all face types. By contrast, prominent familiarity effects were found for the right N250 and occipitotemporal negativity which were much larger for original familiar faces than their anti-faces, but not for unfamiliar faces versus their anti-faces. Results confirm the right N250 as correlate of identity processing of known faces, and show for the first time that the face-sensitive P200 is primarily modulated by DTN of a face in nMDFS.

Neurocognitive assessment of a training program for poor face recognisers using shape and texture caricatures

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Based on initial evidence that good and poor face recognisers differ in utilising facial shape and texture information (Kaufmann et al., 2013), we tested a training program for poor recognisers based on selectively caricaturing faces in either shape or texture. Young adults with poor face recognition ( $> 1$  SD below the mean in  $> 2/3$  face processing tests: CFMT, GFMT, BFFT) were pseudorandomly assigned to one of three groups ( $n=16$  each). Participants in the two training groups completed six training sessions across three weeks. Per session, they learned ten face identities (depending on group, photorealistic caricatures in either shape or texture).

Before and after training (or waiting in the control group), all participants completed EEG experiments on face learning and famous face recognition, and various diagnostic tests. Results suggested small but specific training-induced improvements. Whereas shape training especially improved face matching (GFMT), texture training elicited some improvements in face learning (CFMT). Face-sensitive ERPs showed training-induced plasticity in terms of enhancements in the N170 and N250 components, following both texture and shape caricature training. Although further research is necessary, our results suggest that training with caricatured faces is a promising way to improve performance in people with poor face recognition skills.

Effects of anti-voice adaptation on voice recognition in naturalistic speech: Evidence for norm-based representations of personally familiar voices

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Inspired by influential proposals for faces (Leopold et al., 2001), it has been suggested that voice identity may be encoded relative to a norm. Here we investigated the representation of personally familiar voices in an anti-voice adaptation paradigm. Based on two pre-studies, we selected four target speakers from 21 female speakers, who were all familiar and well recognized by their colleagues, and rated to have similar voice distinctiveness by independent unfamiliar listeners. In the adaptation experiment, a group of 25 familiar listeners conducted a 4-alternative-forced-choice task on identity-reduced test voices (sentence stimuli) ranging from -15% to 45% identity strength (IS). Prototypical average voices in the center of the voice space (IS 0%) were created from 35 different unfamiliar female speakers. Crucially, before each test voice, listeners adapted to either a matching or a non-matching anti-voice (IS -90%, using different sentences relative to the test voice). Importantly, we found strong and consistent contrastive adaptation aftereffects for all four target speakers: Participants were more likely, and faster, to identify test voices on the matching identity-trajectory compared to test voices on the non-matching identity trajectory. Our findings provide strong and novel evidence for norm-based coding of personally familiar voices in naturalistic speech.

Leopold, D. A., O'Toole, A. J., Vetter, T., & Blanz, V. (2001). Prototype-referenced shape encoding revealed by high-level aftereffects. *Nature Neuroscience*, 4(1), 89-94

Are averages meaningful when learning individual voice identities?

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Models of voice perception propose that identities may be encoded relative to an abstracted average or prototype voice. While there is some evidence for average-based coding when learning to discriminate different voice identities, nothing is known about how representations of individual identities are formed. In the current study, we created 3 perceptually distinct voice identities from one donor voice by manipulating fundamental frequency (F0) and vocal tract length (VTL). Each voice identity included their own within-identity distribution of Fo and VTL values. Listeners first learned to recognise these 3 identities based on ring-shaped distributions located around the perimeter of each within-identity voice space – crucially, these distributions were missing their centres. At test, 40 listeners made old/new judgements (3 learned identities plus 3 distractor identities) for items located on both the ring-shaped distribution and an untrained distribution nested around the centre of each ring-shaped distribution (i.e. covering the previously untrained average of the trained distribution). Accuracy was higher for the untrained centre distribution compared to the previously exposed ring-shaped distribution. Furthermore, accuracy increased as the acoustic distance to the centre decreased. This is a first demonstration that the acoustic average of trained categories is meaningful when learning individual voice identities.

A hippocampal model of rapid sequence learning applied to repetition effects in immediate serial recall

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We present a model of rapid sequence learning by the hippocampus and apply it to account for repetition effects in immediate serial recall (ISR). The model takes the form of a simple recurrent network---a type of model that has been applied effectively to cortical sequence learning in many domains---but modified to be consistent with the function of the hippocampus rather than neocortex. One-trial learning of novel sequences is enabled by separating the assignment of structure-sensitive but highly sparse context representations to items and prior context (via a k-winners-take-all algorithm) from the use of these representations to predict next items in the sequence (via direct error-correction). The accumulation of learning effects across trials gives rise to an advantage for whole-list repetition in ISR---the Hebb effect. Shared structure across lists, such as repetition of item-position associations, accumulates with sufficient exposure, reflecting structure-sensitive overlap among the sparse representations. Analyses show that the structure of the training environment systematically influences the degree to which item and position information are represented independently versus conjunctively. The model shares important properties with a number of existing models and can be viewed as an integration of them that accounts for a broader range of phenomena.

Reversing the dissociation caused by deferred feedback in category learning: The limits of multiple systems

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Smith et al. (2014) demonstrated that deferring and rearranging feedback led to impaired learning of a two-dimensional (diagonal) categorization task that required information integration, but had little effect on learning of a unidimensional category structure. They argued that this finding was “one of the strongest explicit–implicit dissociations yet seen in the categorization literature” (p.447) and that it arose because deferring feedback selectively disabled an implicit category learning system required for information-integration learning, but left an explicit rule-based system intact. Contrary to this conclusion, we show that a diagonal, information-integration structure is neither necessary (Experiment 1) nor sufficient (Experiment 2) for observing impaired category learning under deferred feedback conditions. Rather than supporting the multiple-systems interpretation, our data suggest that deferring feedback produces a greater performance impairment for categorization tasks that impose greater cognitive demands. These findings add to a growing literature questioning the multiple-systems account of category learning.

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.

### Is human causal learning driven by uncertainty?

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A number of influential learning theories are built on the concept of prediction error; the idea we learn because of a discrepancy between what is expected and what is experienced. However, recent experiments suggest a role for uncertainty in human causal learning, with causally ambiguous cues being learned about more readily than cues with a certain causal status, despite the latter having a larger prediction error. More recent experiments have extended on this research, by considering different kinds of causally uncertain cue, from the perspective of attentional learning theories, as well as considering the manner in which learning is impacted when learned beliefs are violated. The findings of these studies pose a serious challenge to several established learning theories. The data suggest that uncertainty about the causal status of cues drives learning in humans, and that participants are resistant to updating their beliefs about the status of cues they have previously learned about.

### Category-selective patterns of response to objects with the same image properties, but from different categories

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Neuroimaging studies have revealed distinct patterns of response to different object categories in the ventral visual pathway. However, object categories also differ systematically in their image properties. So, it is possible that these patterns of neural response could reflect differences in image properties. To differentiate between these alternative explanations, we compared the response to objects from five categories (bottles, chairs, faces, houses, shoes) with a corresponding set of objects that had similar image properties, but were semantically different. The neural response to the objects defined by category or image was then measured in 25 participants using fMRI. Consistent with previous findings, we found that there were distinct patterns of response to objects defined by category. However, we also found that there were distinct patterns of response to objects defined by image properties. Critically, we found similar patterns of response to objects defined by either category or image in the corresponding conditions. For example, the pattern of response to bottles was similar to the pattern of response to objects with similar image properties to bottles. These results suggest an image-based neural representation of objects in the ventral visual pathway.

#### Recognition performance after rule-based and information-integration categorization

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One popular task in the categorization literature is learning the information-integration category structure. High performance on this task is argued to require integrating stimulus information at a pre-decisional stage. Furthermore, as the structure is difficult to describe verbally, many papers have argued that it is learned implicitly using a procedural learning mechanism (Ashby & Valentin, 2016). Here, we examine whether participants do indeed have explicit access to category knowledge by examining recognition performance after category training. We find that our results are more consistent with an explicit model of categorization, such as SUSTAIN (Love et al., 2004), than one that predicts implicit learning and category knowledge.

Ashby, F. G., & Valentin, V. V. (2016). Multiple systems of perceptual category learning: Theory and cognitive tests. In H. Cohen & C. Lefebvre (Eds.), *Handbook of Categorization in Cognitive Science* (2nd ed., pp. 547–572). New York, NY: Elsevier.

Love, B. C., Medin, D. L., & Gureckis, T. M. (2004). SUSTAIN: A network model of category learning. *Psychological Review*, *111*(2), 309–332.

Controlled semantic cognition necessitates a deep multimodal hub

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The semantic system must satisfy a number of essential properties. Principally, it must 1) learn to form coherent context-invariant conceptual representations by abstracting over episodes across time and by learning the complex non-linear relationships between features across different sensory modalities, and 2) dynamically use subsets of features to create a context-appropriate similarity space and produce context-dependent behaviours. These performance criteria are non-trivial to achieve, particularly because they necessitate the presence of and interaction between context-variant and context-invariant processes. A variety of different architectures can and have been theorised to subserve the semantic system, however, the ability of these architectures to synthesise context-invariant representations and task-specific outputs have never been formally tested. We investigated the importance of five architectural features: a hub, a multimodal hub, depth, hierarchical convergence across modalities and the inclusion of sparse long-range connections. An architecture employing a single, deep multimodal hub with sparse long-range connections from modality-specific inputs, was identified as optimal. We also explored where the control signal should connect into the network, and the consequences of lesioning control and representation regions of the model. Implications for the architecture of the cortical semantic system and its impairment in semantic dementia and semantic aphasia will be considered.

Exploring the role of meaning in response inhibition

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The meaning of perceptual inputs guides our decisions about actions. However, most research on Response Inhibition (RI) has used simple stimuli devoid of meaning. In two Go/No-Go experiments, we examined whether neural mechanisms supporting RI are influenced by the relevance of meaning to the decision, and by presentation modality (words/images). In experiment 1 (on-line fMRI), we found common regions for RI across perceptual and conceptual decisions (bilateral intraparietal sulci and right inferior frontal sulcus), whose neural responses have been linked to diverse cognitive demands in previous studies. We also identified a cluster in ventrolateral occipital cortex sensitive to modality, with a stronger response to inhibition for meaningful images than words. In experiment 2 (resting-state fMRI) we found that participants with stronger connectivity between these common inhibition regions and limbic areas in medial temporal/anterior cingulate cortex were better at meaning-driven inhibition. Regions involved in picture inhibition were more connected to a cluster in thalamus/caudate for participants who were better at performing the picture task off-line. Together these studies indicate that efficient inhibition depends on interactions between common control regions, important across multiple types of inputs and decisions, and other brain regions linked to specific inputs (visual features) or representations (memory).

Exploring the contribution of the DMN to the integration of semantic information

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The contribution of default mode network (DMN) to semantic cognition remains unclear. In a meta-analysis of neuroimaging studies, Binder and colleagues (2009) found the peak semantic response was in angular gyrus (AG) within DMN. However, DMN has also been described as task-negative and distinct from semantic processing: Humphreys et al. (2015) showed that while temporal lobe regions respond to semantic content, AG within DMN deactivates across both semantic and non-semantic tasks. Most recently, DMN has been associated with information integration at the top of a cortical hierarchy (Margulies et al., 2016). We tested this hypothesis by manipulating the degree to which semantic decisions for ambiguous words were constrained by visual cues depicting locations and/or facial emotions. We contrasted highly-constrained semantic retrieval (when both cue types were presented) with less constrained trials (including one or no cues). The contrast of two vs. no cues elicited

activation within certain DMN regions, supporting an information-integration view. Moreover, the semantic integration regions were spatially intermediate between DMN and task-positive regions associated with executive control. This suggests that semantic integration, at least when tested in an externally-presented task, has a distinctive position on a large-scale gradient that reflects the transition between DMN and executive regions.

Binder, J. R., Desai, R. H., Graves, W. W., & Conant, L. L. (2009). Where is the semantic system? A critical review and meta-analysis of 120 functional neuroimaging studies. *Cerebral Cortex*, *19*(12), 2767-2796.

Humphreys, G. F., Hoffman, P., Visser, M., Binney, R. J., & Ralph, M. A. L. (2015). Establishing task-and modality-dependent dissociations between the semantic and default mode networks. *Proceedings of the National Academy of Sciences*, *112*(25), 7857-7862.

Margulies, D. S., Ghosh, S. S., Goulas, A., Falkiewicz, M., Huntenburg, J. M., Langs, G., ... & Jefferies, E. (2016). Situating the default-mode network along a principal gradient of macroscale cortical organization. *Proceedings of the National Academy of Sciences*, *113*(44), 12574-12579.

Graded constraints in semantic cognition: How do we retrieve knowledge in a flexible way?

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Flexible semantic retrieval is critical to the production of appropriate thoughts and behaviour. Recent studies have delineated separable components of semantic cognition – semantic representation and control processes - yet little is known about the biological basis of individual differences in semantic control capacity. In addition, while recent studies have shown that the default mode (DMN), semantic control and multiple demand (MDN) networks together support semantic processing, the topological arrangement of brain regions implicated in flexible semantic retrieval remains unclear. In Study 1, we conducted analyses of MRI-based cortical thickness to identify structural markers of individual differences in semantic control. Participants who performed relatively well on tests of controlled semantic retrieval showed increased structural covariance between left posterior middle temporal gyrus and left anterior middle frontal gyrus. This pattern of structural covariance was specific to semantic control and did not predict performance on harder non-semantic judgements contrasted with easier semantic judgements. In Study 2 using task-fMRI, we found orderly transitions in patterns of cortical recruitment (from DMN, through semantic control regions to the MDN), as the mismatch between task requirements and long-term semantic representations increased.

Towards a distributed connectionist account of cognates and interlingual homographs:  
Evidence from semantic relatedness tasks

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Current (localist connectionist) models of how bilinguals process words that exist in both their languages (cognates and interlingual homographs) are based primarily on data from lexical decision tasks. To provide converging evidence, we conducted two English semantic relatedness experiments. In Experiment 1, highly proficient Dutch–English bilinguals (N=29) and English monolinguals (N=30) judged the semantic relatedness of word pairs that included a cognate (e.g. “wolf”–“howl”; n=50), interlingual homograph (e.g. “angel”–“heaven”; n=50) or English control word (e.g. “carrot”–“vegetable”; n=50). We found evidence for an interlingual homograph inhibition effect of 36.8ms (only for the bilinguals), but unexpectedly found no evidence for a cognate facilitation effect. Experiment 2 (N=101) replicated these findings and also showed that recent experience with these items in Dutch speeded processing of the cognates but slowed down processing of the interlingual homographs in English. This surprising pattern of results is broadly consistent with findings in the monolingual semantic ambiguity literature and may best be explained by the distributed connectionist models proposed to explain those findings. We conclude it is necessary to explore the viability of a distributed connectionist model of the bilingual lexicon. Pre-registrations, data and materials available at [www.osf.io/ndb7p](http://www.osf.io/ndb7p) (Exp. 1) and [www.osf.io/2at49](http://www.osf.io/2at49) (Exp. 2).

Individual differences in reading comprehension and off-task thought relate to perceptually-coupled and decoupled cognition

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Although the default mode network (DMN) is associated with off-task states, recent evidence shows it can support tasks. This raises the question of how DMN activity can be both beneficial and detrimental to task performance. The decoupling hypothesis proposes that these opposing states occur because DMN supports modes of cognition driven by external input, as well as retrieval states unrelated to input. To test this account, we examined individual differences in reading comprehension and off-task thought while participants read an expository text in the laboratory, and related variation in these measures to (i) the neural response during reading in the scanner, and (ii) patterns of intrinsic connectivity at rest. The responsiveness of a region of DMN in middle temporal gyrus (MTG) to orthographic inputs during reading predicted good comprehension, while intrinsic decoupling of the same site from visual cortex

at rest predicted more frequent off-task thought. In addition, good comprehension was associated with greater intrinsic connectivity between MTG and medial prefrontal regions which was also within DMN, demonstrating that DMN coupling can support task performance, not only off-task states. These findings indicate that the opposing roles of DMN in cognition reflect its capacity to support both perceptually-coupled and decoupled cognition.

Implicit expectations about character behaviour are associated with eating disorder symptomatology and body mass index in males: Evidence from eye movements during reading

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Eating disorder prevalence rates are increasing in males, perhaps more rapidly than in females. Current theories debate whether it is the way in which body-, food-, or perfectionism-related information is processed that is primarily associated with eating disorder symptomatology. In two experiments, males had their eye movements monitored while they read body-, food-, or perfectionism-related texts, which ended with a sentence containing a critical emotion-based word that either ‘matched’ or ‘mismatched’ one’s expectations concerning how the character might react. Participants read scenarios that were written from either a third-person perspective (Experiment 1, N = 90), or a second-person perspective (Experiment 2, N = 90). Following the reading task, participants completed the Eating Disorder Examination Questionnaire (EDE-Q 6.0) and their body mass index (BMI) was calculated. EDE-Q 6.0 scores were associated with the size of the mismatch effect (reading times for mismatch minus match conditions) for body- and perfectionism-related materials for third-person scenarios. BMI was associated with the size of the mismatch effect for perfectionism-related materials for third-person scenarios, and with the size of the mismatch effect for body-related materials for second-person scenarios. Results support theories proposing that body and perfectionism-related cognitive mechanisms may be key contributors to eating disorder symptomatology.

Pupil size changes influence lasting person perceptions

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Pupil size changes represent a subtle social cue, often processed outside of conscious awareness. Despite this subtlety, changes in pupil size affect our perceptions of the character and emotions of others. In a series of experiments we demonstrated for the first time that pupil size changes are also encoded into long-term memory. In the experiments participants were exposed

to faces whose pupils dilated or constricted. In a subsequent task they were asked to judge the faces for friendliness and interest. Importantly, at this later stage all the faces displayed pupils of the same size. Despite not noticing the pupil size changes in the previous task, participants' ratings were influenced by whether a face had displayed dilated or constricted pupils. This effect interacted with the gender and trustworthiness of the facial stimuli, and affected participants differently if they had been primed to feel socially excluded. Extending this last finding we present unpublished data examining the influence of loneliness on pupil-memory effects. We found participants who were high in loneliness demonstrated a lack of sensitivity to pupil size changes. Conversely those who were less lonely showed the predicted pupil size encoding effects. Interpretations of this finding and future directions will be discussed.

#### Spontaneous attribution of beliefs in adults

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Understanding other people have beliefs different from ours or different from reality is critical to social interaction. Previous studies suggest that healthy adults possess an implicit mentalising system, but alternative explanations for data from reaction time false belief tasks have also been given. In this study, we combined signal detection theory (SDT) with a false belief task. Since SDT allows us to separate perceptual sensitivity from criteria, we are able to investigate how another person's beliefs change the participant's perception of near-threshold stimuli. Participants (n=55) watched four different videos in which an actor saw (or didn't see) a Gabor cube hidden (or not hidden) behind an occluder. At the end of each video, the occluder vanished revealing a cube either with or without Gabor pattern, and participants needed to report whether they saw the Gabor pattern or not. A pre-registered analysis with classical statistics weakly suggests an effect of the actor's belief on participant's perceptions. An exploratory Bayesian analysis supports the idea that the actor believed the cube was present, participants made slower and more liberal judgments. Though these data are not definitive, these current results indicate the value of new measures for understanding implicit false belief processing.

#### Perception of emotional expression in voices by cochlear implant users: A parameter-specific voice morphing approach

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Research on cochlear implants (CIs) has focused on speech comprehension, with little research on perception of emotions in voices. We compared emotion perception in CI users and normal-hearers (NH), using parameter-specific morphing (Skuk & Schweinberger, 2014). Twenty-five CI users and 25 matched NH performed fearful-angry discriminations on stimuli from morph continua across all parameters (full), or across selected parameters (F0, Timbre, or Time information), with other parameters at a non-informative intermediate level. Unsurprisingly, CI users showed poorer vocal emotion perception. Importantly, while NH individuals used timbre and fundamental frequency (F0) information to equivalent degrees, CI users were far more efficient in using timbre information for this task. There was enormous variability between CI users, with poorest performers responding close to guessing level. By contrast, better performing CI users relied on timbre almost as efficiently as NH individuals did, while showing little evidence for successful usage of F0 cues. Thus, under the conditions of this study, CIs were inefficient in transmitting emotion based on F0 alone. Vocal emotion perception was associated with quality of life in this study and previous research. Perceptual training and improvements in CI design may be approaches to improve CI users' perception of social-emotional information.

Skuk, V. G., & Schweinberger, S. R. (2014). Influences of Fundamental Frequency, Formant Frequencies, Aperiodicity and Spectrum Level on the Perception of Voice Gender. *Journal of Speech, Language, and Hearing Research*, 57, 285-296.

High test-retest reliability of a neural index of rapid automatic discrimination of unfamiliar individual faces

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A key aspect of human individual face recognition is the ability to discriminate unfamiliar individual faces. Since many general processes contribute to explicit behavioural performance in individual face discrimination tasks, measuring unfamiliar individual face discrimination ability in humans is challenging. In recent years, a fast periodic visual stimulation approach has provided objective (frequency-locked) implicit electrophysiological indices of individual face discrimination that are highly sensitive at the individual level. Here we evaluate the test-retest reliability of this response across scalp electroencephalographic (EEG) recording sessions separated by more than two months, in the same 30 individuals. We found no test-retest difference overall across sessions in terms of amplitude and spatial distribution of the EEG individual face discrimination response. Moreover, with only 4 minutes of recordings, the variable individual face discrimination response across individuals was highly stable (i.e., reliable) in terms of amplitude, spatial distribution and shape. This stable EEG response was also significantly correlated with speed, but not accuracy rate, of the Benton face recognition

task (BFRT-c, Rossion, & Michel, 2018). Overall, these observations strengthen the diagnostic value of FPVS-EEG as an objective and rapid flag for specific difficulties at individual face recognition in the human population.

Lateralization for faces in prereaders depends on the perceptual processing level: An EEG fast periodic visual stimulation study

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The developmental origin of human adults' right hemispheric lateralization to face stimuli is unclear, in particular because young infants' right hemispheric advantage in face perception is no longer present in preschool children, before written language acquisition. Here we used fast periodic visual stimulation (FPVS) with scalp electrophysiology to test 52 preschool children (5 years old) at two levels of face processing (i.e., faces vs. objects, or discrimination between individual faces). While the contrast between faces and nonface objects elicits strictly bilateral occipital responses in children, discrimination of faces on the basis of identity in the same children is associated with a strong right hemispheric lateralization over the occipito-temporal cortex. Inversion of the face stimuli does not modulate right lateralization but significantly decreases the discrimination response. Furthermore, there is no relationship between right hemispheric lateralization in individual face discrimination and preschool levels of letter recognition. These observations suggest that right lateralization for face perception is essentially driven by the necessity to process faces at the level of identity. Overall, they also challenge the view that the adult right hemispheric lateralization for face perception emerges late and slowly during childhood due to increased competition with left lateralized posterior network for reading.

Decoding the sound of hand-object interactions in primary somatosensory cortex

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Neurons, even in earliest sensory regions of cortex, are subject to a great deal of contextual influences from both within and across modality connections. We investigated whether hearing sounds depicting familiar hand-object interactions would trigger activity in primary somatosensory cortex. In a rapid event-related fMRI experiment, right handed participants (N=10) listened to five exemplars from each of three categories of auditory stimuli:

hand-object interactions (e.g. bouncing a ball), animal calls (e.g. dog barking), and pure tones (unfamiliar control). Participants listened attentively, and performed a one-back repetition counting task, which eliminated any need for a motor response during scanning. An independent finger-mapping localizer was completed afterwards, and used to define finger-sensitive voxels within anatomically drawn masks of the right and left post-central gyrus (PCG). Multivariate pattern analysis revealed significant decoding of different hand-object interactions within bilateral PCG, whilst no significant decoding was found for either control category. Crucially, in the finger-selective voxels, decoding accuracies were significantly higher for decoding hand-object interactions compared to both control categories in left PCG. Thus cross-modal connections from audition to early somatosensory cortex transmit content specific information about familiar hand-object sounds. This finding is consistent with Predictive Coding models of brain function.

Testing a goal-driven account of involuntary attentional capture by motivationally salient stimuli

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Typically, attentional biases towards motivationally relevant stimuli (e.g. reward, threat) are conceptualised as stimulus-driven because they are often involuntarily captured. Conversely, goal driven attention is characterised as a voluntary process. It is, however, plausible that individuals would actually want to search for motivational stimuli. Additionally, contingent capture research has shown that our current voluntary goals can paradoxically induce an involuntary bias to irrelevant stimuli. We, therefore, tested whether the involuntary attention to motivationally relevant stimuli could be accounted for by a goal-driven mechanism. To do this we modified a RSVP task with entirely task-irrelevant reward associated (i.e. alcohol, cigarettes) and threat associated (i.e. mutilation scenes, emotional faces, dangerous animals) stimuli. Across 15 different experiments we found that these stimuli only captured attention when participants were voluntarily searching a relevant location for the same single category of motivationally relevant stimuli. Interestingly, there was no evidence of attentional capture when individuals were searching for a different stimulus category. Additionally, there was no attentional capture induced by passive memory representation or broad non-specific search goals. We therefore find strong evidence favouring the goal-driven account of involuntary attentional capture by motivationally relevant stimuli, and have explored the boundary conditions of this mechanism.

In for a pound, in for a penny: When reward does not enhance memory

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Motivated learning refers to the intuition that rewarding someone for performing well will improve their performance. In this experiment we show that this isn't always true. In two experiments we promised participants a pound for remembering some pictures and 10 pence for remembering others. Their ability to describe the pictures was tested after a minute (Experiments 1 and 2) and after 24 hours (Experiment 2). Participants recalled more high-reward than low-reward pictures when they studied and recalled them together. When they studied high and low-reward pictures in separate lists the effect of reward was greatly attenuated, and was no longer statistically significant. These results replicate, in the domain of positive valence, the emotional list-composition effect that we have previously demonstrated with negatively valenced, distressing pictures. Our recently proposed model of emotional memory, the emotional Context Maintenance and Retrieval model, accounts for these results (Talmi, Lohnas, & Daw, in press). High- and low-reward pictures were forgotten at the same rate in all conditions. This result contradicts the suggestion that reward modulates long-term memory consolidation and suggests, instead, that previous findings supportive of this claim are limited to recognition memory tests.

Linking repetition priming, recognition, and source memory: a single-system model

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We present new behavioral data and modeling that links repetition priming, recognition, and source memory. In a series of experiments, the magnitude of the priming effect, as measured with identification response time in a gradual clarification task, was 1) greater for studied items receiving correct source decisions than incorrect source decisions, and 2) tended to increase as confidence in the source decision increased. Further, the association persisted even when participants did not complete an intermediate recognition task, and persisted regardless of whether item and source information were unitized at encoding. Building on the framework for modeling recognition and priming proposed by Berry, Shanks, Speekenbrink, and Henson (2012), we developed a single-system signal-detection model in which source memory decisions are driven by the same memory strength signal as recognition and priming. A version of this model that allows source-rating criteria to converge with greater recognition confidence, and allows the variances of old and new item strength distributions to be unequal, provided the best qualitative and quantitative account of the data, and was preferable to a "multiple-systems" version of the model.

Berry, C. J., Shanks, D. R., Speekenbrink, M., & Henson, R. N. A. (2012). Models of recognition, repetition priming, and fluency: exploring a new framework. *Psychological Review*, 119, 40-79.

The unequal variance signal-detection model of recognition memory: Tests of the encoding variability hypothesis

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Despite the unequal-variance signal detection (UVSD) model's prominence as a model of recognition, an explanation for the unequal-variance assumption has yet to be established. According to the encoding variability hypothesis, the strength variance of old items ( $\sigma_O$ ) is greater than that of new items because items are incremented by variable, rather than fixed, amounts of strength during study. Conditions that increase encoding variability should therefore produce greater estimates of  $\sigma_O$ . We tested this prediction in two experiments. In Experiment 1, encoding variability was manipulated by presenting items for fixed or variable (normally distributed) durations during study. Estimates of  $\sigma_O$  from the data, however, did not differ between the fixed and variable conditions. In Experiment 2, participants studied items while performing an auditory one-back task in which distractors were presented at fixed or variable (normally distributed) intervals. Surprisingly, estimates of  $\sigma_O$  were greater in the fixed than variable condition. Thus, we found no evidence for the encoding variability hypothesis; instead,  $\sigma_O$  was linked to the mean strength of old items. Fits of the dual-process and mixture signal-detection models are also considered.

Distraction or caution: the influence of attention on post-error slowing

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After making an error, we often slow down and show a deterioration in response times in a phenomenon known as 'post-error slowing' (PES). Several theories have been proposed about the different ways attentional factors could influence this slowing. For example, some theories suggest slow performance after an error reflects reduced attention. This is due to errors being unexpected events, therefore causing a distraction. On the contrary, other theories suggest that attention is increased after an error as we become more controlled and cautious in an attempt to avoid making another error. However, these theories see attention as a unitary process, whilst research has suggested that it is made up of separate networks: Alert, Orienting, and Executive. The Attention Network Test (ANT) was devised to assess each of them by producing separate indexes. Here, we use the ANT to evaluate which attentional networks are associated with PES, by assessing responses after correct trials and after an error. Results indicate that the Executive network was the most strongly affected after an error, especially in the congruent conditions. These results likely reflect an enhanced inhibitory control, suggesting that responses following an error are made in a more controlled and cautionary manner.

Virtual reality modulates vestibular evoked potentials

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The popularity of virtual reality (VR) has increased rapidly in recent years. While significant technological advancements are apparent, a troublesome problem with VR is that between 20% and 80% of users will experience unpleasant side-effects such as nausea, disorientation, blurred vision, and headaches – a malady known as Cybersickness. Cybersickness may be due to conflicts between sensory signals for self-motion: while vision signals that the user is moving in a certain direction with certain acceleration, the vestibular organs provide no corroborating information. To resolve the sensory conflict vestibular cues must be down-weighted leading to an alteration of how the brain interprets actual vestibular information. This may account for the frequently reported after-effects of VR exposure. Here we investigated whether VR exposure modulates vestibular processing. We measured vestibular-evoked myogenic potentials (VEMPs) during brief immersion in a VR environment. We found changes in VEMPs asymmetry ratio, with a substantial increase in VEMPs amplitude recorded on the left sternocleidomastoid muscle following just one minute of exposure to VR vection. Our results suggest that exposure to VR modulates vestibular processing, which may explain common after-effects of VR.

Perceiving the gravitational vertical in 3D space

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Reference to gravity is essential to explore and interpret the surrounding environment. On Earth, we experience gravity when we stand up. The Gravitational Vertical (GV) defines what is “up” and what is “down” and deviations thereof, in the gravitational field. Humans are very accurate in estimating the GV when upright, but their perceptual experience is biased toward the direction of the body when roll-tilted – the so called *Aubert Effect*. Here we investigated the GV in the 3D-space by exploring the Aubert Effect on the pitch plane. Participants were secured on a 3D human tilt-table passively placed at different pitch inclinations (upright= 0deg vs tilted= +40deg) and asked to judge the orientation of 3D cylinders displayed on a Head Mounted Displays. Cylinders were presented vertical or pitch-tilted. The Point of Subjective Equality (PSE) was estimated for each experimental condition. Results highlighted a PSE shift towards the body when participants were pitch-tilted. Thus, the GV is biased towards the body axes when proprioceptive and vestibular signals are not coherent with the direction of the gravitational vector.







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**London Accommodation**

Below is a selection of London hotels, some of which are close to the venue. PLEASE NOTE these are not recommendations, and you should check the website and prices before making your booking:

<b>Hotel Name</b>	<b>Website</b>	<b>Booking Contact Number</b>
Albany Hotel 34 Tavistock Place	<a href="http://albanyhotelwc1.co.uk/">http://albanyhotelwc1.co.uk/</a>	0207 837 9139
Alhambra Hotel 17-19 Argyle Street	<a href="http://www.alhambrahotel.com/">http://www.alhambrahotel.com/</a>	0207 837 9575
Arosfa Hotel 83 Gower Street	<a href="http://www.arosfalondon.com/">http://www.arosfalondon.com/</a>	0207 636 2115
Avonmore Hotel 57 Cartwright Gardens	<a href="http://www.avonmorehotel.net/">http://www.avonmorehotel.net/</a>	0207 387 1939
Chester Hotel Victoria 27-29 Longmoore Street	<a href="http://www.chesterhotelvictoria.com/">http://www.chesterhotelvictoria.com/</a>	0207 834 3791
Double Tree by Hilton 92 Southampton Row	<a href="http://doubletree3.hilton.com/en/hotels/united-kingdom/doubletree-by-hilton-hotel-london-west-end-LHRLBDI/">http://doubletree3.hilton.com/en/hotels/united-kingdom/doubletree-by-hilton-hotel-london-west-end-LHRLBDI/</a>	0207 242 2828
Fitzroy Hotel 41 Fitzroy Street	<a href="http://www.fitzroy-hotel.net/index.php?page=contact">http://www.fitzroy-hotel.net/index.php?page=contact</a>	0207 387 7919
Grange Hotels Various locations	<a href="http://www.grangehotels.com/hotels-london/">http://www.grangehotels.com/hotels-london/</a>	0207 233 7888
Harlingford Hotel 61-63 Cartwright Gardens	<a href="http://www.harlingfordhotel.com/">http://www.harlingfordhotel.com/</a>	0207 387 1551
Hotel Russell 1-8 Russell Square	<a href="http://www.hotelrusselllondon.co.uk/">http://www.hotelrusselllondon.co.uk/</a>	0207 837 6470
Ibis London Euston 3 Cardington Street	<a href="http://www.ibis.com/gb/hotel-0921-ibis-london-euston-st-pancras/">http://www.ibis.com/gb/hotel-0921-ibis-london-euston-st-pancras/</a>	0207 304 7712
Mentone Hotel 54-56 Cartwright Gardens	<a href="http://www.mentonehotel.com/">http://www.mentonehotel.com/</a>	0207 387 3927
Mercure London Bloomsbury 130-134 Southampton Row	<a href="http://www.accorhotels.com/gb/hotel-8066-mercure-london-bloomsbury/">http://www.accorhotels.com/gb/hotel-8066-mercure-london-bloomsbury/</a>	0207 833 3691
St Athans Hotel 20 Tavistock Place	<a href="https://www.stathanshotel.com/">https://www.stathanshotel.com/</a>	0207 837 9140

The Academy Hotel 21 Gower Street	<a href="http://www.theacademyhotel.co.uk/">http://www.theacademyhotel.co.uk/</a>	0207 631 4115
The George Hotel 58060 Cartwright Gdns	<a href="http://www.georgehotels.co.uk/">http://www.georgehotels.co.uk/</a>	0207 387 8777
The Wesley Euston Hotel 81-103 Euston St	<a href="http://www.thewesley.co.uk/">http://www.thewesley.co.uk/</a>	0207 380 0001
Thistle Bloomsbury Park Hotel 126 Southampton Row	<a href="http://www.thistle.com/en/hotels/united_kingdom/london/bloomsbury_park/">http://www.thistle.com/en/hotels/united_kingdom/london/bloomsbury_park/</a>	0871 376 9007
Travelodge Various	<a href="https://www.travelodge.co.uk/">https://www.travelodge.co.uk/</a>	08719 848484

See also dedicated hotel booking websites,

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

<http://www.booking.com/hotels>

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

## **Travel**

London is well served by transport links, both for travelling to and from London from the UK, Europe and the wider world, and for getting round the city.

Full details of travel to UCL can be found at: <http://www.ucl.ac.uk/maps/public-transport/>

UCL campus map: <http://www.ucl.ac.uk/maps/downloads/campus-map-2014.pdf>

UCL in London: <http://www.ucl.ac.uk/maps/downloads/ucl-central-london-2014.jpeg>

## Conference Dinner

The conference dinner will be held on Thursday 3rd January at 8:15pm in Pescatori, which is a 10-15 minute walk from the meeting rooms. The restaurant address is 57 Charlotte Street, London, W1T 4PD.

As with last year in London, the menu, dinner bookings and payment will be exclusively online (although choices are shown below). Payments must be made electronically using a credit or debit card. Please complete all required information to ensure your place and menu choices at the dinner. Once booked, the system will generate an automatic receipt to your email address.

STARTER
Burrata Pugliese, anchovies & salsa verde ( <i>fish, gluten free</i> )
Thinly sliced bresaola, mustard dressing, walnut & watercress ( <i>meat, gluten free</i> )
Beetroot salad with honey truffle goats cheese ( <i>vegetarian, gluten free</i> )
Quinoa, pomegranate & pumpkin ( <i>vegan</i> )
MAIN
Aubergine and courgette timbale with vegan cheese ( <i>vegan</i> )
Chicken balotina, spinach & fontina cheese, butter & lemon sauce ( <i>meat, gluten free</i> )
Ravioli beef and pork, butter and parmesan ( <i>meat</i> )
Seabass fillet, puy lentils and Amalfi lemon ( <i>fish, gluten free</i> )
DESSERT
Lemon tart
Tiramisu
Poached pear in Barolo, raspberry sorbet ( <i>vegan, gluten free</i> )

The standard dinner cost for EPS members is £37.00 this year. Please note that postgraduates can book at a reduced fee of £18.50, but must provide evidence of their postgraduate status by emailing a letter from their supervisor (or a direct email from the supervisor) to the London organiser James Bisby [j.bisby@ucl.ac.uk](mailto:j.bisby@ucl.ac.uk).

**To book your place here before 15 December, please use the link below**

The portal will close after this date and late submissions cannot be accepted. No cash or cheque payments are possible.

<http://tinyurl.com/y8gg8gn4>

- Places are limited and will be reserved on a first come/first served basis.
- Please indicate if you have any dietary requirements in the text box on the form and the restaurant will be informed.

Please contact James Bisby ([j.bisby@ucl.ac.uk](mailto:j.bisby@ucl.ac.uk)) with any questions or suggestions, but email UCL online store if anything is unclear about the booking process ([uclonlinestore@ucl.ac.uk](mailto:uclonlinestore@ucl.ac.uk)).

*The Seventeenth Mid-Career  
Prize Lecture*



New and old ideas about the neural basis of  
semantic cognition

will be delivered by

Professor Matthew Lambon Ralph

MRC- Cognition and Brain  
Sciences Unit

University of Cambridge



6.00pm, Thursday 3rd January 2019

Lower Ground Floor Lecture  
Theatre

University College London  
26 Bedford Way  
London, WC1H 0AP

*The lecture will be open to the public.  
This lecture, and its recording, is generously supported by Sage publications.*



**APPLYING TO JOIN THE  
EXPERIMENTAL PSYCHOLOGY SOCIETY**

To apply for membership to the Experimental Psychology Society please go to the EPS website: <https://eps.ac.uk/applying-for-membership/> and fill in the form, ensuring all boxes are completed (Entries should be made in clear black type) before signing and returning to the EPS Administrator: [eps@lancaster.ac.uk](mailto:eps@lancaster.ac.uk) or sending to:

Sandra Harris  
EPS Administrator  
Department of Psychology  
Lancaster University  
Lancaster  
LA1 4YF

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; *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 by email: [eps@lancaster.ac.uk](mailto:eps@lancaster.ac.uk) or by post to Sandra Harris, Department of Psychology, Lancaster University, Lancaster, LA1 4YF.

See Criteria and Procedures on following page

**CRITERIA AND PROCEDURES TO JOIN  
EXPERIMENTAL PSYCHOLOGY SOCIETY**

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 at their Autumn meeting. 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 at least 2 independent accounts of their work in reputable, peer-reviewed psychological journals, and
- c) personally delivered an oral paper to the Society at one of the three EPS meetings held each year.

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.

**London meeting 3 – 4 January 2019**

The programme for the London meeting is included in this programme. Details for how to book the conference dinner at Pescatori, 57 Charlotte Street, London, W1T 4PD on Thursday 3rd January at 8:15pm are also included. If you wish to attend the dinner, please follow the instructions to make your online booking.

N.B. All bookings should be made by the closing date of 15th December 2018. 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 71st Annual General Meeting will be held on Thursday 3rd January at 5:00pm in the Lower Ground Floor Lecture Theatre. The Agenda for this follows on the next page.

The programme also includes:

Thursday 3rd January 6:00pm 17th EPS Mid-Career Award Lecture:

**New and old ideas about the neural basis of semantic cognition**

*Professor Matthew Lambon Ralph (University of Cambridge)*

Thursday 3rd January 1:30pm Symposium to accompany the Mid-Career Award Lecture:

**The neural basis of semantic cognition**

*Organised by Dr Beth Jefferies*

Friday 4th January 9:00am Symposium:

**Memory consolidation and its modulation**

*Organised by Dr James Bisby*

## **Annual General Meeting**

The 71st Annual General Meeting will be held on Thursday 3rd January 2019 at 5:00pm in the Lower Ground Floor Lecture Theatre, Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, London, WC1H 0AP.

### AGENDA

- 19/1 Minutes of the Business Meeting held in the Placentia Bay room, Delta Hotels St John's Conference Centre, St John's, Newfoundland on Thursday 5th July, 2018.
- 19/2 Matters arising
- 19/3 Secretary's Report
  - 3.1 Annual Report of the Society
- 19/4 Treasurer's Report
  - 4.1 Treasurer's Report
- 19/5 QJEP Editor's Report
  - 5.1 Editor's Report

Due to time constraints, the Committee's award nominations and the names of officers and committee members for approval will be communicated to the membership by electronic means.

- 19/6 Confirmation of Forty Eighth Bartlett Lecturer
- 19/7 Confirmation of Eighteenth EPS Mid-Career Award
- 19/8 Confirmation of Twenty Seventh EPS Prize Lecturer
- 19/9 Confirmation of Eighth Frith Prize winner
- 19/10 Election of Officers and Committee Members
  - Welcome of Professor Heather Ferguson as Hon Sec
  - Re-appointment of Professor Patrick Haggard as Hon Treasurer
  - Welcome of Professor Matt Longo as Data Protection Officer
- 19/11 Admission of Ordinary Members
- 19/12 Members with lapsed subscriptions
- 19/13 Arrangements for future meetings

19/14 Members views on the value of commercial stands at Society meetings

19/15 Any other business

Date, time and place of next meeting

**Minutes of the April 2018 Business Meeting**

These Business meeting Minutes were made available online on the Society website and agreed upon at the St John's meeting in July 2018. They are included here for completeness of the printed record.

A Business Meeting was held at 5.30pm on Thursday 19 April 2018, at University of Leicester in Lecture Room 1.63.

**MINUTES**

There were 22 members present at the meeting.

**18/15** Minutes of the 70<sup>th</sup> Annual General Meeting held on Thursday 4 January 2018, at University College London, were agreed and approved. These had been included within the Leicester meeting programme.

**18/16 Matters arising**

There were none

**18/17 Secretary's Report**

A brief report was presented. The Hon Sec expressed his thanks to the local organisers of the Leicester meeting for a full and exciting meeting. He also expressed thanks to SAGE for their financial contributions to the Society Prize awards, including those at this Leicester meeting.

The Hon Sec described the new member number information in the recently despatched handbook, and how this would be used to access QJEP.

The new scheme for a President's Commendation for a student poster was explained, and it was noted that the scheme was in place for the current meeting. We would report outcomes as they became available.

**18/18 Treasurer's Report**

The Hon Treasurer was not able to be at the meeting. On behalf of the Hon Treasurer, the Hon Sec reported that the financial position of the Society remained very strong, and that income continued to meet Society expenditure.

The Hon Treasurer also wished to confirm that following a committee meeting, the EPS had agreed to increase the Grindley Grant allowance for the Canada meeting (to £750 per application). This change was in addition to the meeting-specific arrangements that had already been put in place.

**18/19 QJEP Editor's Report**

The QJEP Editor reported that the Journal position was strong and continued to praise SAGE for their efficiency in leading the new Journal initiatives and their support in developing the Journal. Submissions were strong in number and quality, and he continued to encourage members to look to the Journal as the premier outlet for their best work – the strength of the Society is only enhanced by the strength of the Journal contents.

**18/20 Arrangements for future meetings**

The Conference Secretary again noted our thanks to the local organiser and the team for an excellent meeting.

Plans are already well advanced for the St John's meeting in Canada with CSBBCS. Oral submissions had closed and poster submission were nearly full.

The following meeting would be in UCL and would be a two-day meeting because of constraints with timing and venue availability. Subsequent meetings are planned in Manchester and Bournemouth and among other forthcoming meetings, the decision to plan a meeting in China in 2021 was highlighted.

**18/21 Any other business**

None

**Date, time and place of next meeting**

The next meeting will be held in St John's, Canada.

Details to be confirmed.

**Minutes of July 2018 Business Meeting**

A Business Meeting was held on Thursday 5<sup>th</sup> July 2018, at St John's Conference Centre, Delta Hotel, 120 New Gower Street, St John's, Newfoundland and Labrador.

## MINUTES

**18/22** Minutes of the Business Meeting held on Thursday 19<sup>th</sup> April 2018, in Bina Popat Lecture Theatre University of Leicester, at 5.30pm were agreed and approved. These minutes had been available on the EPS website (<https://eps.ac.uk/minutes-of-the-eps-business-meeting-leicester-april-2018/>) and members had been provided information about them in Society communications. It was not feasible to place the minutes in the programme for the current joint meeting.

**18/23 Matters arising**

There were none

**18/24 Secretary's report**

A brief report was presented. The meeting thanked Anna Weighall for her help as EPS liaison for the current meeting and it was agreed that the current meeting is highly successful and enjoyable

**18/25 Treasurer's report**

The Hon Treasurer was not able to be at the meeting. It was reported that the Society financial position remains stable and the reserves are very healthy.

**18/26 QJEP Editor's report**

The Editor confirmed that the Journal is doing well and we have a very strong and constructive relationship with our publishers, SAGE. The Journal's impact factor has ticked up slightly, and the Editor reminded members that this reflected efforts of the previous editor.

The Editor confirmed that additional pages will be bought for the Journal to start to tackle the current publication lag. The cost of the additional page purchase can be met by the income the Society received in our publisher transition contract.

A member asked about the current publication lag and the visibility of articles in press. The Editor confirmed that he aims for a balance between publication speed and maintenance of a

publication ‘buffer’ to allow for good journal management. In-press articles are available via the Journal website shortly after they have been accepted, and Sage provide both the Author Accepted Manuscript and the preprint once they are available. Both of these are citable.

In the context of our joint meeting, the President commented on respects in which the relationship between the EPS and QJEP is similar to, and different from, the relationship between the Canadian Society for Brain, Behavior and Cognitive Science (CSBBCS) and the Canadian Journal of Experimental Psychology (CJEP). Exchange with officers of CSBBCS suggests that the Society is fortunate; we have more autonomy and enjoy greater financial benefits from our relationship with the Journal.

### **18/27 Arrangements for future meetings**

Members were alerted to the likelihood that the next meeting in London would be busy especially as venue constraints meant this will be a 2-day meeting only. We hope to be able to recommence the President’s commendation for posters award at this and subsequent meetings.

Future events are now planned that include an overseas meeting in China and returns to Scotland and Wales.

### **18/28 Any other business**

A member suggested that the EPS consider the potential value of a student and/or ECR member on the committee, to help provide a voice or perspective for these groups in terms of what the Society does or can offer. This will be considered by the committee.

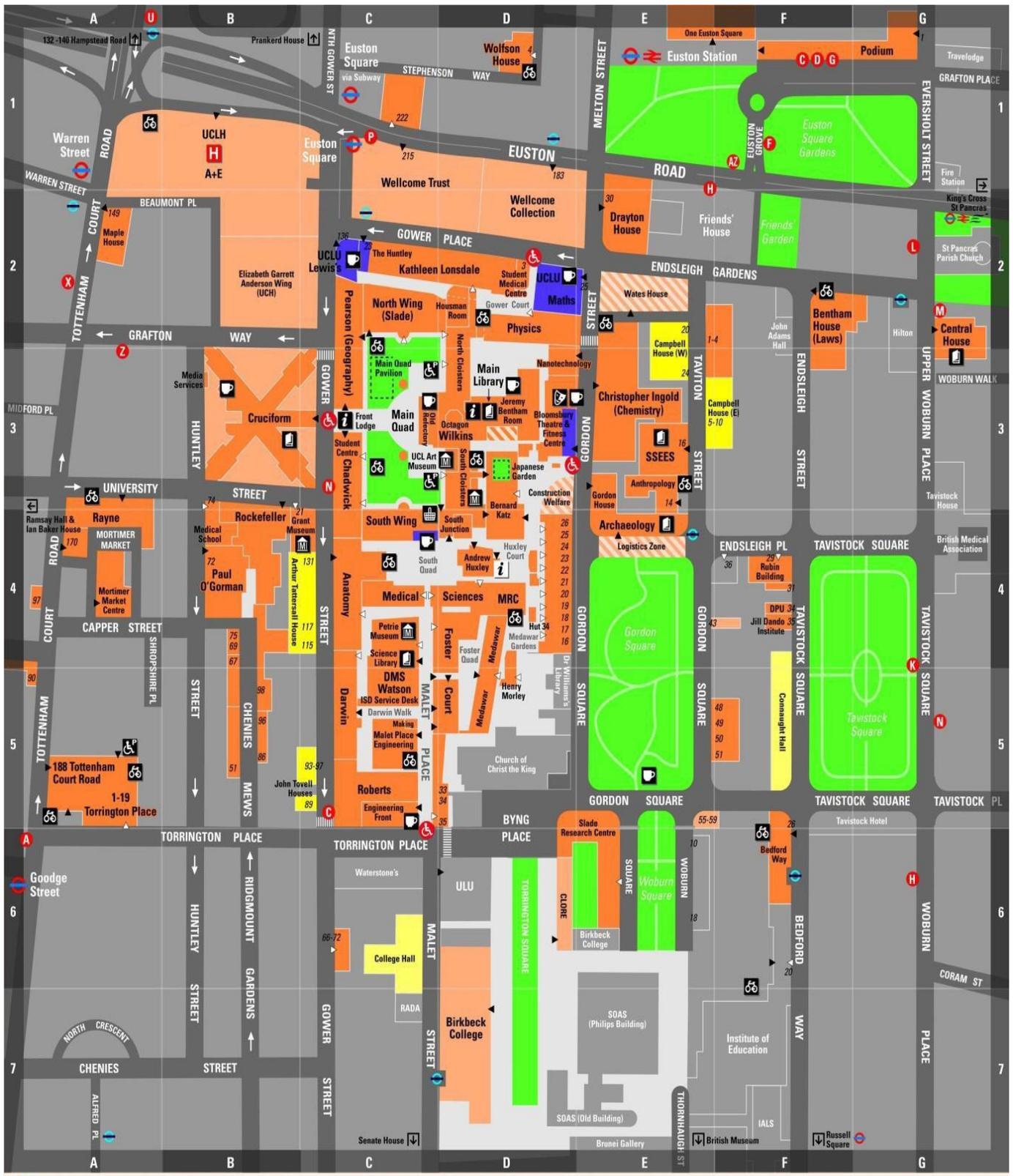
The President noted that CSBBCS’s prize lectures are introduced by colleagues, former students or mentors, who have detailed knowledge of the lecturer’s work, and that this generates a positive and engaging atmosphere. The EPS might wish to consider adopting a similar practice at some point in the future.

The meeting finished at 12:25

Next meeting: London, January 2019







- |                       |                     |                       |                     |                          |
|-----------------------|---------------------|-----------------------|---------------------|--------------------------|
| Main UCL Buildings    | UCL Library Sites   | Cafés                 | Underground Station | Street number            |
| Student Accommodation | UCL Shop            | Cycle Parking         | Railway Station     | Main Accessible Entrance |
| UCL Union Buildings   | Information Point   | Museums & Collections | Cycle Hire Station  | Accessible Route         |
| Pedestrian Area       | Security and Access | Theatre               | Bus stop            | Pedestrian Access        |
|                       | Hospital            | Accessible Parking    | One-Way Streets     | Pedestrian Crossing      |

