

EPS

Experimental
Psychology
Society

**LEEDS
MEETING**

8-10 APRIL 2015

A scientific meeting will be held in the Michael Sadler building, University of Leeds, Beech Grove Terrace, Leeds, LS2 9DA. The local organiser is Pam Blundell.

Thirteenth EPS Mid-Career Award

Thursday 9th April, 6:00pm

Producing and comprehending language in monologue and dialogue

Professor Martin Pickering, University of Edinburgh

Symposium - To accompany the 13th EPS Mid-Career Award Lecture

Thursday 9th April, 2:00pm

Contact points between language production and comprehension

Organiser: Dr Robert Hartsuiker, Ghent University, Belgium

Fourth EPS Frith Prize Lecture

Wednesday 8th April, 5:00pm

The neural mechanisms of relief: the role of safety signals in avoidance learning

Dr Anushka Fernando, University of Oxford

Symposium – *Wednesday 8th April, 2:00pm*

Right hemisphere contributions in language and semantics

Organiser: Dr Ekaterini Klepousniotou, University of Leeds

Symposium - *Thursday 9th April, 9:00am*

Timescales of word learning: from immediate to long term representations across development

Organiser: Dr Anna Weighall, University of Leeds

Poster Session

This will be held in conjunction with the drinks reception on Wednesday evening at 6:00pm in LG10 of the Michael Sadler building. Delegates may put up posters from midday and should take them down by the end of the session.

Platform Presentations

Sessions will be held in Lecture Theatres LG15 and LG19 which are located in the Michael Sadler building. Both theatres have data projectors available for PowerPoint presentations. Presenters may provide their own laptops (if using a Mac please bring your own connector), or bring USB keys for the on-site computers. Any queries about facilities in the theatres should be sent to Pam Blundell (p.blundell@leeds.ac.uk)

The conference dinner will be held at 8:00pm at Restaurant Bar & Grill which is just a 15 minute walk from campus. The restaurant is located in the landmark Old Post Office, 3 City Square, Leeds, LS1 2AN. Tel: 0113 244 9625. A booking form is enclosed.

START OF PARALLEL SESSIONS

Session A

Lecture Theatre LG15

- 1:00 **Alina M Udall***, **Judith I M De Groot***, **Simon B De Jong*** and **Avi Shankar*** (University of Bath) (Sponsor: Richard Allen)
The power of identity for increasing environmentally significant behaviour
- 1:30 **Leah T Johnstone*** and **David P Carey** (Bangor University)
Behavioural predictors of brain asymmetries
- Symposium** Right hemisphere contributions in language and semantics
Organiser: Dr Ekaterini Klepousniotou (University of Leeds)
- 2:00 **Elizabeth Jefferies**, **Giovanna Mollo***, **Katya Krieger-Redwood*** and **Piers Cornelissen*** (University of York and Northumbria University)
Automatic and controlled retrieval in word and picture semantic tasks: MEG and fMRI evidence for the roles of left and right IFG and pMTG
- 2:30 **Ekaterini Klepousniotou** (University of Leeds)
Right hemisphere contributions to non-literal language processing
- 3:00 **Hannah E. Thompson** and **Elizabeth Jefferies** (University of York)
The role of the right hemisphere in semantic control
- 3:30 Tea
- 4:00 **Grace E Rice***, **Matthew A Lambon, Ralph** and **Paul Hoffman*** (University of Manchester and University of Edinburgh)
The roles of the left vs. right anterior temporal lobes in conceptual knowledge
- 4:30 **Guido Gainotti** (Institute of Neurology, Università Cattolica, Rome)
Lower- and higher-level models of right hemisphere language

End of Symposium

Rupert Beckett Lecture Theatre - Frith Prize Winner Lecture

- 5:00 **Anushka B P Fernando*** (University of Cambridge)
The neural mechanisms of relief: the role of safety signals in avoidance learning
- 6:00 POSTERS AND DRINKS RECEPTION – Posters will be displayed and drinks will be served in LG10 of the Michael Sadler Building.

START OF PARALLEL SESSIONS

Session B

Lecture Theatre LG19

- 1:00 **Helen Blank* and Matt H Davis** (University of Cambridge)
Predictive coding computations in speech perception shown by multivoxel fMRI patterns
- 1:30 **Jelena Mirkovic* and Gareth Gaskell** (York St John University and University of York)
How does the old support the new? The role of memory consolidation in learning novel morphological forms
- 2:00 **Connor Quinn*, Jo S H Taylor and Matthew H Davis** (MRC Cognition and Brain Sciences, University of Cambridge and University of London)
Generalisation and consolidation in learning to read words and name objects: an fMRI study
- 2:30 **Heidi Solberg Økland*, Ana Todorovic*, Claudia S Lüttke*, James M McQueen and Floris P de Lange*** (Radboud University Nijmegen and MRC Cognition and Brain Sciences Unit)
The interplay of predictive semantic and visual cues in audiovisual speech perception
- 3:00 **Joseph L Brooks, Alexia Zoumpoulaki* and Howard Bowman** (University of Kent and University of Birmingham)
A method for choosing regions-of-interest in EEG/MEG studies that avoids inflating false positive rates
- 3:30 Tea
- 4:00 **Elisabeth E F Bradford*, Juan-Carlos Gomez* and Ines Jentzsch** (University of St Andrews)
Exploring the role of ‘Self’ and ‘Other’ in theory of mind with behavioural and EEG measures
- 4:30 **Peter Moseley*, Charles Fernyhough*, Amanda Ellison* and David Smailes*** (Durham University) (Sponsor: John Everett Marsh)
Investigating auditory false perceptions in a non-clinical sample

Rupert Beckett Lecture Theatre - Frith Prize Winner Lecture

- 5:00 **Anushka B P Fernando*** (University of Cambridge)
The neural mechanisms of relief: the role of safety signals in avoidance learning
- 6:00 POSTERS AND DRINKS RECEPTION – Posters will be displayed and drinks will be served in LG10 of the Michael Sadler Building.

Session A

Lecture Theatre LG15

Symposium Timescales of word learning: From immediate to long-term representations across development

Organiser: Dr Anna Weighall (University of Leeds)

- 9:00 **Jessica S Horst*** (University of Sussex)
The role of context in learning the meanings of words
- 9:30 **Courtenay Norbury, Marta Ponar*** and **Gabriella Vigliocco** (Royal Holloway, University of London, University of Kent and University College London)
Acquisition of abstract concepts is influenced by emotional valence
- 10:00 **Faye Smith*, Gareth Gaskell, Anna Weighall, Meesha Warmington*** and **Lisa Henderson** (University of York and University of Leeds)
Consolidation of new vocabulary in children with and without dyslexia: the role of sleep
- 10:30 Coffee
- 11:00 **Jo S H Taylor, Matthew H. Davis** and **Kathleen Rastle** (Royal Holloway, University of London and Medical Research Council Cognition and Brain Sciences Unit, Cambridge)
Learning to read aloud versus learning to comprehend: The impact of training focus on behavioural and neural responses to artificial scripts.
- 11:30 **Iske Bakker*, Atsuko Takashima*, Janet G van Hell*, Gabriele Janzen*** and **James M McQueen** (Behavioral Science Institute, Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behavior, Radboud University Nijmegen, Pennsylvania State University and Max Planck Institute for Psycholinguistics, Nijmegen)
Memory formation and integration operate in parallel during initial encoding of novel words
- 12:00 **Efthymia C Kapnoula*** and **Bob McMurray*** (University of Iowa)
Immediate integration of novel word forms: Evidence from eye movements

End of Symposium

- 12:30 **Anna Weighall, Lisa Henderson, Dale Barr*** and **Gareth Gaskell** (University of Leeds, University of York and University of Glasgow)
Tracking the time-course of novel word learning and lexical competition in adults and children: A visual world eye-tracking study
- 1:00 Lunch

Session B

Lecture Theatre LG19

- 9:00 **James Rackie***, **Karen R Brandt** and **Michael Eysenck*** (University of Roehampton)
Attentional properties of the translation effect
- 9:30 **Karen R Brandt**, **Michael W Eysenck***, **Maria Kragh Nielsen*** and **Tim J Von Oertzen*** (University of Roehampton, St. George's Hospital and Wagner-Jauregg Neuroscience Centre, Linz)
Exploring qualitative aspects of memory function in a patient with a selective lesion to the entorhinal cortex
- 10:00 **Adele James***, **Karen R Brandt** and **Ray Norbury*** (University of Roehampton)
Exploring object recognition memory in a patient with a selective lesion to the entorhinal cortex
- 10:30 Coffee
- 11:00 **Karla K Evans*** and **Alan Baddeley** (University of York)
Automaticity of visual recognition memory
- 11:30 **Judith Bek***, **Ellen Poliakoff**, **Hannah Marshall***, **Sophie Trueman*** and **Emma Gowen** (University of Manchester)
The effects of attention and motor imagery on the kinematics of imitated hand actions
- 12:00 **Akib Ul Huque***, **Ellen Poliakoff** and **Richard J Brown** (University of Manchester and University of Dhaka)
Does training on somatosensory decision-making transfer to other perceptual tasks?
- 12:30 **Matt Craddock***, **Ellen Poliakoff**, **Wael El-Deredy***, **Ekaterini Klepousniotou** and **Donna Lloyd** (University of Leeds and University of Manchester)
Tactile misperceptions are predicted by pre-stimulus alpha oscillations over contralateral somatosensory cortex
- 1:00 Lunch

Session A

Lecture Theatre LG15

2:00 **Kremena Koleva***, **Anna Weighall**, **Jelena Havelka**, **Mark Mon-Williams***
and Ekaterini Klepousniotou (University of Leeds)

Right hemisphere involvement for pun processing: the case of idioms

Symposium Contact points between language production and comprehension

Organiser: Dr Rob Hartsuiker* (Ghent University)

2:30 **Falk Huettig*** (Max Planck Institute for Psycholinguistics)

A multiple-mechanisms account of prediction in language processing

3:00 **Victor Ferreira***, **Daniel Kleinman*** and **Elin Runnqvist*** (University of California
San Diego and Université Aix-Marseille)

Predicting the future, one word at a time.

3:30 Tea

4:00 **Gabriella Vigliocco** (University College London)

Iconicity in language production and comprehension

4:30 **Robert Hartsuiker*** (Ghent University)

Cues for language activation in bilinguals

5:00 **Albert Costa*** (Universitat Pompeu Fabra)

Those who know nothing of foreign languages know nothing of their own

End of Symposium

Rupert Beckett Lecture Theatre

5:30 Business meeting

6:00 **Thirteenth EPS Mid-Career Lecture – Professor Martin Pickering**
(University of Edinburgh)

Producing and comprehending language in monologue and dialogue

Session B

Lecture Theatre LG19

- 2:00 **Emma Gowen, Elizabeth Evans* and Ellen Poliakoff** (University of Manchester)
Believe it or not: moving non-biological stimuli believed to have human origin can be represented as human movement
- 2:30 **Andrew J Johnson*, Jordan Shaw* and Chris Miles*** (Bournemouth University) (Sponsor: Peter Hills)
Hebb repetition learning for tactile sequences
- 3:00 **Daniel Poole*, Ellen Poliakoff, Emma Gowen and Paul A Warren*** (University of Manchester)
Visual-haptic cue combination in adults with autism spectrum condition
- 3:30 Tea
- 4:00 **Robin S S Kramer, Kay L Ritchie and A Mike Burton** (University of York)
Viewers extract the mean from images of the same person: A route to face learning
- 4:30 **Kay L Ritchie and A Mike Burton** (University of York)
Learning faces from variability
- 5:00 **Emma Portch*, Jelena Havelka, Charity Brown and Russell Hutter** (University of Leeds)
Does language play a direct or indirect role in emotion perception?

Rupert Beckett Lecture Theatre

- 5:30 Business meeting
- 6:00 **Thirteenth EPS Mid-Career Lecture – Professor Martin Pickering** (University of Edinburgh)
Producing and comprehending language in monologue and dialogue

Friday 10 April, am

Session A

Lecture Theatre LG15

- 9:00 **Laura M T Lantz***, **Sarah J White** and **Kevin B Paterson** (University of Leicester)
Eye movement behaviour and word processing after first-pass reading: word n-1 and words beyond n-1
- 9:30 **Kayleigh L Warrington**, **Victoria A McGowan***, **Sarah J White**, **Kevin B Paterson** and **Irene Gottlob*** (University of Leicester)
Eye movements during reading of text with transposed letters: A comparison of young and older readers
- 10:00 **Nick Cooper*** and **Kate Nation** (University of Oxford)
Premature ageing along the garden path? A dual-task study of syntactic reanalysis
- 10:30 Coffee
- 11:00 **Mirela Nikolova***, **Stephanie Jainta***, **Hazel I Blythe**, **Matthew O Jones*** and **Simon P Livversedge** (University of Southampton and Leibniz Research Centre)
The effects of removing foveal and parafoveal binocular input during sentence reading
- 11:30 **Ilhan Raman**, **Simay İkiç***, **Evren Raman***, **Elcin Kilecioğlu***, **Dilek Uzun*** and **Sebnem Zeyveli*** (Middlesex University, Yeditepe University and Brunel University)
The role of age of acquisition and frequency on memory: Evidence from free recall of pictures and words
- 12:00 **Caroline Whiting***, **Jana Klimova*** and **William Marslen-Wilson** (University of Cambridge)
Letter position sensitivity in the ventral visual stream
- 12:30 **Catherine Davies*** and **Helene Kreysa*** (University of Leeds and Friedrich Schiller University, Jena) (Sponsor: Heather J Ferguson)
Speakers are informative even when they fixate a contrast object briefly

End of Meeting

Session B

Lecture Theatre LG19

- 9:00 **Nabil Hasshim* and Ben Parris** (Bournemouth University)
Trial type mixing modulates response set membership effects in the Stroop task
- 9:30 **Alexis Makin, Letizia Palumbo, Damien Wright*, Giulia Rampone* and Marco Bertamini** (University of Liverpool)
A neural signature of perceptual goodness?
- 10:00 **Letizia Palumbo, Nicole Ruta* and Marco Bertamini** (University of Liverpool and Sapienza University of Rome)
Implicit preference for curved shapes
- 10:30 Coffee
- 11:00 **Valentina Cazzato*, Stergios Makris* and Cosimo Urgesi***(University of Udine, University of Bradford, Edge Hill University and Bangor University)
(Sponsor: Gillian Waters)
Transcranial direct current stimulation of the extrastriate body area modulates implicit anti-fat bias
- 11:30 **Yee Mun Lee* and Elizabeth Sheppard*** (University of Nottingham Malaysia Campus and Nottingham Trent University) (Sponsor: David Crundall)
The effect of dynamic information on drivers' ability to predict intentions of other road users
- 12:00 **James Stone* and John Towse** (Lancaster University)
Working memory capacity and the transfer of training benefits: searching for the Holy Grail
- 12:30 **Faisal Mushtaq*, Richard M Wilkie, Mark A Mon-Williams* and Alexandre Schaefer*** (University of Leeds and Monash University)
The role of the FRN in the encoding of short-term changes in expectations

End of Meeting

1. **Benny Ogidan* and Robert A Johnston** (University of Kent)
The influence of level of contact experience on facial composite construction
2. **Andrea Piovesan*, Christophe De Bezenac*, Noreen O`Sullivan* and Marco Bertamini** (University of Padova and University of Liverpool)
Self-enfacement: a new procedure to test the effect of multisensory stimulation in relation to sense of ownership and agency of a face
3. **David B Eтчells* and Robert A Johnston** (University of Kent)
Assessing three-quarter face-view utility, compared to Face Recognition Unit formation, using a face learning experiment
4. **Natalie W Gentry* and Robert A Johnston** (University of Kent)
Operator involvement and expertise effects on matching accuracy of composites to target faces
5. **Alexander Kirkham*, Ralph Pawling* and Steven Tipper** (University of York and Liverpool John Moores University)
Context modulates automaticity of facial mimicry
6. **Hannah Tummon* and Robert A Johnston** (University of Kent)
Will providing additional photos in passports help or hinder imposter detection?
7. **Philip I N Ulrich*, Robert A Johnston and David T Wilkinson** (University of Kent)
Superior face-recognition from vestibular stimulation
8. **Scott P Jones*, Peter J Hills, Samuel Bennett* and Mirko Uljarevic*** (Anglia Ruskin University, Bournemouth University, Stirling University and LaTrobe University)
Individual differences in identifying faces: the role of anxiety and eye movements
9. **Piril Hepsomali* Matthew J Garner*, Julie A Hadwin* and Simon P Liversedge** (University of Southampton)
Biased oculomotor and pupillary responses in anxiety: an oculomotor delay response study
10. **Anna K Bobak* and Stephen R H Langton** (Bournemouth University and University of Stirling)
Reassessing the impact of working memory load on eye-gaze cueing
11. **Frouke Hermens** (University of Lincoln)
Fixation instruction influences gaze cueing

12. **Rhiannon S Barrington***, **Abby E Laishley***, **Lucy C Worf*** and **Julie A Kirkby** (Bournemouth University)
Eye movements and parafoveal processing in children with and without dyslexia
13. **Marina Soltan***, **Sarah J White**, **Stefan T Weger***, **Kayleigh L Warrington***, **Victoria A McGowan*** and **Kevin B Paterson** (University of Leicester)
Eye movements during reading and skimming of medically related text: the role of prior knowledge
14. **Rebecca Nicole Elisa*** and **Benjamin Parris** (Bournemouth University)
Exploring the relationship between inattention and working memory in adults
15. **Andrew Moss***, **Andrew Johnson*** and **Christopher Miles*** (Bournemouth University) (Sponsor: Peter Hills)
Odorant verbalisability influences strategy refinement in olfactory working memory
16. **Sylvie Serpell***, **Simon Handley*** and **Steve Newstead** (Plymouth University)
The search for counterexamples and alternative models on spatial transitive inference tasks
17. **Amy Smith***, **Denis McKeown** and **David Bunce*** (University of Leeds)
Pattern separating improves with time to consolidate
18. **Damien Wright*** and **Marco Bertamini** (University of Liverpool)
Aesthetic preference for dynamic abstract configurations
19. **Sabrina Golonka*** (Leeds Beckett University) (Sponsor: Kevin Paterson)
Preference for relations in categorisation depends on stimulus size
20. **Nina Fisher***, **Reiner Heinrich Sprengelmayer*** and **Ines Jentzsch** (University of St Andrews)
The effects of musical activity on emotional wellbeing
21. **Anna Abraham*** and **Barbara Rutter*** (Leeds Beckett University and Justus Liebig University of Giessen) (Sponsor: Kevin Paterson)
Creative conceptual expansion: An ERP study comparing high and low creative groups
22. **Jack Graveson***, **Denis McKeown**, **Sarah Bauermeister*** and **David Bunce*** (University of Leeds)
Intraindividual variability and gait speed in healthy older adults

23. **Andrew D Wilson***, **Winona Snapp-Childs*** and **Geoffrey P Bingham***
(Leeds Beckett University and Indiana University) (Sponsor: Kevin Paterson)
Transfer of learning is a function of the task dynamic

24. **George Kountouriotis***, **Andrew Tomlinson***, **Oliver Carsten*** and **Natasha Merat*** (University of Leeds) (Sponsor: Richard M Wilkie)
Detection Response Task (DRT): manipulating cognitive and manual
difficulty of secondary tasks during driving

25. **Gizem Arabaci***, **Peter Hills** and **Peter Bright*** (Anglia Ruskin University and
Bournemouth University)
The relationship between N2, response inhibition and response conflict: the
importance of task complexity

The power of identity for increasing environmentally significant behaviour

Alina M Udall, Judith I M De Groot, Simon B De Jong and Avi Shankar
University of Bath
alinaudall23@gmail.com
Sponsor: Richard Allen

Many scholars have experimentally tested the factors which influence environmentally significant behaviour (ESB). One upcoming avenue of research is the study of individual factors, such as an individual's identity. However, the accumulated body of knowledge regarding identity and ESB is fragmented, due to the various constructs and operationalizations of identity. Consequently, to date there is no systematic account of the identities that positively or negatively influence ESB. Therefore, we conducted a systematic review to clarify the relationships between the many identities and ESB. Furthermore, we provided a systematic account of the constructs and operationalizations used to assess identity in relation to ESB. The review included an initial search in Web of Science ($n = 1640$), PsycArticles ($n = 436$), and Scopus ($n = 3,827$). This search was further reduced to over 500 papers for final analysis. Preliminary results suggested there were five main clusters of identities (Green, Moral, Economic, Social, and Cultural identities) which have been reported to influence ESB. These identities influenced ESB differently, in both direction (positive or negative) and strength (weak or strong). This review has provided clarity regarding the relationship between identity and ESB, allowing more specific and detailed experimental research.

Behavioural predictors of brain asymmetries

Leah T Johnstone and David P Carey
Bangor University
l.johnstone@bangor.ac.uk

Our best estimates suggest that 95% of right handers are left-hemisphere dominant for language, as are 70% of left handers. The average response in groups of left and right handers differ somewhat on various behavioural measures (such as dichotic listening tasks, visual half-field tasks and manual asymmetry tasks), but usually both groups show an effect in the same direction, with the left hander group showing a slightly weaker asymmetry. The often implicit assumption is that this mean difference is accounted for by a small proportion of the sample of left handers having a reversed asymmetry, relative to the rest of the left handers and virtually all of the right handers. Such behavioural tests, however, are not perfect predictors of hemispheric asymmetries due to various sources of noise: attentional biases, imbalanced hearing ability, etc. We suggest that if multiple indirect tests are carried out in the same individual, we can improve the predictive power they may have. Here we present behavioural data from groups of left- and right-handed individuals on a battery of indirect 'asymmetry' tasks, as well as preliminary neuroimaging data aiming to validate our battery.

Symposium: Right hemisphere contributions in language and semantics

Organiser: Dr Ekaterini Klepousniotou, University of Leeds

Automatic and controlled retrieval in word and picture semantic tasks: MEG and fMRI evidence for the roles of left and right IFG and pMTG

Elizabeth Jefferies¹, Giovanna Mollo¹, Katya Krieger-Redwood¹ and Piers Cornelissen²

¹University of York

²Northumbria University

beth.jefferies@york.ac.uk

Controlled semantic retrieval to words elicits co-activation of inferior frontal (IFG) and left posterior temporal cortex (pMTG), but research has not yet established (i) the distinct contributions of these regions across the hemispheres or (ii) whether the same processes are recruited for non-verbal stimuli. We compared these sites in fMRI and MEG, using word and picture tasks that involved the identification of weak vs. strong associations (tapping more controlled and automatic forms of retrieval respectively). (1) Posterior IFG (BA44) showed graded effects of modality (e.g., words > pictures in *left* BA44; pictures > words in *right* BA44). (2) An equivalent response to difficulty was observed in left mid-IFG (BA45) *across* modalities, consistent with the multimodal semantic control deficits that follow LIFG lesions. (3) Anterior IFG (BA47) showed a stronger response to verbal than pictorial associations, potentially reflecting a role for this region in establishing a meaningful context that can be used to direct semantic retrieval. (4) Left pMTG also showed a stronger response to the retrieval of weak verbal than picture-based associations. We propose that left anterior IFG and pMTG work together to maintain a meaningful context that is needed to shape ongoing semantic retrieval for words.

Right hemisphere contributions to non-literal language processing

Ekaterini Klepousniotou

University of Leeds

e.klepousniotou@leeds.ac.uk

Communication is filled with ambiguity and in normal comprehension more than one meaning of words and phrases can be activated, often without awareness or intention. Numerous functional neuroimaging studies reported increased activity in the left inferior frontal gyrus (LIFG) and the pars opercularis (Brodmann's area 44) in particular of the left hemisphere (LH) during the performance of linguistic tasks apparently reflecting LH dominance for language processes. With respect to lexical semantics, evidence from lesion studies and divided visual field studies suggests that both the left and the right hemisphere (RH) contribute to the comprehension of semantic relations. Yet, the exact role of the RH and its coordination with the LH is still under investigation.

Studies will be presented that investigated the role of the pars opercularis (Brodmann's area 44) and the inferior parietal lobule (Brodmann's area 40) bilaterally in the processing of lexical ambiguity and metaphorical language. The results elucidate the role of the RH in lexical ambiguity and metaphor

processing, suggesting that the RH is differentially involved in the processing of non-literal meanings and that secondary or subordinate, non-literal meanings are less available when the RH is dysfunctional.

The role of the right hemisphere in semantic control

Hannah Elizabeth Thompson and Beth Jefferies

University of York

hannah.thompson@york.ac.uk

Semantic cognition is bilateral, and neuroimaging evidence has shown that controlled retrieval processes are bilateral. However, neuropsychological research has focused on the left hemisphere's contribution (LH). Semantic aphasia (SA) following left hemisphere stroke is characterised by largely intact knowledge combined with deficient semantic access/control mechanisms. This study examined right hemisphere (RH) stroke patients. There were three potential hypotheses: (1) only the LH is necessary for semantic control. (2) The LH and RH make qualitatively different contributions to semantic control. (3) Damage to the network causes qualitatively similar deficits in LH and RH stroke patients. We compared 9 RH stroke patients to healthy controls on a range of semantic tasks that manipulated semantic control demands. Although RH patients were within the normal range on most tasks, they showed a similar pattern to LH patients in more difficult tasks tapping judgements about distantly related concepts and facial emotions. This suggests that the semantic control network is bilateral. However, there were marked differences in overall level of semantic performance and subtle differences in the presentation of semantic deficits following LH and RH stroke. This leaves open the possibility of a division of labour between the hemispheres.

The roles of the left vs. right anterior temporal lobes in conceptual knowledge

Grace E Rice¹, Matthew A Lambon Ralph¹ and Paul Hoffman²

¹ University of Manchester

² University of Edinburgh

grace.rice@postgrad.manchester.ac.uk

The anterior temporal lobes (ATLs), bilaterally, are a critical neural substrate for the meaning of words, objects, people, and social concepts; however, the specific roles of the left and right ATLs are a source of debate. Previously, we have shown in a large-scale meta-analysis of the functional imaging literature, that ATL activation is predominately bilateral and highly overlapping across different classes of stimuli. Secondary to this bilateral representation, there were subtle gradations in function both between and within the ATLs. However, given the systematic technical limitations within the literature, the ventral ATLs (vATLs) could not be accessed with the meta-analysis. Therefore, we present data from fMRI tailored to imaging the vATLs, to explore responses to different semantic categories (people, landmarks, animals) presented as visual and auditory inputs. Results showed that vATL activation was highly bilateral across different stimuli types, albeit with subtle gradations. These data are best accommodated by a graded representation of semantic knowledge in the ATLs; which is supported through bilateral connectivity between the ATLs and

modality-specific sensory, motor and limbic cortices. Graded specialisations emerge as a consequence of (a) differential connectivity between these regions and ATL sub-regions and (b) hemispheric asymmetries in white matter pathways.

Lower-and-higher-level models of right hemisphere language

Guido Gainotti
Institute of Neurology, Università Cattolica, Rome
gainotti@rm.unicatt.it

Two main models have been advanced to explain right hemisphere language. The older (and lower- level) models assume that right hemisphere language reflects the ontogenesis of conceptual and semantic-lexical development and mainly concerns concrete words. On the contrary, more recent models assume that the right hemisphere plays an important role in higher-level language functions, such as the use of metaphors, to communicate complex, abstract concepts. Since higher-level models remain controversial and are partly based upon lower-level models, the aim of this paper will consist in illustrating the principles underlying the representation in the right hemisphere of conceptual and semantic-lexical knowledge. The principles on which the right hemisphere semantic-lexical knowledge is based are, in my opinion, the construct of ‘higher-order convergence zone’ (Damasio, 1990), the ‘differential weighting hypothesis’ (Warrington & Shallice, 1984) and the Hebb’s (1949) model of ‘cell assembly’. The role of these principles in the construction of the right hemisphere language will be shortly discussed.

Damasio, A.R. (1990). Category-related recognition defects as a clue to the neural substrates of knowledge. *Trends in Neuroscience*, 13, 95-98.

Warrington, E.K., Shallice, T. (1984). Category-specific semantic impairments. *Brain*, 107, 829-854.

Hebb, D.O. (1949). *The organization of behaviour: A neurophysiological theory*. Wiley, Hoboken, NJ.

End of Symposium

Predictive coding computations in speech perception shown by multivoxel fMRI patterns

Helen Blank and Matt H Davis
MRC Cognition and Brain Sciences Unit, Cambridge
helen.blank@mrc-cbu.cam.ac.uk

Degraded speech is better understood when it matches prior expectations [1]. However, the underlying mechanism by which expectations influence speech processing is unclear. Interactive activation models propose that expectations activate perceptual representations leading to more specific (sharpened) activation of expected compared to unexpected speech signals [2]. Alternatively, predictive coding theories suggest that expected information is explained away and

only unexpected sensory information is further processed [3]. In the present study, we combined behavioural measures and multivariate fMRI analysis with computational modelling to differentiate between sharpening and predictive coding. We collected fMRI data while participants read matching written words or neutral text (“XXXX”) and then heard degraded spoken words. Following 1/8 of all trials, participants said aloud the previous word. Both increased speech clarity and matching prior expectations improved accuracy of word report for degraded speech but had opposite effects on speech coding in posterior superior temporal sulcus. Following neutral text, increased sensory detail enhanced the amount of speech information measured in multivoxel activity patterns (representational similarity). However, matching prior expectations reduced the amount of measured information during presentation of clearer speech. We conclude that matching expectations explain away sufficiently clear speech, in line with our predictive coding simulations.

Remez, R.E., Rubin, P.E., Pisoni, D.B., & Carrell, T.D. (1981). Speech perception without traditional speech cues. *Science*, 212, 947-950.

McClelland, J.L., & Elman, J.L. (1986). The TRACE model of speech perception. *Cognitive Psychology*, 18, 1-86.

Rao, R.P., & Ballard, D.H. (1999). Predictive coding in the visual cortex: a functional interpretation of some extra-classical receptive-field effects. *Nature Neuroscience*, 2, 79-87.

How does the old support the new? The role of memory consolidation in learning novel morphological forms

Jelena Mirković¹² and Gareth Gaskell²

¹ York St John University

² University of York

jelena.mirkovic@york.ac.uk

The English past tense has had a long history as a major testing ground between opposing views of language and cognition. In the current study we introduced a new dimension to this debate by focusing on the role of memory systems in learning novel morphological forms. We examined the predictions of a Complementary Learning Systems (CLS) approach (McClelland et al., 1995), suggesting that the similarity between newly acquired information and existing knowledge crucially determines the relative involvement of the hippocampal vs. neocortical memory systems in acquiring and consolidating new knowledge. We test this hypothesis by training native English speakers on novel verbs (e.g. *plare*, *fleep*) and their past tenses (e.g. *plared/plore*; *flept/fleeped*), which varied in their similarity to existing verbs (cf. *share/shared*; *sleep/slept*). Participants were trained in the morning or in the evening, and tested immediately and after 12hrs. The similarity between the novel and the existing forms influenced performance both immediately and after a delay. Crucially, there was a significant difference between sleep and wake at the delayed test, which included sentence completions, and recall and recognition tasks. The findings are discussed in the context of the CLS model of memory and psycholinguistic models of the English past tense.

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Generalisation and consolidation in learning to read words and name objects: an fMRI study

Connor Quinn^{1,2}, Jo Taylor³, Matt Davis¹

¹MRC Cognition and Brain Sciences

²University of Cambridge

³Royal Holloway, University of London

connor.quinn@mrc-cbu.cam.ac.uk

Taylor et al. (2014) used fMRI to show additional neural activity in left parietal cortex while participants learned to read new words written in unfamiliar symbols and anterior fusiform regions when participants learned the names of novel objects. These findings might be taken to challenge theories in which fusiform regions are specialised for word reading (Cohen et al., 2002).

Here we explore the impact of overnight consolidation on activation associated with reading words in a novel writing system and naming novel objects. We combined word/object learning from Taylor et al. (2014) with a design in which participants learn different items on two successive days before being scanned on the second day (cf. Davis et al., 2009). Consequently items learned on day 1 but not day 2 should be consolidated at the time of scanning. Results replicate and extend previous findings with parietal regions showing additional activation for reading a novel orthography and fusiform regions showing additional activation during naming of novel objects. Participants showed accurate generalisation of systematic spelling-sound correspondences in reading untrained words, this was associated with increased activity in left inferior frontal regions. The relationship between neural activity for novel and familiar words/objects will be explored.

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Taylor, J.S.H., Rastle, K., & Davis, M.H. (2014). Distinct neural specializations for learning to read words and name objects. *Journal of Cognitive Neuroscience*, *26*, 2128-2154.

The interplay of predictive semantic and visual cues in audiovisual speech perception

Heidi Solberg Økland^{1,2}, Ana Todorovic¹, Claudia S. Lüttke¹, James M McQueen^{1,3,4} and Floris P. de Lange¹

¹Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour

² MRC Cognition and Brain Sciences Unit

³ Radboud University Nijmegen, Behavioural Science Institute

⁴ Max Planck Institute for Psycholinguistics, Nijmegen

heidi.solberg-okland@mrc-cbu.cam.ac.uk

Audiovisual speech perception is a complex process where visual and auditory signals are mapped onto each other in order to extract meaning. There is increasing evidence to suggest that speech perception is a predictive process where our brains are generating predictions about future events in line with Bayesian inference [1, 2]. Indeed, both abstract semantic information and visual cues from the face aid predictive speech perception [3, 4]. However, little is known about whether and how these two factors interact. Here we investigated the interplay of predictive semantic and visual cues during the perception of audiovisual sentences. We hypothesized that these would influence speech perception hierarchically such that semantic information from the sentence context would modulate the influence of visual cues from the lips on auditory speech perception. We recorded ongoing brain activity in healthy participants to analyse the latency and amplitude of early auditory electromagnetic brain responses to sentence-final words. Our results demonstrate that prior semantic and visual information interact at an early stage in audiovisual speech processing. We additionally show that the influence of prior semantic information is stronger and at a higher level than the influence of visual cues in the predictive processing hierarchy for audiovisual speech.

Friston, K. (2005). A theory of cortical responses. *Philosophical transactions of the Royal Society B: Biological Sciences*, 360, 815-836.

Pickering, M. J., & Garrod, S. (2013). An integrated theory of language production and comprehension. *Behavioral and Brain Sciences*, 36, 329-347.

Altmann, G.T.M., & Kamide, Y. (1999). Incremental interpretation at verbs: Restricting the domain of subsequent reference. *Cognition*, 73, 247–264.

van Wassenhove, V., Grant, K. W., & Poeppel, D. (2005). Visual speech speeds up the neural processing of auditory speech. *Proceedings of the National Academy of Sciences of the United States of America*, 102, 1181–1186.

A method for choosing regions-of-interest in EEG/MEG studies that avoids inflating false positive rates

Joseph L. Brooks¹, Alexia Zoumpoulaki² and Howard Bowman^{2,3}

¹ School of Psychology, University of Kent

² School of Computing, University of Kent

³ University of Birmingham

j.l.brooks@kent.ac.uk

In large, multi-dimensional EEG/MEG datasets, it is often difficult to know, a priori, where effects will occur in space (i.e. on the scalp/brain), time, and frequency. To overcome this, researchers often identify regions-of-interest (ROIs) for testing, but have been criticized for sometimes using biased,

data-driven methods to identify them and thereby inflating Type I error rates (i.e., false positives). Here, we demonstrate a method to position ROIs for statistical testing which is data-driven but nonetheless maintains Type I error rates at five percent. It reduces the need for precise a priori ROIs and avoids statistical corrections involved in mass univariate approaches. To do this, we identify an ROI using the aggregated-grand average (AGA) wave which is computed by collapsing the data across the contrast of interest. We use simulations to demonstrate that using the AGA to select an ROI maintained 5% Type I error rates in null hypothesis data containing realistic EEG noise and realistic ERP deflections. However, the AGA must be computed in a particular manner to avoid bias under certain conditions. Our results demonstrate a simple, unbiased and data driven ROI localization method which will be relevant for a common subset of ERP/ERF studies.

Exploring the role of ‘Self’ and ‘Other’ in theory of mind with behavioural and EEG measures

Elisabeth E F Bradford, Juan-Carlos Gomez and Ines Jentzsch
University of St Andrews
eefb@st-andrews.ac.uk

‘Theory of Mind’ (ToM) refers to the ability to compute, attribute and understand the mental states of both ourselves (‘Self’) and other people (‘Other’). This research explored differentiation between ‘Self’ and ‘Other’ in belief-attribution abilities, part of the ToM mechanism. Adult participants completed a computerized false-belief task in which they attributed beliefs to themselves and other people, in a matched design, assessing behavioural and neural correlates of belief-attribution to the ‘self’ and ‘other’. Participants responded faster to self-oriented than other-oriented questions, and this distinction was supported by electroencephalography (EEG) measures, largest across central parietal lobes from 550ms post-stimulus onset. Importantly, when a ‘perspective-shift’ was required within a trial, shifting from Self-to-Other was significantly slower than shifting from Other-to-Self. In contrast, in ‘no perspective-shift’ trials, no difference was observed between Self-to-Self and Other-to-Other trials. EEG measures revealed an early-onset interaction between perspective-shifting and probe type (300 ms post-stimulus presentation), maximal across-fronto central areas. Results demonstrate a differentiation between ‘Self’ and ‘Other’ within the ToM mechanism, indicating that the ‘Self’ is consistently processed, whilst the ‘Other’ is only processed when explicitly necessary. Critically, results highlight the importance of perspective-shifting abilities, at both a behavioural and neural level.

Investigating auditory false perceptions in a non-clinical sample

Peter Moseley, Charles Fernyhough, Amanda Ellison and David Smailes
Durham University
pmoseley@uclan.ac.uk
Sponsor: John Everett Marsh

The advantage of processing early over late acquired items in lexical and semantic tasks across a number of languages is well documented. Interestingly, the role of AoA on memory is less well understood and restricted to English. Dewhurst, Hitch and Barry (1998) reported an advantage

to recall low frequency, late acquired words under a mixed list condition with only a significant word frequency effect but no reliable effect for AoA under a pure list condition in English.

The current experiments aim to shed further light on this discrepancy by exploring the influence of AoA and frequency on free recall on standardised pictures and their names (words) under mixed and pure lists in Turkish. Eighty participants were recruited from Yeditepe University and were assigned to either a picture (N=40) or a word condition (N=40) in which stimuli were presented in either a mixed or a pure list. Following a distracter task, participants were asked to recall as many pictures or words as they could remember from the list they viewed. The findings lend partial support to the previous findings in English and the implications are discussed within the context of current cognitive frameworks.

EPS Frith Prize Lecture

The neural mechanisms of relief: the role of safety signals in avoidance learning.

Anushka B P Fernando^{1,2}, Gonzalo P Urcelay^{1,2}, Adam C Mar^{1,2}, Anthony D Dickinson^{1,2} and Trevor W Robbins^{1,2}

¹ University of Cambridge

² Behavioural and Clinical Neuroscience Institute, University of Cambridge

abpfern@gmail.com

Avoidance behaviour, symptomatic of anxiety disorders, persists even in the absence of aversive events. The relief that is experienced following the completion of an avoidance response has been argued to reinforce behaviour. Furthermore, theoretical analyses of the interactions between appetitive and aversive reinforcement anticipate that inhibitors of fear, by providing relief, should be functionally equivalent to appetitive exciters. I will present research conducted during my PhD examining whether signals of relief, i.e. safety signals, can act as instrumental reinforcers using behavioural tests of conditioned reinforcement in combination with neuropharmacological manipulations. Behavioural evidence for both the fear inhibiting and reinforcing properties of an instrumentally trained safety signal will be presented followed by their disruption with selective infusions of drugs within regions of the striatum. Finally, I will present evidence suggesting different psychological processes and neurobiological mechanisms support appetitive (safety signals) versus aversive (footshock) reinforcers of avoidance behaviour.

Symposium: Timescales of word learning: from immediate to long term representations across development

Organiser: Dr Anna Weighall, University of Leeds

The role of context in learning the meanings of words

Jessica S. Horst
University of Sussex
jessica@sussex.ac.uk

Vocabulary acquisition is an important milestone in early cognitive development. Although much is known about how children guess the meaning of a new word (cf. fast mapping), less is known about how children commit word-meaning associations to memory for later retrieval. This talk will review several empirical studies demonstrating the initial naming context plays a critical role in how well children form robust memory representations of new name-object associations. We will explore word learning contexts in terms of both the to-be-learned targets and the other objects that may be present and competing for children's attention. This series of studies includes both traditional fast mapping tasks as well as teaching children words from reading storybooks. Overall, it's not just what is named that matters—but the context in which the initial naming occurs.

Acquisition of abstract concepts is influenced by emotional valence

Courtenay Norbury¹, Marta Ponari² and Gabriella Vigliocco³

¹ Royal Holloway, University of London

² University of Kent

³ University College London

courtenay.norbury@rhul.ac.uk

The acquisition of abstract concepts such as *freedom* and *culture* is a protracted developmental process relative to the acquisition of concrete concepts, yet abstract language is critical to social and scholastic achievement. There is considerable theoretical debate about the linguistic and cognitive skills that underpin acquisition of abstract concepts. In this study we consider the role of emotional valence as providing an embodied learning experience in which to anchor abstract meanings. In experiment 1, we analyse corpus data to demonstrate that abstract words have a privileged link to emotion and reliably predict age of acquisition norms for abstract concepts. In experiment 2, we provide empirical evidence detailing the development of abstract concepts using a lexical decision paradigm in three groups of children aged 6-7; 8-9; and 10-12 years (n = 60). Across all three age groups, positively valenced abstract words were more accurately recognized than neutral abstract words, whereas valence did not support recognition of concrete words. These findings provide the first evidence that young, school-aged children are sensitive to the emotional valence of abstract words and that this facilitates acquisition of abstract concepts.

Consolidation of new vocabulary in children with and without dyslexia: the role of sleep

Faye Smith¹, Gareth Gaskell¹, Anna Weighall², Meesha Warmington¹ and Lisa Henderson¹

¹ University of York, UK

² University of Leeds, UK

faye.smith@york.ac.uk

It is well established that sleep plays an important role in word learning, strengthening new phonological representations and integrating them with existing lexical knowledge. Children with dyslexia have difficulty learning new phonological forms and also show subtle differences in sleep architecture. This study investigated spoken vocabulary acquisition and consolidation in children with and without dyslexia, and examined whether individual differences in word learning were associated with sleep dynamics. Twenty-five children with dyslexia and 27 typical readers were taught 16 spoken novel words. Memory for the new words was assessed after learning and after 24-hour and 1-week delays. Overnight polysomnographic recordings were collected on the night after learning. Preliminary analyses suggest that children with dyslexia recalled fewer novel words than typical readers at all time points although the pattern of consolidation over time, as reflected by improvements on an explicit cued recall task, did not differ between groups. However, the pattern of performance on a pause detection task, assessing lexical competition effects, suggest that the new words were less well integrated with existing lexical knowledge after 1 week in the group with dyslexia compared to the controls. Relationships between word learning outcomes and selected features of sleep will also be discussed.

Learning to read aloud versus learning to comprehend: The impact of training focus on behavioural and neural responses to artificial scripts.

Jo S H Taylor¹ Matthew H. Davis² and Kathleen Rastle¹

¹ Royal Holloway University of London

² Medical Research Council Cognition and Brain Sciences Unit, Cambridge

j.taylor@rhul.ac.uk

We investigated whether the way in which reading is taught influences the division of labour between the direct print-to-meaning pathway and the indirect print-to-sound-to-meaning pathway. 24 native English-speaking adults learned to read two sets of 24 novel words, written in different unfamiliar alphabets. Print-to-sound mappings were systematic, but print-to-meaning mappings were arbitrary. Participants completed 6 tasks every day for ten days: three print-sound tasks; reading aloud, spelling, rhyme judgements, and three print-meaning tasks; saying the meaning, select written word associated with picture, semantic judgements. For one orthography, they completed print-sound tasks three times per day and print-meaning tasks once per day, whereas for the other orthography the reverse focus was applied. Accuracy was > 80% on all 6 tasks for both orthographies by Day 10. Reading aloud and spelling were more accurate and faster if training had a print-sound (relative to a print-meaning) focus. Saying the meaning, word-picture association, and semantic judgements were of equivalent accuracy but slower speed if training had a print-sound (relative to a print-meaning) focus. A focus on learning systematic print-sound mappings facilitates accurate reading aloud and comprehension. In contrast, a focus on learning arbitrary print-meaning

mappings compromises reading accuracy but facilitates comprehension speed.

Memory formation and integration operate in parallel during initial encoding of novel words

Iske Bakker^{1,2}, Atsuko Takashima^{1,2}, Janet G. van Hell^{1,3}, Gabriele Janzen^{1,2}
and James M McQueen^{1,2,4}

¹ Radboud University Nijmegen, Behavioral Science Institute

² Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behavior

³ Pennsylvania State University

⁴ Max Planck Institute for Psycholinguistics, Nijmegen

i.bakker@donders.ru.nl

According to the Complementary Systems account of word learning, novel words are initially encoded by the hippocampus and thereafter slowly integrated into the neocortical mental lexicon. However, it has recently been suggested that the neocortical system is capable of immediate integration when input matches prior knowledge. A direct link between neocortical involvement during encoding and later memory integration has however not yet been established. Here, we employed semantic priming as a direct behavioral measure of novel words' lexico-semantic integration. Enhanced BOLD activation in ventral medial prefrontal cortex and language-specific representational areas in left middle temporal and fusiform cortex during the first encounter with novel words predicted the magnitude of subsequent priming effects. In contrast, subsequent recall performance, a measure of successful memory formation, was predicted by activation in left inferior frontal gyrus, fusiform and posterior parietal cortex. Crucially, subsequent integration effects were independent of recall performance. This indicates that memory formation and integration processes can operate in parallel during initial encoding, thus challenging a strictly serial view of novel word consolidation.

Immediate integration of novel word forms: Evidence from eye movements

Efthymia C Kapnoula and Bob McMurray

University of Iowa

efthymiaevangelia-kapnoula@uiowa.edu

Learning a word entails, among other things, the acquisition of its phonological form and the integration of this word-form into the lexicon. This integration can be measured as the ability of a novel word to interfere with the recognition of other similar-sounding familiar words. Research on the conditions required for integration suggests that consolidation may be necessary to observe interference (Dumay & Gaskell, 2007; Gaskell & Dumay, 2003). However, recent work in our lab has used a more sensitive measure of interference, the sub-phonemic mismatch paradigm coupled with eye-tracking in the visual world paradigm. This provides evidence for lexical integration immediately after exposure to a novel word (Kapnoula, Packard, Gupta, & McMurray, 2015). In addition, this interference is still present despite changes in talker voice (Kapnoula & McMurray, submitted), suggesting early representations are not entirely episodic. These findings together suggest that consolidation, even though may be important for stabilizing lexical representations, is

not a prerequisite for lexical integration. Further, recent studies demonstrate that inhibitory links between known words can also be altered with short term training. This suggests that lexical integration is sub-served by the same learning mechanisms as those that tune on-line interactions among familiar words.

End of Symposium

Tracking the time-course of novel word learning and lexical competition in adults and children: A visual world eye-tracking study

Anna Weighall¹, Lisa Henderson², Dale Barr³ and Gareth Gaskell²

¹ University of Leeds

² University of York

³ University of Glasgow

a.r.weighall@leeds.ac.uk

The integration of novel and existing word knowledge benefits from sleep in adults (Dumay & Gaskell, 2007) and children (Henderson et al., 2012). However, seemingly immediate lexical integration has been shown in adults under some circumstances, e.g., when pictures were trained alongside phonology (Leach & Samuel, 2007) and using a visual world task (Kapnoula et al., 2014). Here, a visual world paradigm was employed with 42 adults and 40 children (aged 7-8) with lexical integration for novel word-picture pairs (e.g., biscial) indexed by competition with their existing basewords (increased looks to biscial upon hearing biscuit). Pairings learned both immediately prior to testing and the previous day exhibited significant competition effects relative to untrained controls suggesting immediate integration. However children, not adults, demonstrated further enhancement for those learned prior to overnight sleep. In contrast, explicit memory benefitted significantly from overnight consolidation for both. Interestingly, the magnitude of competition effects was significantly smaller from novel competitors than existing words, suggesting that whilst integration may have occurred novel items may not immediately operate as fully fledged lexical items. The results also concur with recent research suggesting sleep boosts some aspects of learning for children more than adults (Wilhelm et al., 2013).

Dumay, N., & Gaskell, M.G. (2007). Sleep-associated changes in the mental representation of spoken words. *Psychological Science*, 18, 35-39.

Henderson, L.M., Weighall, A.R., Brown, H., & Gareth Gaskell, M. (2012). Consolidation of vocabulary is associated with sleep in children. *Developmental Science*, 15, 674-687.

Kapnoula, E.C., Packard, S., Gupta, P., & McMurray, B. (2015). Immediate lexical integration of novel word forms. *Cognition*, 134, 85-99.

Leach, L., & Samuel, A.G. (2007). Lexical configuration and lexical engagement: When adults learn new words. *Cognitive Psychology*, 55, 306-353.

Wilhelm, I., Rose, M., Imhof, K.I., Rasch, B., Büchel, C., & Born, J. (2013). The sleeping child outplays the adult's capacity to convert implicit into explicit knowledge. *Nature Neuroscience*, 16, 391-393.

Attentional properties of the translation effect

James Rackie, Karen R Brandt and Michael Eysenck
University of Roehampton
james.rackie@roehampton.ac.uk

Early research suggested that the between-domain encoding processes of a translation effect (TE) (e.g. hear and write and read and vocalise) lead to the formation of more distinctive memory traces than the within-domain encoding processes of a non-translation effect (e.g. silently hearing, reading and writing), enabling enhanced memory performances for these items. Under a refurbished fully crossed design, recent research has revealed a TE of vocalisation but not writing to occur in recognition memory. Furthermore, the TE of vocalisation arose in the rich episodic experience of recollection rather than feelings of familiarity. The present research outlines a more comprehensive understanding of both TE's, by uncovering their attentional properties in relation to episodic memory. Findings from divided attention experiments revealed that both TE's were still able to occur during divided attention at encoding, but were eliminated during divided attention at retrieval. These findings postulate that both TE's are more reliant on the binding of contextual information at retrieval than the between-domain processing of information at encoding. Related neurological findings on the "binding of item and context" model and behavioural findings on the desirable difficulty hypothesis support such findings respectively.

Exploring qualitative aspects of memory function in a patient with a selective lesion to the entorhinal cortex

Karen R Brandt¹, Michael W Eysenck¹, Maria Kragh Nielsen¹ and Tim J Von Oertzen^{2,3}
¹ University of Roehampton
² Atkinson Morley St. George's Hospital
³ Wagner-Jauregg Neuroscience Centre, Linz
karen.brandt@roehampton.ac.uk

Past research remains unclear as to the role of the entorhinal cortex in qualitative aspects of memory retrieval. The aim of the present research was to explore this relationship, comparing a unique patient (MR) with a selective impairment to the left entorhinal cortex with a set of matched controls. Four experiments tested participants' recognition memory, recollection and familiarity for familiar and unfamiliar faces and words. A fifth experiment tested participants' priming associated with the familiarity process. MR had intact performance in pseudoword recognition and in both face recognition experiments. Crucially, however, in the familiar word experiment, whilst MR performed similarly to controls in terms of recollection, she showed a marked impairment in familiarity. Furthermore, this selective familiarity impairment was further evidenced in a negative priming effect

in MR. MR's impairment is thus both material-specific and selective for previously encountered but not new verbal items (pseudowords). These findings provide the first clear evidence that selective impairment of the entorhinal cortex impairs the familiarity process for familiar verbal material whilst leaving recollection intact. These results suggest the entorhinal cortex does not have attributes reflective of both recollection and familiarity as previously assumed, but rather supports context-free long-term familiarity-based recognition memory.

Exploring object recognition memory in a patient with a selective lesion to the entorhinal cortex

Adele James, Karen R Brandt and Ray Norbury
University of Roehampton
jamesa1@roehampton.ac.uk

Previous research has shown that different medial temporal lobe areas may be responsible for the recognition of object identity (perirhinal cortex) versus object location (hippocampus). The present research explored what role the entorhinal cortex, which lies between the hippocampus and perirhinal cortex, might play in these processes. Object recognition and recollection and familiarity processes were investigated in MR, a temporal lobe patient with epilepsy, who has a selective lesion to the left entorhinal cortex and a set of matched controls. Previous research on MR has found that she has impaired familiarity judgments but her recollection is spared. Experiment 1 explored object identity memory and Experiment 2 explored object location memory. The results found that whereas MR's memory for object location was normal, her object identity memory was impaired. In addition, this impairment was selectively found for overall recognition memory with no impairments found in recollection or familiarity. These results provide the first suggestion that the entorhinal cortex may play a selective role in object identity but not object location memory, and that this role is not dependent on the qualitative aspects of memory retrieval.

Automaticity of visual recognition memory

Karla K. Evans and Alan Baddeley
University of York
karla.evans@york.ac.uk

Humans have an astonishing ability to remember with high fidelity previously viewed scenes with robust memory for visual detail. Investigating the mechanism that affords us this massive memory we tested the automaticity of encoding into visual long-term memory in two ways across three experiments. First, measuring the effect of limiting the time of encoding by varying the allotted time to encode each image while keeping overall time of study constant. Second, measuring the effect of an attention-demanding concurrent task on subsequent retention by systematically varying the levels of demand imposed by the concurrent executive task. If encoding is automatic, not requiring executive attention, neither shorter exposure nor concurrent demand should influence subsequent recognition.

We found a significant reduction in performance when encoding time was decreased from 3 seconds to 1. However, a further reduction in encoding time to 0.5 seconds showed no significant

decrement suggesting that encoding might follow a two-step process. Two further experiments involved a concurrent working memory task and sets of either heterogeneous scenes or more homogenous doors. Both showed a concurrent task effect, which was greater for the homogenous set. Results suggest that visual memory encoding is the outcome of a two-stage process of which one at least is attentionally limited.

The effects of attention and motor imagery on the kinematics of imitated hand actions

Judith Bek¹, Ellen Poliakoff¹, Hannah Marshall¹, Sophie Trueman¹ and Emma Gowen²

¹ School of Psychological Sciences, University of Manchester

² Faculty of Life Sciences, University of Manchester

judith.bek@manchester.ac.uk

Action observation and imitation activate brain regions involved in movement, known as the action observation network (Cross et al., 2009). Imitation can increase motor learning (Stefan et al., 2008) and has shown therapeutic potential (Buccino et al., 2011).

The effects of observed actions on movement have been shown to be increased by drawing attention to movement characteristics or combining observation with imagery. Based on these findings we investigated how attention and motor imagery affect imitation. We compared the effects on goal-directed and goal-less movements, since movement kinematics are normally coded less accurately when goals are present (Wild et al., 2010).

Motion kinematics were recorded during imitation of goal-directed and goal-less hand movement sequences. Halfway through the session, participants were instructed either to imagine or attend to the characteristics of the observed movements. A control group received no additional instructions.

Instructions increased the accuracy of imitation in terms of duration, peak velocity and amplitude, with no difference between attention and motor imagery. The effects of instructions did not differ for goal-directed and goal-less movements. Instructing participants to attend to or imagine observed actions can increase how accurately motion kinematics are imitated, but further work is needed to clarify the processes involved.

Buccino, G., Gatti, R., Giusti, M. C., Negrotti, A., Rossi, A., Calzetti, S., & Cappa, S.F. (2011). Action Observation Treatment Improves Autonomy in Daily Activities in Parkinson's Disease Patients: Results from a Pilot Study. *Movement Disorders*, 26, 1963-1964.

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Stefan, K., Classen, J., Celnik, P., & Cohen, L.G. (2008). Concurrent action observation modulates practice-induced motor memory formation. *European Journal of Neuroscience*, 27, 730-738.

Wild, K.S., Poliakoff, E., Jerrison, A., & Gowen, E. (2010). The influence of goals on movement kinematics during imitation. *Experimental Brain Research*, 204, 353-360.

Does training on somatosensory decision-making transfer to other perceptual tasks?

Akib Ul Huque^{1,2}, Ellen Poliakoff¹ and Richard J Brown¹

¹ University of Manchester

² University of Dhaka, Bangladesh

mdakibul.huque@manchester.ac.uk

When trying to detect weak somatosensory stimuli, people often produce false alarms (FAs) where they report a touch when no stimulus was presented. We investigated whether training can alter the frequency of FAs and possible transfer to other perceptual experiences. In Study 1, 46 participants with a low FA rate were rewarded for hits and punished for misses with the aim of increasing their FA rate. In Study 2, 30 participants with a high FA rate were rewarded for correct rejections and punished for false alarms with the aim of decreasing their FA rates. The training altered FA rates as predicted, compared to a control condition with no rewards/punishment, but did not transfer to another perceptual experience as measured by the spontaneous sensation test. These findings were replicated using a pseudo-conditioning procedure in control conditions in Study 3 ($n = 34$) and 4 ($n = 39$). In addition, we found that the training transferred to FAs on an auditory voice detection task in Study 3. These studies indicate that training influences somatosensory misperceptions which can transfer to other perceptual experiences under some circumstances.

Tactile misperceptions are predicted by pre-stimulus alpha oscillations over contralateral somatosensory cortex

Matt Craddock¹, Ellen Poliakoff², Wael El-Deredy², Ekaterini Klepousniotou¹ and Donna Lloyd¹

¹ University of Leeds

² University of Manchester

m.p.craddock@leeds.ac.uk

Fluctuations of pre-stimulus oscillatory activity in the alpha band (8-12 Hz) observed in human electroencephalography (EEG) influence detection of supra- and peri-threshold somatosensory targets. We investigated this relationship using EEG and the Somatic Signal Detection Task (SSDT; Lloyd, Mason, Brown, & Poliakoff, 2008). In the SSDT, participants detect brief (20ms) peri-threshold touches delivered to the index finger of their non-dominant left hand using a vibrotactile stimulator. These touches are sometimes accompanied by a simultaneous flash of an LED located next to the index finger; while on other occasions, the light flashed but no touch was delivered. Participants successfully detected more touches with a simultaneous light flash than touches presented alone. They were also more likely to falsely report touch on trials with only a light flash. In the EEG, we found a linear, negative relationship between contralateral alpha power and reports of touch. As alpha power increased, participants became less likely to report a touch. This relationship held for trials both with and without touch and did not interact with the presence of the

light flashes. Thus, low alpha power does not specifically facilitate accurate tactile detection, since it also increases the probability of falsely reporting touch.

Lloyd, D.M., Mason, L., Brown, R.J., & Poliakoff, E. (2008). Development of a paradigm for measuring somatic disturbance in clinical populations with medically unexplained symptoms. *Journal of Psychosomatic Research*, 64, 21–24.

Right hemisphere involvement for pun processing: the case of idioms

Kremena Koleva, Anna Weighall, Jelena Havelka, Mark Mon-Williams and
Ekaterini Klepousniotou
University of Leeds
lnpkk@leeds.ac.uk

The study investigated the hypothesis that right hemisphere (RH) involvement has not been reported during pun processing due to failure to control for the internal semantics of puns. We employed a cross-modal half-field semantic priming paradigm to investigate the time-course of meaning activation for puns motivated by non-decomposable and decomposable idioms. Given the evidence that idioms do indeed induce RH processing, we expect RH involvement in the processing of puns as well.

In non-decomposable idioms, idiomatic meanings are unrelated to the literal meanings of the component words (e.g., *kick the bucket* \neq *die*), whereas in decomposable idioms idiomatic meanings are related to the component words (i.e., *pop the question* \rightarrow *propose*). Two experiments used non-decomposable and decomposable idioms in sentence-final position in idiomatic and punning contexts as auditory primes. Visual lateralized targets, presented with an inter-stimulus interval of 0ms (Experiment 1) or 750ms (Experiment 2), were related to: (i) the literal meaning of the idiom, (ii) the idiomatic meaning, or (iii) were unrelated.

In both ISIs, non-decomposable puns showed LH processing, while decomposable puns were processed bilaterally. We argue that differences in the mental representations of non-decomposable and decomposable idioms make decomposable puns harder to process leading to RH recruitment.

Symposium: Contact points between language production and comprehension
Organizer: Rob Hartsuiker (Ghent University, Belgium)

A multiple-mechanisms account of prediction in language processing

Falk Huettig
Max Planck Institute for Psycholinguistics
falk.huettig@mpi.nl

The notion that prediction is a fundamental principle of human information processing has been en vogue over recent years. The investigation of language processing may be particularly illuminating for testing this claim. Linguists traditionally have argued prediction plays only a minor role during language understanding because of the vast possibilities available to the language user as each word is encountered. I will consider four central questions of anticipatory language processing: Why (i.e. what is the function of prediction in language processing)? What (i.e. what are the cues used to predict up-coming linguistic information and what type of representations are predicted)? How (what mechanisms are involved in predictive language processing and what is the role of possible mediating factors such as working memory)? When (i.e. do individuals always predict up-coming input during language processing)? I will propose that prediction occurs via a set of diverse PACS (production-, association-, combinatorial-, and simulation-based prediction) mechanisms

which are minimally required for a comprehensive account of predictive language processing. Models of anticipatory language processing must be revised to take multiple mechanisms, mediating factors, and situational context into account.

Predicting the future, one word at a time.

Victor Ferreira¹, Daniel Kleinman¹ and Elin Runnqvist²

¹ University of California San Diego

² Université Aix-Marseille

vferreira@ucsd.edu

Both speakers and comprehenders are constantly trying to make life easier for their future selves. For instance, after producing a word, speakers tune their lexicon to make that word easier to retrieve in the future, under the assumption that current behavior predicts future behavior. Meanwhile, comprehenders predict upcoming words to amortize processing costs over time. The research that I will present investigates how both of these tasks are accomplished. Specifically, what kind of learning takes place when speakers learn from their own productions? And how many predictions do comprehenders make for an upcoming word? In three experiments that used the cumulative semantic interference (CSI) paradigm, subjects named pictures (e.g., SOCK) that were presented either in isolation or after a strongly constraining sentence frame (“After doing his laundry, Mark always seemed to be missing one...”). Naming SOCK slowed the subsequent naming of the picture SHIRT – the standard CSI effect. However, although picture naming was much faster overall after sentence frames, the amount of interference was not affected by the context (bare vs. sentence) in which either picture was presented. This finding has two theoretical implications. First, the only model of CSI that can accommodate the results claims that it arises when speakers use error-based learning to tune their language systems during production; thus, speakers are sensitive to prediction error for their own words. Second, that model indicates that during sentence comprehension in the present experiments, only the best completion (SOCK) was pre-activated; other plausible completions (SHIRT) were not. This suggests that comprehenders predict only one word at a time.

Iconicity in language production and comprehension

Gabriella Vigliocco

University College London

g.vigliocco@ucl.ac.uk

In traditional models of language production and comprehension phonological and semantic processing are treated as two completely distinct levels, in line with the assumption that there is only an arbitrary link between phonology and semantics.

However languages embed iconicity (more transparent links between form and meaning). Iconicity is readily visible in sign languages although it is also widespread in spoken languages if one considers prosody and gestures that accompany speech. In the talk I will review our evidence especially from

sign language for a role of iconicity in processing and discuss the implications for current models of word recognition and word production.

Cues for language activation in bilinguals

Robert Hartsuiker
Ghent University
robert.hartsuiker@ugent.be

Much evidence supports the hypothesis that bilinguals activate words in both of their languages during language production and comprehension. To prevent spurious production or comprehension in the non-intended language, they need to maintain a balance between the activation of their languages. Here I will discuss recent work that tested whether this language balance is affected by extrinsic cues for languages. This work showed that in a joint picture naming task, naming latencies were slower when the other person has just switched language (i.e., a switch cost from comprehension to production). Another line of research showed that people's faces can serve as language cues. After familiarization to a person speaking language A, there is a cost in responding to that person when they are now speaking language B. Interestingly, this cost disappeared after exposure to only a few incongruent trials. A final study showed that the language associated with famous people can act as a misleading language cue, which triggers intrusion errors from the non-target language. This effect even occurs for people from societies in which the media usually dubs the speech of famous people (so that their knowledge that Obama is Anglophone clashes with their experience of hearing Obama "speak" German). These three lines of research converge on an account of bilingual language production whereby language activation is highly sensitive to exogenous cues for language.

Those who know nothing of foreign languages know nothing of their own

Albert Costa
Universitat Pompeu Fabra
costalbert@gmail.com

We are constantly making decisions of many different sorts. From more mundane decisions such as which clothes to wear every morning or where to go for lunch, to more relevant ones, such as whether we can afford the price of a nice holiday on a Pacific island, or whether an investment plan is too risky; decision making is an everyday life activity. It is well known that frequently our decisions often depart from a purely rational cost benefit economical analysis, and that indeed they are biased by several factors that prompt intuitive responses that often drive the decision made. In this talk, I will describe several studies in which there is a pervasive effect of the language in which problems are presented on decision making. These studies cover economic, moral and intellectual decisions. Together the evidence suggests that a reduction in the emotional resonance prompted by the problem leads to a reduction in the impact of intuitive processes on decision making. This evidence not only helps to understand the forces driving decision making, but it also has important implications for a world in which people are commonly faced with problems in a foreign language.

End of Symposium

Believe it or not: Moving non-biological stimuli believed to have human origin can be represented as human movement

Emma Gowen, Elizabeth Evans and Ellen Poliakoff
University of Manchester
emma.gowen@manchester.ac.uk

Does our brain treat non-biological movements (e.g. moving abstract shapes or robots) in the same way as human movements? The current work tested whether the movement of a non-biological rectangular object, believed to be based on a human action is represented within the observer's motor system. A novel visuomotor priming task was designed to pit true imitative compatibility, due to human action representation against more general stimulus response compatibility (SRC) that has confounded previous belief experiments. SRC effects were found for the object. However, imitative compatibility was found when participants repeated the object task with the belief that the object was based on a human finger movement, and when they performed the task viewing a real human hand. These results provide the first demonstration that non-biological stimuli can be represented as a human movement if they are believed to have human agency and have implications for interactions with technology and robots.

Hebb repetition learning for tactile sequences

Andrew J Johnson, Jordan Shaw and Chris Miles
Bournemouth University
andjohnson@bournemouth.ac.uk
Sponsor: Peter Hills

The Hebb repetition effect refers to the incidental acquisition of order memory following surreptitious repetition of a sequence. This implicit memory effect has been found across a range of stimulus types, suggesting repetition learning of order to be a general property of memory. The present study examines sequence learning for tactile stimuli in order to investigate further cross-modal similarity. Whilst immediate free recall of tactile stimuli has been shown to produce similar patterns of memory to that of verbal stimuli (Cortis, Dent, Kennett, & Ward, in press), there is a paucity of work examining the effects of implicit memory for tactile stimuli (Gallace & Spence, 2009). Across three experiments blindfolded participants received tactile stimulations to six fingers and were required to reconstruct the order of presentation through movement of the fingers. Every third trial, the same sequence was surreptitiously repeated. The canonical serial position function of strong primacy and moderate recency found with serial order reconstruction was observed, and, in addition, gradual improvement for the repeated sequence was reported. Despite self-report data indicating verbal and visuo-spatial strategies in tactile memory (Picard & Monnier, 2009), these effects were impervious to suppression conditions, indicating employment of a tactile code.

Cortis, C., Dent, K., Kennett, S., & Ward, G. (in press). First things first: Similar list length and

output order effects for verbal and non-verbal stimuli. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.

Gallace, A. & Spence, C. (2009). The cognitive and neural correlates of tactile memory. *Psychological Bulletin*, 135, 380-406.

Picard, D. & Monnier, C. (2009). Short-term memory for spatial configurations in the tactile modality: a comparison with vision. *Memory*, 17, 789-801.

Visual-haptic cue combination in adults with autism spectrum condition

Daniel Poole, Ellen Poliakoff, Emma Gowen and Paul A Warren
University of Manchester
daniel.poole@manchester.ac.uk

Adult performance on a number of multisensory tasks is well predicted by a statistically optimal maximum likelihood estimation (MLE) model, whereby unisensory cues are combined so that the variance of the multisensory estimate is as low as possible^{1,2}. The current study investigated visual-haptic cue-combination in participants with autism spectrum condition (ASC). If participants with ASC do not combine the cues in a manner which minimises variance then their perceptual estimates are likely to be noisier. This may contribute to differences in sensory experience reported by many with the condition. Adults with ASC (n =13) and a matched neurotypical (NT) control group completed an adapted version of a standard paradigm³ for measuring visual-haptic cue integration. Participants judged the height of blocks presented visually, haptically or via both senses (multisensory). Performance in the multisensory condition was less reliable (higher variance) than the prediction of the MLE model for both ASC and NT groups. However, performance was well predicted by a non-optimal stochastic cue switching (SCS) model which assumes that participants switch between the unisensory cues from trial-to-trial. The failure to replicate optimal multisensory cue combination in NT participants and possible directions for future research in ASC will be discussed.

Ernst, M.O. & Banks, M.S (2002). Humans integrate visual- haptic information in a statistically optimal fashion. *Nature*, 415, 429-433.

Alais, D. & Burr, D. (2004). The ventriloquist effect results from near optimal bimodal integration. *Current Biology*, 14, 257-269.

Gori, M., Del Viva, M., Sandini, G. & Burr, D. (2008) Young children do not integrate visual and haptic form information. *Current Biology*, 18, 694-698

Viewers extract the mean from images of the same person: a route to face learning

Robin S S Kramer, Kay L Ritchie and A Mike Burton
University of York
remarknibor@gmail.com

Research on ensemble encoding has found that viewers extract summary information from sets of similar items. When shown a set of four faces of different people, viewers merge identity information from the exemplars into a representation of the set average. Here, we presented sets containing unconstrained images of the same identity. In response to a subsequent probe, viewers recognised the exemplars accurately. However, they also reported having seen a merged average of these images. Importantly, viewers reported seeing the matching average of the set (the average of the four presented images) more often than a nonmatching average (an average of four other images of the same identity). These results were consistent for both simultaneous and sequential presentation of the sets. Our findings support previous research suggesting that viewers form representations of both the exemplars and the set average. Given the unconstrained nature of the photographs, we also provide further evidence that the average representation is invariant to several high-level characteristics.

Learning faces from variability

Kay L Ritchie and A Mike Burton
University of York
kay.ritchie@york.ac.uk

There are large behavioural differences in the perception of familiar and unfamiliar faces. However, little is known about face learning – how faces make the transition from unfamiliar to familiar. Most experimental work on this topic examines the effects of study time, and systematic variation of exposure (changes in pose etc). We have argued that a critical component of face learning is within-person variability – i.e. exposure to the range of naturally-occurring variations which are idiosyncratic for a particular face. Here, we present two experiments which manipulate the degree of variability to which viewers are exposed during face learning. Participants learned name and face associations for twenty unfamiliar identities presented with high and low within-person variability. Stimuli were ambient images, showing faces ‘in the wild’. We show more accurate performance on a speeded name verification task for identities learned in high compared to low variability. We go on to show that exposure to high variability across just two images improves performance on a face matching task. The results demonstrate the critical role of variability in face learning.

Does language play a direct or indirect role in emotion perception?

Emma Portch, Jelena Havelka, Charity Brown and Russell Hutter
University of Leeds
e.s.portch@leeds.ac.uk

In four experiments we investigated how language may affect perceptual processing of emotional faces. We contrasted theoretical accounts that predict that emotion perception will be influenced by general or by emotion-specific language manipulations (construction vs. labelling). A modified semantic satiation paradigm was used (Lindquist et al., 2006). Participants repeated a word, out loud, 3 or 30 times before deciding whether two faces matched in emotional expression. Across

experiments participants repeated either emotion labels, neutral words with no emotional connotations ('paper'), or non-words ('borbi'). Two trends in the combined data support a direct role of language in perceptual processing of emotional faces. First, accuracy was reduced after massed repetition of *any word*, suggesting that the manipulation prevented access to decision-necessary labels. Second, at both levels of repetition, participants showed facilitated performance after repeating an emotion label that matched both expressions. This suggests that overtly repeated labels may direct attention towards category-diagnostic features, speeding decisions for matching face stimuli. Findings support the notion that word-to-concept mappings are flexible, and that conceptual activation may depend on task demands.

Lindquist, K.A., Barrett, L.F., Bliss-Moreau, E., & Russell, J.A. (2006). Language and the perception of emotion. *Emotion*, 6, 125-138.

EPS Mid-Career Award

Producing and comprehending language in monologue and dialogue

Martin Pickering
University of Edinburgh
Martin.Pickering@ed.ac.uk

The psychology of language has largely been regarded a slightly obscure and difficult branch of individual cognition, for instance investigating how people solve complicated problems such as decoding letters on a screen. Instead, I argue its primary focus should be on dialogue, with monologue treated as a special case (when the interlocutor is absent). Moreover, it should assume that the mechanisms underlying production and comprehension are tightly interwoven. I outline experimental work that is consistent with these proposals. I first consider evidence, primarily from my research on structural priming, that interlocutors align their linguistic representations and argue that such alignment underlies communicative success. I then propose that speakers predict their own utterances and that comprehenders predict their partners' utterances by making use of mechanisms of simulation and forward modelling, and use this proposal to explain the fluidity of dialogue and the processes underlying linguistic joint action.

Eye movement behaviour and word processing after first-pass reading: word n-1 and words beyond n-1

Laura M T Lantz, Sarah J White and Kevin B Paterson
University of Leicester
lntl1@le.ac.uk

Two experiments manipulated the availability of the word to the left of the fixated word (n-1) and words further to the left (beyond n-1) within sentences. As the eyes moved past each word, either all words to the left were masked (see Schotter, Tran, & Rayner, 2014), or all words beyond n-1 were masked. The masks retained word shape information and remained during re-reading. In the control conditions all previously read text remained available. In Experiment 1 the sentences had simple constructions. In Experiment 2 the sentences either contained a temporary structural ambiguity, or were non-ambiguous. Importantly, when only words beyond n-1 were masked, comprehension scores were similar to the control. However when all words to the left were masked, comprehension scores were 4-8% lower than the control. The results indicate that the availability of n-1 may be important for sentence comprehension. Furthermore, the results demonstrate that the availability of meaningful text beyond n-1 is important for eye movement control during re-reading, particularly for sentences that are more difficult to process (ambiguous). Together the results indicate the importance of the word to the left (n-1) for comprehension, and the role of meaningful text in driving eye movement control during re-reading.

Schotter, E.R., Tran, R., & Rayner, K. (2014). Don't believe what you read (only once): Comprehension is supported by regressions during reading. *Psychological Science*, 25, 1218-1226.

Eye movements during reading of text with transposed letters: a comparison of young and older readers

Kayleigh L Warrington, Victoria A McGowan, Sarah J White, Kevin B Paterson and Irene Gottlob
University of Leicester
klw53@leicester.ac.uk

Single word priming tasks have demonstrated flexibility in letter position coding in young readers (aged 18-30) (Perea & Lupker, 2003). Previous research using letter transpositions has additionally established that young readers display flexible letter position coding in natural reading (White, Johnson, Liversedge, & Rayner, 2008). The current study aimed to examine whether the nature of letter position coding is equivalent for young and older adults. Young (aged 18-30) and older (aged 65+) readers' eye movements were recorded as they read sentences with words containing transposed adjacent letters. In addition to a control (e.g. *problem*) condition, there were three transposed letter conditions: word-initial transposition (*rpoblem*), internal transposition (*porblem*) and word-ending transposition (*probelm*). The frequency of a critical word was also manipulated. The results showed that older adults, like the young adults, display flexibility in their

letter position coding, with the greatest disruption being observed for word-initial transpositions for both groups. The results indicate that the position of word-initial letters is especially critical for word processing for both young and older adults. These findings have important implications for the nature of older adults' word recognition processes during sentence reading.

Perea, M., & Lupker, S. J. (2003). Does judge activate COURT? Transposed-letter similarity effects in masked associative priming. *Memory & Cognition*, *31*, 829-841.

White, S.J., Johnson, R.J., Liversedge, S. P., & Rayner, K. (2008). Eye movements When reading transposed text: The importance of word-beginning letters. *Journal of Experimental Psychology: Human Perception and Performance*, *34*, 1261-1276.

Premature ageing along the garden-path? A dual-task study of syntactic reanalysis

Nick Cooper and Kate Nation
University of Oxford
nicholas.cooper@psy.ox.ac.uk

Longer reading times for “garden-path” sentences containing temporary syntactic ambiguities have been demonstrated not to necessarily entail complete reinterpretation, increasingly with age (Christianson et al., 2006). If this results from “good-enough” processing (Ferreira et al., 2002) and associated cognitive control deficits, similar eye movements and comprehension may be expected in younger participants given an extrinsic memory load. These experiments compared comprehension question accuracy and eye-movement patterns of younger (age 18-30) and older (age 65-85) readers on garden-path sentences – giving half a concurrent n-back task. For younger participants, the concurrent task did not affect comprehension but removed the garden-path effect in disambiguating verb first pass reading times, while producing a significantly greater effect in re-reading measures – suggesting later ambiguity recognition. Older participants showed reduced comprehension accuracy, but similar eye-movement patterns to those of younger participants under load. Follow-up experiments using two-sentence paragraphs containing garden-path sentences (cf. Slattery et al., 2013) further supported increased “good-enough” online processing in younger groups under load. These data suggest similar online processing for older readers, and younger readers with cognitive load. This supports a role of cognitive load in good-enough syntactic processing, but questions its role in subsequent comprehension, and also the conditions underpinning “good-enough” processing.

Christianson, K., Williams, C., Zacks, R., Ferreira, F. (2006). Misinterpretations of garden-path sentences by older and younger adults. *Discourse Processes*, *42*, 205-238.

Ferreira, F., Bailey, K.G., & Ferraro, V. (2002). Good-enough representations in language comprehension. *Current directions in psychological science*, *11*, 11-15.

Slattery, T.J., Sturt, P., Christianson, K., Yoshida, M., & Ferreira, F. (2013). Lingering misinterpretations of garden path sentences arise from competing syntactic representations. *Journal of Memory and Language*, *69*, 104-120.

The effects of removing foveal and parafoveal binocular input during sentence reading

Mirela Nikolova¹, Stephanie Jainta², Hazel I Blythe¹, Matthew O Jones¹
and Simon P Liversedge¹

¹ University of Southampton

² Leibniz Research Centre for Working Environment and Human Factors
m.nikolova@soton.ac.uk

Humans typically make use of both eyes during reading, which necessitates precise binocular coordination in order to achieve a unified perceptual representation of written text. Previous studies have examined various aspects of binocular coordination during reading, such as fixation disparity, fusional processes and the benefit of binocular vision for language comprehension. The present sentence reading experiment used a novel gaze-contingent technique where the availability of binocular information for foveal and parafoveal processing was manipulated on a fixation-to-fixation basis. We examined the effect of this manipulation on standard reading measures, as well as vergence metrics. Findings revealed that a global binocular benefit was present in reading, as reflected in average fixation duration, total sentence reading time, number of fixations per sentence and number of regressive saccades. In addition, presenting parafoveal information monocularly caused significant disruption to reading to a greater extent than when foveal input was monocular. Effects of the manipulation on binocular coordination (fixation disparity) and lexical processing are also discussed. The study demonstrates that uninterrupted binocular input during both foveal and parafoveal processing is advantageous for reading and considers the interplay between binocular fusion and lexical identification.

The role of age of acquisition and frequency on memory: evidence from free recall of pictures and words

Ilhan Raman¹, Simay İkieş², Evren Raman^{1,3}, Elcin Kilecioğlu², Dilek Uzun²
and Sebnem Zeyveli²

¹ Middlesex University

² Yeditepe University, Istanbul

³ Brunel University

i.raman@mdx.ac.uk

The advantage of processing early over late acquired items in lexical and semantic tasks across a number of languages is well documented. Interestingly, the role of AoA on memory is less well understood and restricted to English. Dewhurst, Hitch and Barry (1998) reported an advantage to recall low frequency, late acquired words under a mixed list condition with only a significant word frequency effect but no reliable effect for AoA under a pure list condition in English.

The current experiments aim to shed further light on this discrepancy by exploring the influence of AoA and frequency on free recall on standardised pictures and their names (words) under mixed and pure lists in Turkish. Eighty participants were recruited from Yeditepe University and were assigned to either a picture (N=40) or a word condition (N=40) in which stimuli were presented in either a mixed or a pure list. Following a distracter task, participants were asked to recall as many pictures or

words as they could remember from the list they viewed. The findings lend partial support to the previous findings in English and the implications are discussed within the context of current cognitive frameworks.

Letter position sensitivity in the ventral visual stream

Caroline Whiting^{1,2}, Jana Klimova¹ and William Marslen-Wilson^{1,2}

¹ University of Cambridge

² MRC Cognition & Brain Sciences Unit

cmw59@cam.ac.uk

Left occipitotemporal cortex, and in particular the visual word form area (VWFA), plays a critical role in letter and word recognition. In this study, we used multivariate pattern analysis to identify the visual and orthographic processes supported by the ventral visual stream across time. Searchlight-based Representational Similarity Analysis (RSA) was applied to combined magneto- and electroencephalography (MEG-EEG) data for a set of visually-presented words. We tested: (a) visual models based on pixel-level features and (b) orthographic models based on letter position, contrasting position-specific with position-nonspecific models (e.g. *bake* and *beak* share one position-specific letter, but all four letters regardless of position). RSA successfully identified regions in the ventral stream that are sensitive to the different visual word form properties captured by the models. The visual model reveals bilateral occipital areas involved in early visual processing, beginning at 70 ms in occipital pole. The position-specific orthographic model reveals effects in left posterior fusiform gyrus, including VWFA, emerging at 200 ms. The position-nonspecific model, in contrast, does not engage VWFA and adjacent posterior fusiform areas. These results provide direct evidence for the type of orthographic processes supported by posterior areas of the ventral stream, showing selective processing of abstract letter position.

Speakers are informative even when they fixate a contrast object briefly

Catherine Davies¹ and Helene Kreysa²

¹ University of Leeds

² Friedrich Schiller University, Jena

c.n.davies@leeds.ac.uk

Sponsor: Heather J Ferguson

We investigate the prerequisites for producing an optimally informative referring expression (RE), e.g. ‘the small apple’ to refer to one of a pair of apples contrasting in size. Using a 2 (presence vs. absence of contrast) x 2 (array complexity: 4 or 8 objects) within-subjects design, 20 participants instructed an addressee to click on a target object from arrays containing a target, a contrast-mate, and unrelated distracters.

Speakers were largely informative in their choice of RE (median 81%, mean 78%, $SD=21$, contrast condition only), although they tended to fixate the contrast object only briefly (fixation time: $M=483ms$, $SD=456$ for 4-object arrays; $M=398ms$, $SD=360$ for 8-objects; total trial time 4000ms; fixation count: $M=1.5$, $SD=1.4$ for 4-object arrays, $M=1.4$, $SD=1.2$ for 8-objects). A linear mixed

effect model revealed that speech onset was earlier for underinformative utterances ($M=1095$, $SD=287$ vs. $M=1106$, $SD=244$ for optimal utterances; estimated effect 84.1ms, $t=2.97$, $p<.05$).

These results suggest that visual scanning preceding or during speech production is not the main factor in informative verbal behaviour. We conclude that speakers are compelled to provide sufficient information even under time constraints and with minimal checking of contrast objects. Instead, speakers may rely on their memory of visual scenes to assess distinctive features, accessed during a pre-utterance phase.

Trial type mixing modulates response set membership effects in the Stroop task

Nabil Hasshim and Ben Parris
Bournemouth University
nhasshim@bournemouth.ac.uk

When *response set trials* (e.g. the word BLUE presented in green, with both being possible responses) are compared to *non-response set trials* (e.g. the colour blue is not one of the responses) it has been consistently shown that the former are responded to slower; an effect referred to as the *response set effect*. This effect has been considered so robust that it is one of a few key effects that models of Stroop task performance attempt to explain. Based on previous work showing variable magnitudes of the response set effect, the present study aimed to explore the influence of presenting trial types in mixed vs. pure blocks. The results showed that response set effects are greatly reduced when trials are presented in mixed blocks and consequently that the magnitude and make up of Stroop interference is dependent on experimental context. It is concluded that the response set effect is the result of labile, transient association processes, not fixed attentional allocation mechanisms suggested in extant models of Stroop interference. A further study supporting the hypothesis that the underlying mechanism behind this mixing effect is modulated by the strength of activation of each colour concept is also discussed.

A neural signature of perceptual goodness?

Alexis D.J. Makin, Letizia Palumbo, Giulia Rampone, Damien Wright
and Marco Bertamini
University of Liverpool
alexis.makin@liverpool.ac.uk

Gestalt psychologists introduced the concept of Prägnanz, or ‘perceptual goodness’. More recently, Van der Helm and Leewenberg (1996) proposed a quantitative model of perceptual goodness for dot patterns. Their ‘Holographic model’ states that $W = E/N$ (where W is perceptual goodness, E is evidence for regularity, and N is total information). In many experiments we have measured ERPs produced by abstract symmetrical and random patterns. Amplitude was always more negative at posterior electrodes from around 250 ms onwards in the symmetrical conditions. This Sustained Posterior Negativity (SPN) is a measure the brain’s ‘symmetry response’, probably generated by the extrastriate visual cortex (for review see Bertamini & Makin, 2014). Here we tested

whether the SPN a neural index of W from the Holographic model. This was confirmed in several data sets. First, we found that SPN amplitude was larger for reflection than translational symmetry. SPN amplitude also increased with the proportion of reflected elements and the number of reflection axes. Across all experiments, correlation between W and SPN amplitude was remarkably high ($r^2 = 0.93$), and W predicted SPN amplitude better than competing models. This work is a major step forward in understanding mid-level vision, where consciously experienced perceptual structure emerges.

Bertamini, M., & Makin, A.D.J. (2014). Brain Activity in Response to Visual Symmetry. *Symmetry*, 6, 975-996.

van der Helm, P.A., & Leeuwenberg, E.L.J. (1996). Goodness of visual regularities: A nontransformational approach. *Psychological Review*, 103, 429-456.

Implicit preference for curved shapes

Letizia Palumbo¹, Nicole Ruta² and Marco Bertamini¹

¹ University of Liverpool, UK

² Sapienza University of Rome

lpalumbo@liverpool.ac.uk

Curved shapes are preferred over angular shapes. Such a preference might derive from a dislike for angular shapes as the latter signal a threat (Bar & Neta, 2006; 2007). This hypothesis was tested in two experiments, which employed novel abstract shapes with different contours (angular vs. curved), but matched in all other aspects. In Experiment 1 we used a multidimensional Implicit Association Test (Gattol, Saaksjarvi, & Carbon, 2011) to verify the strength of the association of curved and angular shapes with valence (positive vs. negative words) danger (safe vs. danger words) and gender (female vs. male names). Results showed that curved shapes were associated with positive and safe concepts and with female names, whereas angular shapes were associated with negative and danger concepts and with male names. In Experiment 2 the Manikin task (De Houwer, Crombez, Baeyens, & Hermans, 2001) tested implicit approach and avoidance reactions to curved and angular shapes respectively. We found that RTs for approaching vs. avoiding angular shapes did not differ. By contrast participants were faster and more accurate when moving the manikin towards curved shapes. We conclude that curvature is per se visually appealing. The nature of such a preference needs further investigation.

Bar, M. & Neta, M. (2006). Humans prefer curved visual objects. *Psychological Science*, 17, 645-648.

Bar, M. & Neta, M. (2007). Visual elements of subjective preference modulate amygdala activation. *Neuropsychologia*, 45, 2191-2200.

De Houwer, J., Crombez, G., Baeyens, F., & Hermans, D. (2001). On the generality of the affective Simon effect. *Cognition and Emotion*, 15, 189-206.

Gattol, V., Saaksjarvi, M., & Carbon, C.C. (2011). Extending the implicit association test (IAT): assessing consumer attitudes based on multi-dimensional implicit associations. *PLoS ONE*, 6, e15849.

Transcranial direct current stimulation of the extrastriate body area modulates implicit anti-fat bias.

Valentina Cazzato^{1,2}, Stergios Makris^{1,3} and Cosimo Urgesi^{1,4}

¹ University of Udine, Italy

² University of Bradford

³ Edge Hill University

⁴ Bangor University

v.cazzato@bradford.ac.uk

Sponsor: Gillian Waters

Explicit negative attitudes and beliefs towards obese individuals are well documented¹. Several studies have shown that the Extrastriate Body Area (EBA) is critical for body aesthetic perception^{2,3}. Nevertheless, it is still unclear whether EBA serves a role in implicit weight-stereotypical bias, thus reflecting a top-down modulation in the aesthetic preference for slim than to overweight/obese bodies. Here, we used transcranial direct current stimulation (tDCS) to test the causal role of EBA in triggering implicit weight and aesthetic stereotypical associations (i.e., “ugly” with overweight and “beauty” with slim). An ad-hoc personality-IAT, which focused on body-concepts nonrelated to aesthetic representations, was developed as a control condition. Anodal, cathodal, or sham tDCS (2 mA, 10min) over the right and left EBA was administered to 12 female and 12 male participants. Results showed that cathodal stimulation over left-EBA reduced the weight-bias for the personality-IAT in male participants, as compared to anodal and sham stimulation over the same hemisphere. The effect was specific for the polarity and hemisphere of stimulation. To the opposite, female participants did not show any significant tDCS modulation in both IATs. Finding suggests that negative attitudes towards Obesity may depend on neural signals from the extrastriate visual cortex.

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The effect of dynamic information on drivers' ability to predict intentions of other road users

Yee Mun Lee¹ and Elizabeth Sheppard²

¹ University of Nottingham Malaysia Campus

² Nottingham Trent University

khyx2lyn@nottingham.edu.my

Sponsor: David Crundall

Failure in making the correct judgment about the intention of an approaching road user at a junction could lead to a collision. Previous research with photograph stimuli (Walker, 2005) suggested that when road users meet at junctions, they engage in effortful sociocognitive processing to evaluate intention from a range of behavioural cues. We investigated the impact of dynamic information on drivers' judgments of other road users' intentions for cars and motorcycles. Whether or not a signal was made were also manipulated. Twenty participants were presented with a) videoclips of drivers approaching a junction which terminated immediately before the vehicle made any manoeuvre, and b) images of the final frame of each video. They were asked to judge whether or not the vehicle would turn. Drivers were better in making judgments about the manoeuvre of approaching cars when a signal was not provided, suggesting that absence of an overt signal induces drivers to focus on other cues to intention. Dynamic information boosted performance for judgments about cars, implying that this acts as an additional cue to enhance judgment. For motorcycles performance was similar across conditions, which may imply that drivers focus on cues occurring across conditions when judging motorcyclists' intentions.

Walker, I. (2005). Signals are informative but slow down responses when drivers meet bicyclists at road junctions. *Accident; Analysis and Prevention*, 37, 1074–85.

Working memory capacity and the transfer of training benefits: searching for the Holy Grail

James Stone and John Towse
Lancaster University
j.stone@lancs.ac.uk

Working memory has been shown to be relevant to individual differences in fluid intelligence (Conway, Cowan, Bunting, Theriault, & Minkoff, 2002), and play a role in atypical cognitive development (Alloway, 2009). So the possibility that working memory capacity is trainable, and that such changes will generalize, is highly noteworthy. There are now several claims that working memory training can lead to both near and far transfer benefits, with commercial products based on the premise that working memory can be trained. However, some analyses cast doubt on training benefits (Melby-Lervag & Hulme, 2013) and there are methodological limitations in some training study designs. We present results from two working memory training studies among children, aged 9-11, that attempt to address methodological concerns and resolve interpretive questions. We find almost no evidence to suggest generalisable (far-transfer) effects of training working memory, and even 'near-transfer' effects are inconsistent. In study one participants were given a 'cocktail' of working memory based training tasks, in study two participants were given a specific regimen of training tasks. We suggest that working memory training effects may result from strategy changes more than from enduring changes in functional learning capacity.

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Melby-Lervåg M, Hulme C. (2013). Is working memory training effective? A meta-analytic review. *Developmental Psychology*, 49, 270-291.

The role of the FRN in the encoding of short-term changes in expectations

Faisal Mushtaq¹, Richard M Wilkie¹, Mark A Mon-Williams¹ and
Alexandre Schaefer²

¹ University of Leeds

² Monash University

f.mushtaq@leeds.ac.uk

Rapid updating of outcome expectancies is necessary for adaptive goal-directed behaviour. The Feedback Related Negativity (FRN) is an event-related potential (ERP) said to reflect outcome monitoring processes. We examined this components sensitivity to short-term changes expectations induced by sequential presentation of decision outcomes. A multi-trial gambling task, in which outcomes at each trial were randomised, was employed to test predictions from four theoretical models on FRN aetiology. Event-related potentials for outcomes in the current trial (t_n) were separated for outcomes from the preceding two (t_{n-1} and t_{n-2}). We found that the amplitude of this component was sensitive to Outcome at t_{n-1} in Win $_{t-0}$ but not Loss $_{t-0}$ trials. These data demonstrate that reward prediction error and outcome salience interpretations cannot account for short-term changes in expectation encoded in the FRN. Instead, in line with the FRN as a positivity signal, we show transient expectations modulate reward-related FRN in a manner consistent with affective priming. We propose that, in contexts where stable long-term predictions cannot be formed, the FRN displays increased sensitivity to affective factors. The results point to a need for a multifactorial explanation of the FRN- one that considers motivational factors in outcome processing alongside computational considerations of prediction error.

End of Meeting

The influence of level of contact experience on facial composite construction

Benny Ogidan and Robert A Johnston
University of Kent
bo72@kent.ac.uk

Own race bias (ORB) is found for the recognition of own-race compared with other-race faces. One explanation for ORB is it arises from lower levels of contact with other-race faces. Facial composites are constructed from memory by witnesses and could be vulnerable to ORB. However, composites are shown to an end-user (police officer) so a difference in race between suspect and witness may be further modified by the race of the end-user. The contact hypothesis predicts the experience a witness has with other race faces will influence the effectiveness of their composites. Pseudo-witnesses, recruited from either the UK or Nigeria, constructed composites of either Black or Caucasian faces. Subsequently, additional independent judges (all Caucasian) rated their effectiveness. For White faces the judges rated composites by white witnesses no differently from composites by Black witnesses when the witnesses originated from the UK. However, when the Black witnesses were from Nigeria their composites of white faces were judged as being less effective. For Black faces, composites produced by white witnesses were judged as poorer than composites by Black witnesses from Nigeria, but no differently from those produced by Black witnesses from the UK. The implications of ORB on composite construction is discussed.

Self-enfacement: a new procedure to test the effect of multisensory stimulation in relation to sense of ownership and agency of a face

Andrea Piovesan^{1,2}, Christophe De Bezenac², Noreen O`Sullivan² and Marco Bertamini²
¹ University of Padova
² University of Liverpool
andrea.piovesan@gmail.com

Past studies demonstrated that one's own body representation is based on the integration between sensory input. Illusions could be generated from the manipulation of these input, such in the case of the Rubber Hand Illusion (Botvinick & Cohen, 1998) and the enfacement illusion (Sforza et al., 2010). The synchronization between the different stimulations (tactile, visual and proprioceptive) is particularly important for these two illusions. The present study introduces a new paradigm (called self-enfacement) verifying if an asynchronous stimulation between sight, touch and proprioception could induce a decrease of the sense of ownership (SoO) and agency (SoA) in relation to one's own face. Secondly there is an effect's comparison of different sensory modalities. Additionally we collected measures of depersonalisation, locus of control, hallucination-proness and delusional beliefs. Results suggest that the SoO and SoA over one's own face is decreased when the visual feedback is presented with a delay of a few seconds. Secondly results suggest that an inconsistency between proprioception and sight induces a deeper decrease of the sense of ownership than the inconsistency between touch and sight. Thirdly, contrarily to expectancies, participants with depersonalisation experience seem to have stronger sense of ownership of their face independently of

the feedback.

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Sforza, A., Bufalari, I., Haggard, P., & Aglioti, S.M. (2010). My face in yours: Visuo-tactile facial stimulation influences sense of identity. *Social Neuroscience*, 5, 148-162.

Assessing three-quarter face-view utility, compared to face recognition unit formation, using a face learning experiment.

David B Etchells and Robert A Johnston
University of Kent
db4@kent.ac.uk

Evidence suggests Face Recognition Units (FRUs) are formed when two unfamiliar face-views are learned over learning one of these views, when tested on a novel view (Etchells & Johnston, 2014). However, a question arises concerning view-type utility – i.e., is it the combination of views that produces a FRU effect or is one particular view able to produce the same effect? The three-quarter (TQ) view was chosen as it provides greater visual utility by virtue of its angular/rotational proximity to most other views (Liu & Chaudhuri, 2002; Longmore, Liu & Young, 2008). The current study therefore provided unfamiliar face learning of true TQ views (singularly or both), and tested the following day on the same view or other view learned - or a completely novel view (front-view). Findings of principal interest were that those who had learned both views recognised the novel test view significantly more accurately than identities learned from only a single view - supporting previous FRU formation evidence (Etchells & Johnston, 2014). For view-type utility - findings demonstrate that single TQ view angular/rotational similarity to the novel test view (front-view) was insufficient to overcome or equal the advantage that a FRU representation provided.

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Longmore, C. A., Liu, C. H., & Young, A.W. (2008). Learning faces from photographs. *Journal of Experimental Psychology-Human Perception and Performance*, 34, 77-100.

Operator involvement and expertise effects on matching accuracy of composites to target faces.

Natalie W Gentry and Robert A Johnston
University of Kent
nwg4@kent.ac.uk

Police operators are employed to guide witnesses through the difficult task of composite construction. Social inhibition research has demonstrated that the presence of an observer whilst completing a difficult task is likely to impair task performance. Nevertheless, the usefulness of the operator may counteract negative impacts of social inhibition on composite construction. Facial composites were created by 16 pseudowitnesses with the help of either an active or passive operator. Operator experience was also manipulated to determine whether this would interact with the level of operator involvement. Eighty-three participants attempted to individually match the created composites to the corresponding target face in a line-up. Composites produced with the help of an active operator were more frequently matched to the correct target face compared with those produced with a passive operator. Composites produced with a more experienced operator were also found to be matched to the corresponding target face more often than composites produced with a less experienced operator. These findings suggest that benefits of the operator's assistance outweighs any negative impacts of social inhibition on facial composite construction. Consequently, police operators play an important role in improving the effectiveness of facial composites and thus act as a valuable resource to witnesses.

Context modulates automaticity of facial mimicry

Alexander Kirkham¹, Ralph Pawling² and Steven Tipper¹

¹ University of York

² Liverpool John Moores University

alexander.kirkham@york.ac.uk

Facial mimicry is thought to assist in relationships with others through empathy and communication. However, it is unknown if this is an automatic or contextually driven response. Participants had facial EMG responses recorded whilst viewing and categorising faces as smiling or frowning. In Study 1 participants implicitly learnt to associate 4 faces as showing consistent emotions (smiling at positive images/frowning at negative images), and 4 different faces as showing inconsistent emotions (reverse expressions to the same images). EMG results exhibited highly similar mimicry to both consistent and inconsistent faces. In Study 2 participants explicitly associated all faces as showing consistent (2a) or inconsistent (2b) emotions. EMG results in 2a showed traditional strong mimicry effects. In 2b mimicry towards frowns remained but was greatly reduced compared to 2a. No mimicry was shown toward smiles. The results show that facial mimicry is automatic unless contextual factors are explicitly clear and defined.

Will providing additional photos in passports help or hinder imposter detection?

Hannah Tummon and Robert A Johnston

University of Kent

hmt23@kent.ac.uk

At passport control fast and efficient decisions are needed, ideally detecting all imposters without wasting resources by making false challenges. Additional photographic information may facilitate these decisions yet may create noise when used unnecessarily. Time pressure is

unavoidable in a passport control scenario and could impact on the benefit additional information may hold. In this experiment participants completed a computer based task comparing video clip stills with either a standard passport photo or four photos combining neutral/smiling expression with full frontal/three-quarter views. For each trial participants reported if the person in the photo matched the person in the clip and their confidence in their decision. Participants were instructed to respond as quickly and accurately as possible (time pressure) or to take as much time as they needed before responding (no time pressure). Under time pressure participants missed fewer imposters but made more false challenges, especially when using the additional photographic information. Furthermore, participants were more confident under time pressure when imposters were missed. This suggests that under time pressure participants err on the side of caution and are therefore confident in their decisions despite making errors. Implications of these findings for passport design are discussed.

Individual differences in identifying faces: the role of anxiety and eye movements.

Scott P Jones¹, Peter J Hills², Samuel Bennett³ and Mirko Uljarevic⁴

¹ Anglia Ruskin University

² Bournemouth University

³ Stirling University

⁴ LaTrobe University

scott.jones@anglia.ac.uk

People vary in their ability to identify faces (Burton, White, & McNeil, 2010), and that factors such as anxiety and facets of personality can influence an individual's ability to accurately recognise a face (*e.g.*, Davis *et al.*, 2011; Megreya and Bindemann 2013). Two experiments examined how anxiety may influence the way in which faces are attended. In particular, how individuals with higher anxiety traits may actively avoid faces relative to those with low anxiety. Experiment 1 examined the relationship between anxiety and perception of neutral faces as positive or negative (valence). Participants were required to subjectively rate the expressions of happy, neutral, and angry faces, on a continuum, following identity matching. Consistent with previous findings mood altered the ability to identify faces, but also the perception of faces. Individuals who were more anxious perceived angry expressions to be more negative. Similarly, those who reported higher levels of depression perceived angry expressions to be more negative. A subsequent experiment investigating the relationship between anxiety and time spent attending to faces, by recording eye movements, will also be presented. Results are discussed in terms of individual differences in perceptual processing skills and mechanisms that underlie the relationship between mood and face processing.

Burton, A.M., White, D., & McNeill, A. (2010). The Glasgow Face Matching Test. *Behavior Research Methods*, 42, 286–291.

Davis, J.M., McKone, E, Dennett, H., O'Connor, K.B., O'Kearney, R., *et al.* (2011). Individual Differences in the Ability to Recognise Facial Identity Are Associated with Social Anxiety. *PLoS ONE* 6, e28800.

Megreya, A.M., & Bindemann, M. (2013). Individual differences in personality and face identification. *Journal of Cognitive Psychology*, 25, 30-37.

Biased oculomotor and pupillary responses in anxiety: an oculomotor delay response study

Piril Hepsomali¹, Matthew J Garner^{1,2}, Julie A Hadwin¹ and Simon P
Liversedge¹
¹ University of Southampton
² Clinical and Experimental Sciences, University of Southampton
p.hepsomali@soton.ac.uk

Research suggests that oculomotor and pupillary mechanisms are affected by executive and affective processing. We investigated the effect of delay durations and facial expressions on oculomotor and pupillary systems in high (HA) and low (LA) anxiety groups by using oculomotor delayed-response task. Results showed that delay duration affected effectiveness and efficiency oppositely. In long delay, anxiety affected only effectiveness. Unlike the oculomotor control system, the pupillary system responded to threat-related stimuli. However, all facial expressions elicited increased peak pupillary diameters (PPD) in HA. Besides, larger PPD were observed in long delay. Regardless of delay type, HA showed increased PPD. Results suggest that efficiency and effectiveness are affected by fixate-move competition such that shorter fixation activity resulting in earlier move activity caused fewer errors whereas less temporal preparation associated with that increased latencies and vice versa. Also, increased PPD for highly-arousing threat-related stimuli supports the association between arousal and increased sympathetic activity resulting in increased pupil diameters. Increased input from amygdala resulted from amygdala-prefrontal cortex imbalance in HA increased PPD, as amygdala activity is associated with increased pupillary responses. Additionally, bigger PPD in HA in long and short delay trials indicates increased compensatory effort for task demands regardless of task difficulty.

Fixation instruction influences gaze cueing

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

Studies have shown that perceiving another person's gaze shift facilitates responses in the direction of the cue. While it is often assumed that participants in these experiments maintain fixation on the cue during the cueing interval, eye gaze is not always recorded to confirm this. Here, we present data suggesting that control of fixation is important. Eye movements of three groups of participants were recorded while they responded to peripheral targets in the presence of a gaze cue in the centre of the screen. Two groups of participants were instructed to maintain fixation on the cue during the cueing interval and to respond either by making an eye movement to the target or by pressing the corresponding button. A third group was not given a fixation instruction, but instead was free to look around while manually responding to the targets. Participants whose fixation was controlled showed cueing effects that reduced with the interval between cue and target onset. The

third group showed positive cueing effects at the shorter interval and negative cueing effects at the longer interval. Further analysis suggests that cueing depends on where participants look at target onset and during the cueing interval.

Eye movements and parafoveal processing in children with and without dyslexia

Rhiannon S. Barrington, Abby E Laishley, Lucy C Worf and Julie A Kirkby
Bournemouth University
rbarrington@bournemouth.ac.uk

A key characteristic of skilled adult reading is the ability to process words prior to directly fixating them. Well documented preview benefit effects indicate that both letter identity and letter order facilitate early stages of visual word recognition for orthographically related previews. We understand virtually nothing about children's parafoveal preprocessing let alone in children with dyslexia. In this study we used the boundary paradigm. The initial 2 letters of the target word were manipulated, parafoveal previews were either (1) identical to the target, (2) a transposed-letter neighbour, or (3) a substituted-letter nonword. We monitored the eye movements of three participant groups – children with developmental dyslexia, typically developing children matched for chronological age and typically developing children matched for reading age. The patterns of results indicate that child readers do gain a significant preview benefit. Moreover, we found a significant benefit when the preview contained the transposed letters of the target word compared to substituted initial letters. These findings held for all reading ability groups. Taken together, these results establish that children do gain useful information from the parafovea, and further demonstrates that, similar to adult skilled readers, child readers, with and without dyslexia, show a transposed letter effect.

Eye movements during reading and skimming of medically related text: the role of prior knowledge

Marina Soltan, Sarah J White, Stefan T Weger, Kayleigh L Warrington, Victoria A McGowan and Kevin B Paterson
University of Leicester
ms623@student.le.ac.uk

A recent study indicated that reading goals may modulate the integration of words into sentence context (White, Warrington, McGowan, & Paterson, 2014). The present study further tested whether reading goals modulate integration of the text with prior knowledge. Eye movement behaviour during reading for comprehension and skim-reading (i.e. superficial reading) were compared for participants with prior knowledge (4th year medical students) and with limited prior knowledge (new 1st year medical students) of the text content. Experiment 1 employed simple medically related sentences, for which the content was largely familiar to both groups of participants. Experiment 2 employed more complex medically related sentences, for which the content was familiar only to the 4th year students. The results indicate that skim-reading occurs regardless of whether the reader has prior knowledge of the material. Experiment 2 additionally manipulated the veracity of the sentence content. For the readers with prior knowledge (4th years) the effects of veracity further indicate that linguistic information may be integrated with prior knowledge to a

greater extent during reading for comprehension than skimming. The implications for how reading goals may modulate the role and nature of the integration of prior knowledge during sentence processing are discussed.

White, S. J., Warrington, K. L., McGowan, V. A., & Paterson, K. B. (in press). Eye movements during reading and topic scanning: Effects of word frequency. *Journal of Experimental Psychology: Human Perception and Performance*.

Exploring the relationship between inattention and working memory in adults.

Rebecca Nicole Elisa and Benjamin Parris
Bournemouth University
relisa@bournemouth.ac.uk

Attention deficit hyperactivity disorder (ADHD) is a childhood-onset neurodevelopmental disorder with three core symptoms: inattention, hyperactivity and impulsivity. It has recently been acknowledged that problems frequently extend into adulthood, with the symptom of inattention being the most pervasive. Executive function deficits have been linked to ADHD, but it has been suggested that the symptom of inattention specifically is related to problems with working memory (WM; Diamond, 2005). ADHD is now commonly viewed as dimensional, meaning that it is interesting to explore its manifestation in non-clinical samples. Using the Connors Adult ADHD rating scale (CAARS), 95 adults aged 18-35 were assessed for ADHD symptoms, and completed tests designed to tap different aspects of WM. Results showed that a high inattention score predicted poorer performance on some WM measures; but this was not consistent across all tasks. Importantly, scores for hyperactivity and impulsivity were not found to be related to WM performance, suggesting that WM deficits may be specific to inattention. These results suggest that even non-clinical levels of inattention in adults are related to problems with WM. Results are discussed with reference to which aspects of WM may and may not be related to inattention, and why.

Diamond, A. (2005). Attention-deficit disorder (attention-deficit/ hyperactivity disorder without hyperactivity): a neurobiologically and behaviorally distinct disorder from attention-deficit/hyperactivity disorder (with hyperactivity). *Developmental Psychopathology*, 17, 807-825.

Odorant verbalisability influences strategy refinement in olfactory working memory.

Andrew Moss, Andrew Johnson and Christopher Miles
Bournemouth University
mossa@bournemouth.ac.uk
Sponsor: Peter Hills

Whilst the existence of an olfactory working memory (OWM) slave system is supported by effects of cross-modal dual tasking (Andrade & Donaldson, 2007), there is evidence that, dependent on availability, olfactory memory utilises both verbal and perceptual codes (Zelano, Khan, Sobel, & Montag, 2009). N-back tasks (modelled upon Jönsson, Møller, & Olsson, 2011) were used to

examine OWM ability, using odours that elicit high or low verbal association. Stimuli were presented to participants sequentially, and required a binary forced-choice memory judgment in respect to whether the current odour matched the stimulus two items previous. Using identical stimuli, a second n-back task allowed investigation of any strategy shifts that may occur. Above chance performance for the low verbal group indicates that OWM can operate independently of verbal re-coding. However, superior memory for odours with high verbal associations suggests that verbal recoding can facilitate OWM. This facilitative effect of verbalisation was only found in the second session; equal performance in the first sequence suggests poor or non-existent verbal coding, which was refined for later exposures. Implications for an odour representation that does not utilise a verbal code, and further research involving articulatory suppression and executive loads, are discussed.

Andrade, J., & Donaldson, L. (2007). Evidence for an olfactory store in working memory? *Psychologia*, 50, 76-89.

Jönsson, F., Møller, P., & Olsson, M. (2011). Olfactory working memory: effects of verbalization on the 2-back task. *Memory & Cognition*, 39, 1023-1032.

Zelano, C., Khan, R., Sobel, N., & Montag, J. (2009). A specialized odor memory buffer in primary olfactory cortex. *PLoS ONE*, 4, e4965.

The search for counterexamples and alternative models on spatial transitive inference tasks

Sylvie Serpell, Simon Handley and Steve Newstead
Plymouth University
sylvie.serpell@plymouth.ac.uk

The materials used by Knauff, Rauh and Schlieder (1995) were adapted to develop a novel methodology using spatial transitive inference tasks, to explore whether the lack of evidence to support the search for counterexamples or alternative models in a previous experiment on syllogistic reasoning, was due to problem complexity or reasoners accepting a conclusion that was good enough rather than seeking to find the optimum conclusion. Endorsement rate data was collected on reasoning tasks where participants were required to make judgements about necessity or possibility. The ability of people to differentiate between judgements of necessity and possibility was demonstrated by more endorsements of problems with a possible conclusion than a necessary conclusion. Evidence that people search for counterexamples and alternative models was demonstrated in two ways. Under necessity instructions there were fewer endorsements of PS problems than Necessary problems, and under possibility instructions there were more endorsements of PW problems than Impossible problems. The results suggest that although people are able to search for counterexamples and alternatives, this may be task dependant.

Knauff, M., Rauh, R., & Schlieder, C. (1995). *Preferred Mental Models in Qualitative Spatial Reasoning: A Cognitive Assessment of Allen's Calculus*. Paper presented at the Proceedings of the Seventeenth Annual Conference of the Cognitive Society.

Pattern separating improves with time to consolidate

Amy Smith, Denis McKeown and David Bunce
University of Leeds
ps12avs@leeds.ac.uk

Evidence has emerged suggesting that increased false recognition observed, in older adults, is because they view novel images as though they have previously seen them, thought to reflect a failure in stimulus pattern separation. Here in Leeds, we are using a simple visual continuous recognition task, which can identify failures in pattern separation. In the task pictures of everyday items are presented in sequence and observers report for each whether it is novel (new), previously viewed (old), or whether it shares features with a previously viewed item (similar). It has been reported, that in comparison to young adults, older adults show decreased pattern separation when the number of intervening items between "old" and "similar" items is increased, thought to reflect retroactive interference in memory. Here we manipulated both the inter-item spacing, as well as the number of intervening items between successive items in the continuous recognition task. Importantly, participants' ability to accurately identify similar and repeated items was most dependent on prolonged temporal intervals allowing consolidation of prior items. These findings are discussed in terms of the consolidation processes in visual short term memory.

Aesthetic preference for dynamic abstract configurations

Damien Wright and Marco Bertamini
University of Liverpool
damien.wright@liverpool.ac.uk

Previous research has demonstrated that we have a preference for static abstract stimuli and art (Makin, Pecchinenda & Bertamini, 2012; Jacobsen & Hofel, 2002). However dynamic stimuli such as motion pictures and kinetic art can induce an emotional response just as strongly as static art forms. Despite this, very little research has been conducted on our aesthetic preference to abstract dynamic stimuli. We conducted a series of experiments to begin this exploration. Participants were presented with highly salient symmetrical and random configurations, which they had to provide explicit aesthetic judgments for. Each element of the pattern had local rotation along with the whole pattern having a global transformation (expansion, rotation, shear or translation). It was found that participants consistently showed a preference for symmetrical patterns over random patterns. Secondly, moving symmetrical patterns were more preferred than static symmetrical patterns. Thirdly, expansion was the most preferred of the dynamic transformations. We conclude that preference for symmetry is an overriding feature even for dynamic stimuli.

Jacobsen, T., & Hofel, L.E.A. (2002). Aesthetic judgments of novel graphic patterns: analyses of individual judgments. *Perceptual and motor skills*, 95, 755-766.

Makin, A. D. J., Pecchinenda, A., & Bertamini, M. (2012). Implicit affective evaluation of visual symmetry. *Emotion*, 12, 1021.

Preference for relations in categorisation depends on stimulus size

Sabrina Golonka
Leeds Beckett University
s.golonka@leedsbeckett.ac.uk

Previous research suggests that higher order structural relations drive similarity judgments and categorisation behaviours. This has been interpreted as support for a general cognitive mechanism favouring structural relations over attributes. The purpose of this experiment was to test whether previous results showing a preference for relational matches in similarity and categorisation tasks can actually be explained by stimulus-specific perceptual effects. Construal level - whether we attend holistic properties like shape, or fine-grained object details – depends on contextual factors like image size and contrast, which direct attention to different classes of object / concept properties. Participants in this experiment were asked to choose which of two options went best with a target to form a category. All stimuli were simple geometric shapes. One response option was a relational match to the target (same colour) and the other response option was an attribute match to the target (same relation between components). Stimulus size and visual contrast were manipulated across conditions. Results show that people form categories around relational matches when stimuli are small, but attribute matches are more prevalent when stimuli are large. These results highlight the importance of excluding perception-driven effects in cognitive experiments.

The effects of musical activity on emotional wellbeing

Nina Fisher, Reiner Heinrich Sprengelmayer and Ines Jentzsch
University of St Andrews
nkf@st-andrews.ac.uk

It is not clear why music has evolved. Much research has attempted to understand the possible link between music playing and listening, and cognitive abilities, though generally the findings are mixed. Various studies claim that the main goal of musical experiences is to affect emotion. This study therefore researches the possible emotional advantages that can be gleaned from musical experience. Difficulties in emotion recognition and regulation are thought to negatively influence the development and maintenance of psychopathology. Furthermore, research has demonstrated an age related decline in emotion recognition, and deficits in emotion perception have been found in individuals with frontotemporal dementia. In this study we test musicians and non-musicians on a large battery of computerized, as well as paper-and-pencil, visual and auditory, emotion recognition and regulation tasks. Our results suggest that individuals with high levels of musical training have selective advantages in some aspects of emotion recognition. This research therefore suggests that musical training may improve some aspects of emotion recognition, and could therefore act as a protective effect against ageing, and the development and maintenance of psychological illness. Further research investigating possible underlying mechanisms and investigation into the potential specificity of this advantage to musical training is necessary.

Creative conceptual expansion: An ERP study comparing high and low creative groups

Anna Abraham¹ and Barbara Rutter²

¹ Leeds Beckett University

² Justus Liebig University of Giessen

a.g.abraham@leedsbeckett.ac.uk

Conceptual expansion is a vital aspect of creative cognition and refers to our ability to widen the semantic boundaries of acquired knowledge. This cognitive operation is especially critical in the formulation of creative ideas as thinking in an original yet appropriate manner necessitates forming a novel and fitting association between two previously unrelated concepts. A recent ERP study (Rutter et al., 2012, *Brain and Cognition*, 80, 301-310) demonstrated that processing information that evoked conceptual expansion (novel metaphoric expressions) as opposed to mere novelty (nonsense expressions) or appropriateness (literal expressions) led to a differential modulation of the N400 and late positivity ERP components. How both these ERP components, which index cognitive operations of semantic selection, retrieval and integration, are modulated by individual differences in creative ability when performing the same metaphor processing task was investigated in the present study. Individuals were classified as belonging to high or low ability groups based on their originality scores on the alternate uses task. The previous findings on the modulation of the N400 and the late component as a function of the type of expression (creative, nonsense, or literal) were replicated. Moreover, the comparison of the high and low creative groups revealed group-based effects on the late ERP component, but not the N400. The high creative group exhibited a more positive late component than the low creative group showing a pattern that suggested that they were better able to integrate the creative associations that were presented to a similar extent as the literal expressions within their semantic networks. The findings are discussed from the perspective of the different functional roles that have been attributed to these ERP components which are held to index key operations of semantic cognition.

Intraindividual variability and gait speed in healthy older adults

Jack Graveson, Denis McKeown, Sarah Bauermeister and David Bunce

University of Leeds

ps10jg@leeds.ac.uk

Gait problems in the elderly are an issue of pressing health importance that have been linked to, for example, reduced mobility and loss of independence as well as increased morbidity and mortality. And age-related declines in cognitive abilities, particularly executive function (EF), have been associated with an impaired gait – both of which may share the same frontal circuitry. This study examined measures of intraindividual reaction-time variability (IIV), which is thought to reflect EF, and their ability to predict gait speed in a sample of 65 healthy older adults (mean age 69.6, 82 per cent female). The IIV measures were computed for five cognitive tasks of varying difficulty (from simple RT tasks to more complex tasks involving response inhibition) whereas gait speed was assessed with three 4m trials at the participant's usual pace. Linear regression analyses showed that IIV was associated with gait speed, but only for the more demanding cognitive tasks.

Mediation analyses showed that a high proportion of the variance explained by IIV was removed when measures of processing speed were controlled for. Together these findings suggest that IIV is a strong predictor of gait disturbances under attentionally demanding conditions, and that this may be related to psychomotor speed.

Transfer of learning is a function of the task dynamic

Andrew D Wilson¹, Winona Snapp-Childs² and Geoffrey P Bingham²

¹Leeds Beckett University

²Indiana University

a.d.wilson@leedsbeckett.ac.uk

Sponsor: Kevin Paterson

Learning will sometimes transfer from the trained to an untrained version of a task, but if and when transfer will occur is notoriously hard to predict. We generated predictions about transfer of learning in a coordinated rhythmic movement task on the basis of a model which describes the organisation and composition of the complete perception-action dynamic and which identifies the critical role of access to the information for relative phase in structuring performance and learning. We then trained two groups to produce 90° mean relative phase either unimanually or bimanually and tested learning (improvement at the trained task and improved visual discrimination of 90°) and transfer of learning (to the untrained coordination task). The model predicts transfer between the movement tasks due to and in proportion to improvements in visual discrimination. Both groups learned their task and improved equally in their ability to visually discriminate 90°. This learning transferred to the untrained condition and when scaled by the relative intrinsic stability of each task, transfer levels were also found to be equal. Transfer was structured by the relationship between the perception-action dynamics of the tasks and model of these dynamics are required to predict and explain transfer of learning.

Detection Response Task (DRT): manipulating cognitive and manual difficulty of secondary tasks during driving

George Kountouriotis, Andrew Tomlinson, Oliver Carsten, and Natasha Merat

Institute for Transport Studies, University of Leeds

g.kountouriotis@leeds.ac.uk

Sponsor: Richard M Wilkie

There is an increase in the use of mobile technologies and implementation of warning and advisory systems in vehicles. However, naturalistic driving studies¹ demonstrate a clear link between crashes/near-misses and such distractions. The Detection Response Task (DRT) is being considered by a working group of the International Organisation for Standardization (ISO) to assess the driver workload imposed during interaction with such devices by measuring drivers' reaction times to stimuli. Typical examples of secondary tasks include the n-back task and the visual-manual Surrogate Reference Task (SuRT²). In this experiment we manipulated both the cognitive/visual as well as the manual difficulty of two secondary tasks. To this end, the n-back task was used as in

previous studies, but we developed a new version of a visuo-manual task which could be controlled both in terms of cognitive difficulty (visual search) and – crucially – manual effort (“no”, “easy”, and “difficult” manual response). Results show that whilst the head-mounted DRT was able to distinguish between levels of the n-back task, it did not differentiate between manual effort required for the new task. However, the introduction of any manual aspect was detrimental on DRT response times. These results are also discussed in terms of driving performance.

Klauer, S.G., Dingus, T.A., Neale, V.L., Sudweeks, J.D., and Ramsey, D.J. (2006). *The Impact on Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data* (Report No. DOT HS 810 594). Washington, DC: National Highway Traffic Safety Administration.

Mattes, S. (2003). The lane change task as a tool for driver distraction evaluation. In H. Strasser, H. Rausch, & H. Bubb (Eds.), *Quality of work and products in enterprises of the future* (pp. 57–60). Stuttgart: Ergonomia Verlag.

The relationship between N2, response inhibition and response conflict: the importance of task complexity

Gizem Arabaci¹, Peter Hills² and Peter Bright¹

¹ Anglia Ruskin University

² Bournemouth University

arabaci.gizem@gmail.com

The ERP N2 has been assumed to reflect response inhibition (Ericksen & Ericksen, 1974) and response conflict (Yeung et al., 2004) depending on the task used to investigate it. The question of which process of executive control is mainly responsible for N2 amplitude remains controversial. The present study investigated the role of task complexity on N2 and its relation to response conflict and response inhibition. A matching task was created with different levels of complexity: Stimuli could be matched on one, two or three single features or on all features, thereby increasing the number of potential conflicting responses. Inhibition was induced by manipulating the proportion of the all-match stimuli presented. Results revealed: Greater N2 negativity in conflict conditions than inhibition conditions; reduced N2 for frequent stimuli in the inhibition version of the task relative to the rare stimuli and conflict conditions; N2 negativity also increased as the task became more complex. These data indicate that when simple tasks (with one type of stimuli in each trial) are involved, N2 represents response inhibition, but when the task is more complicated (involving more responses), N2 represents response conflict.

Eriksen, B.A., & Eriksen, C.W. (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Perception & Psychophysics*, 16, 143-149.

Yeung, N., Botvinick, M.M., & Cohen, J.D. (2004). The neural basis of error detection: conflict monitoring and the error-related negativity. *Psychological Review*, 111, 931-959.

NOTES

NOTES

Accommodation

There is a very limited number of en-suite rooms available on campus at a cost of £45.00 per person per night, including breakfast. These will be allocated on a first come/first served basis. Please check availability before sending through your payment.

Please book via the accommodation form by 27th March 2015.

Leeds has a great range of reasonably priced hotels within the city centre, including:

- **Express by Holiday Inn**
Cavendish Street, Leeds LS3 1LY
Tel: 0871 902 1616
Website: www.expressleeds.co.uk
Approximately £110.00 for 2 nights, including breakfast
- **IBIS Leeds Centre**
Marlborough Street 23, Leeds LS1 4PB
Tel: 0113 396 9000
Website: www.ibis.com/1/leeds
Approximately £60.00 for 2 nights, breakfast not included
- **Discovery Inn, Leeds**
15 Bishopgate Street, Leeds LS1 5DY
Tel: 0113 242 2555
Website: www.discovery-inn-leeds.co.uk
Approximately £80.00 for 2 nights, breakfast not included

Other local hotels include:

- **Queens Hotel**
City Square, Leeds LS1 1PJ
Tel: 0113 243 1323
Website: www.qhotels.co.uk/queens_hotel_leeds
Approximately £140.00 for 2 nights, breakfast not included
- **Radisson Blu (The Light)**
1 The Light, The Headrow, Leeds LS1 8TL
Tel: 0113 236 6000
Website: www.radissonblu.co.uk/leeds
Approximately £208.00 for 2 nights, breakfast not included
- **Leeds Marriott**
4 Trevelyan Square, Boar Lane, Leeds LS1 6ET
Tel: 0113 236 6366
Website: <http://www.marriott.com/hotels/travel/lbadt-leeds-marriott-hotel/>
Approximately £218.00 for 2 nights, breakfast not included
- **The Cosmopolitan**
Lower Briggate, Leeds LS1 4AE
Tel: 0113 243 6454

Local information

Website: <http://www.peelhotels.co.uk/hotels/cosmopolitan-hotel-leeds-yorkshire-england/>
Approximately £118.00 for 2 nights, breakfast not included

Try 'Welcome to Visit Leeds' www.visitleeds.co.uk (0113 242 5242) for more information.
Also dedicated hotel booking websites, e.g. <http://www.hotels.com>

Conference Dinner

The conference dinner will be held at 8pm at Restaurant Bar & Grill which is just a 15 minute walk from campus. The restaurant is located in the landmark Old Post Office, 3 City Square, Leeds, LS1 2AN. Tel: 0113 244 9625. A booking form is enclosed.

The cost will be £30.00 for 3 courses, but not including wine, water or gratuity. EPS members please reserve your place on the enclosed form which should be returned to Dr Anna Weighall, School of Psychology, University of Leeds, Leeds, LS2 9JT before 30th March 2014.
Email: a.r.weighall@leeds.ac.uk

Travel

The University campus is within walking distance of most city centre hotels via the Town Hall and up Calverley Street to the University campus or alternatively via Woodhouse Lane to the main entrance.

By Air: Leeds is served by two major airports: Leeds Bradford International Airport and Manchester International Airport. Leeds Bradford airport is approximately 7 miles from the University of Leeds.

By Rail: There are direct rail links between Leeds and many of the UK's major cities, e.g. London, Manchester, Manchester Airport, Newcastle, Birmingham and Hull.

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

Bus travel to and within Leeds: The National Express bus terminal is in the heart of the City Centre (approximately 30 minute walk from campus). This coach service connects extensively throughout the UK. The Leeds central bus station is adjacent to the terminal and allows easy access to the University of Leeds. There are frequent buses from the central bus station including numbers 6, 28, 56, 96, 97. You should get off the bus at the main entrance adjacent to the Parkinson Building.

The number one bus leaves from Infirmary Street, near the city railway station in City Square, to the campus every 10 minutes during the day and every ½ hour in the evening.

There is a 50p flat fare City bus service running every few minutes Monday to Saturday, linking the railway station, city centre and the South end of campus (06:30 to 19:30 only).

Coach and local bus information can be found at the following websites: <http://www.wymetro.com/> and <http://www.nationalexpress.com/home.aspx>

From the train, bus or coach station, it takes about 10-20 minutes to walk to the University.

More Information: Further details about the University and travel can be found at:

www.meetinleeds.co.uk/getting_to_the_university.php

A city centre map is available: <http://www.leeds.ac.uk/icsrim/links/map-leeds-city-centre.pdf>

By Car: The University of Leeds campus is approximately ½ mile from the city centre on Woodhouse Lane, the A660. Leeds is linked to the M1 and M62 and is easily accessible.

Satellite Navigation, main entrance address: University of Leeds, Woodhouse Lane, Leeds, LS2 9JT (street listing can appear as Cavendish Road in some navigation systems).

Parking: Where possible we suggest the use of public transport to travel to the University. Parking is extremely limited, available on a first come, first served basis and chargeable at £5.00 per day. Access to the car park is available via the main University entrance on Woodhouse Lane (postcode LS2 9JT). All other University vehicle entrances are limited to permit holders only.

The closest public car park in Woodhouse Moor multi-storey open 24 hours a day.

For more information, pricing and alternative parking locations please visit: www.parkopedia.co.uk

Local Taxis: ‘Black and White’ taxis can be hailed in the street. Private hire cars must be pre-booked:

Streamline – 0113 244 3322

Amber Cars – 0113 231 1366

Arrow – 0113 258 5888 (Arrow are the official Leeds

Eating and Drinking on Campus

The University of Leeds has 12 cafes and coffee bars on campus, each selling a wide range of snacks, sandwiches and drinks.

Baines Wing Café, Café Maia at Ziff and Parkinson Court Café are the most conveniently located to the conference location.

For more information regarding food and coffee outlets on campus please visit: <http://gfal.leeds.ac.uk>

The main University refectory housed in Leeds University Union (map reference number 32) serves hot and cold food throughout the day.

Leeds University Union additionally houses a number of shops, bars, eateries and ‘Essentials’ which is a mini-supermarket selling newspapers, magazines, stationery, drinks, sandwiches, snacks and confectionery items.

Restaurants

There are some wonderful restaurants in Leeds.

- Ambiente. 36-38 The Calls, Leeds, LS2 7EW. Much lauded tapas.
- Bundobust. 6 Mill Hill, Leeds, LS1 5DQ. Mixing up vegetarian Indian street food with the best in craft beer.
- Whitelock’s. Turk’s Head Yard, Briggate, Leeds, LS1 6HB. One of the best pubs in the city, offering the best in local craft beers and a menu full of modern British classics
- Trinity Kitchen. More than 30 cafés, bars and restaurants are located in Leeds Trinity. Trinity Kitchen has quirky pop-up restaurants as well as a variety of world cuisine.
- Thai Edge. 7 Calverley Street, Leeds. Modern Thai Cuisine

Pubs

There is a growing craft beer culture in Leeds. Within 100 metres of Leeds station are more than 10 superb bars. Particularly recommended are:

- North Bar, 24 New Briggate, Leeds LS1 6NU
- Friends of Ham. 4 New Station St, Leeds LS1 5DL
- Arcadia. 34 Arndale Centre, Headingley
- Tapped Leeds. 51 Boar Lane, Leeds, LS1 5EL
- The Faversham. 1-5 Springfield Mount, Leeds, LS2 9NG

Cafes/Lunch

The University of Leeds has 12 cafes located on campus, each selling a wide range of light snacks, sandwiches and drinks.

All cafés sell Fairtrade or Rainforest Alliance Tea and Coffee and most are open all year round.

Local information

Near to the meeting venue are The Refectory and the Hidden Cafe, located in the Student Union building, and Café Maia in the Ziff building.

Alternatively there are a number of cafes, bakeries and coffee shops in the vicinity of the university.

Opposite: 26 Blenheim Terrace.

Bakery164: 164 Woodhouse lane

Coffee Rand: 28 Blenheim Terrace

Miro: 29 Blenheim Terrace

Local attractions

The Royal Armouries – Home to Britain’s national collection of arms and armour, including Henry VIII and Lord of the Rings swords

Kirkstall Abbey – One of the most complete examples of a medieval 12th century Cistercian abbey in Britain

Thackray Medical Museum – Tells the story of medicine through the ages from within a former hospital

Leeds Kirkgate Market - largest covered market in Europe an dates back to 1875, hosts first Marks and Spencer

Internationally renowned The Henry Moore Institute and Leeds Art Gallery, located in the heart of the Yorkshire Sculpture Triangle

The Tetley – Contemporary art and learning located in art deco headquarters of the former Tetley Brewery

Harewood House – 18th century, 100 acres of exquisite gardens, Royal owned estate

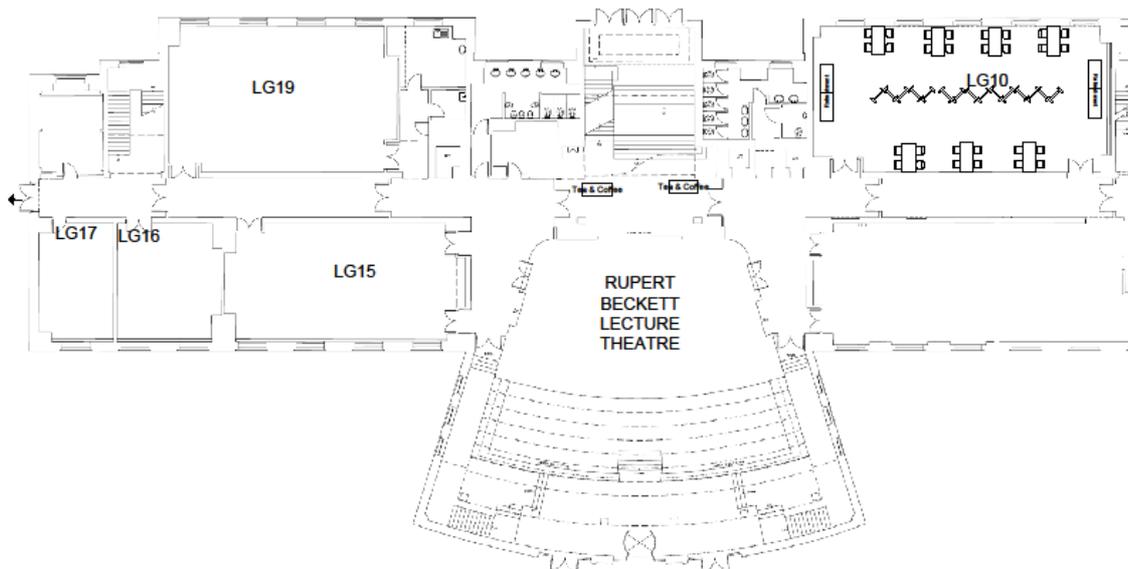
Leeds City Museum – 1862 build by Cuthbert Broderick who also designed the city’s Town Hall and the Corn Exchange

Leeds and Liverpool canal – longest canal in Britain taking 46 years to construct and completed in 1816

For information on restaurants and events happening in Leeds please visit: <http://leeds-list.com>

Rooms in the Michael Sadler Building

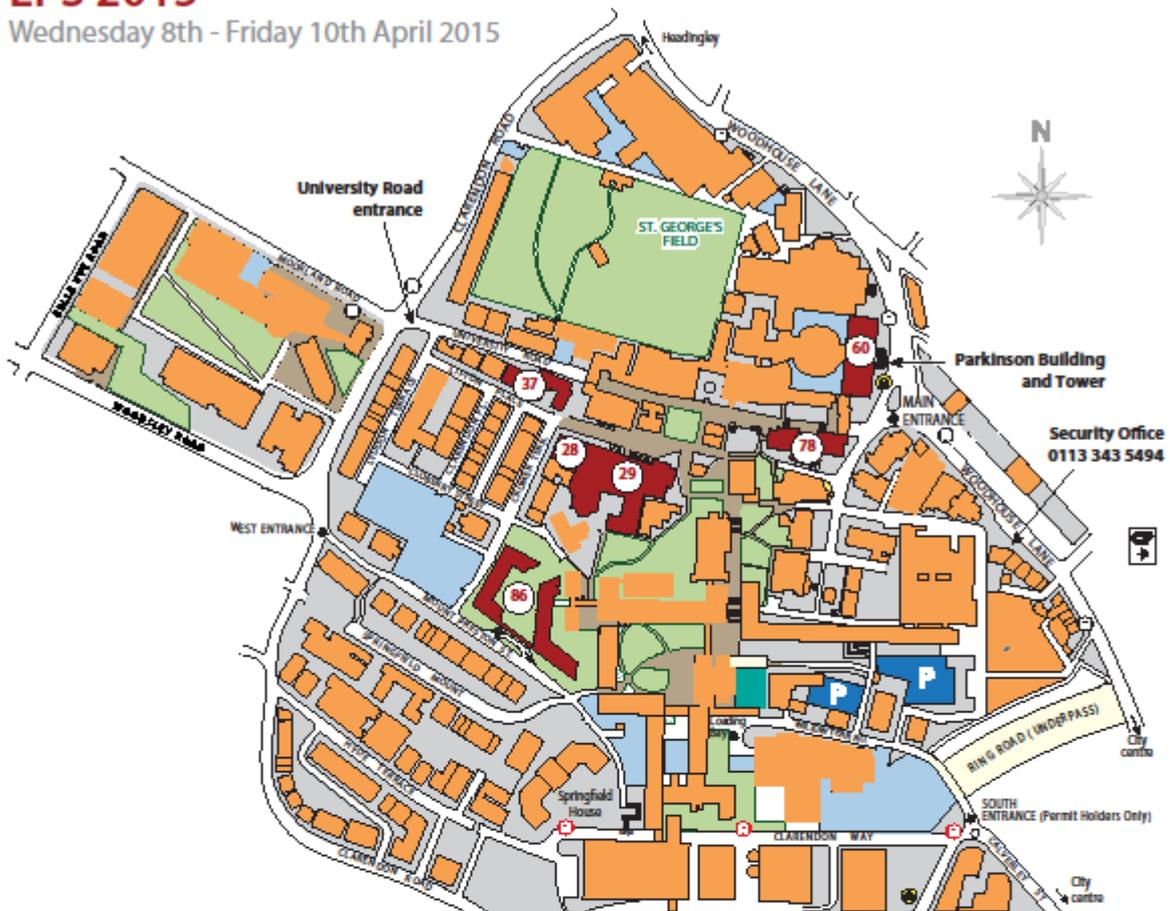
Michael Sadler Building – Lower Ground Floor



ROUGH SCALE ONLY

EPS 2015

Wednesday 8th - Friday 10th April 2015



Key

Venues

- Michael Sadler Building** (78)
- Psychology Building** (37)
- Leeds University Union/Refectory** (29)
- Storm Jameson** (86)
- University House** (28)
- Parkinson Building** (60)

Car parks

- University visitors' car parks (limited access) (Blue square with 'P')
- Other university car parks (Light blue square)
- Public multi-storey car park (Black square with 'P')

Other useful information

- CityBus Stop (Red square with bus icon)
- Taxi Rank (Yellow circle with taxi icon)
- Pedestrian Only Area (Brown square)
- Lawns (Green square)
- Bus Stop (Black circle with bus icon)



**BOOKING FORM FOR
APRIL MEETING 8-10 APRIL, 2015
CONFERENCE DINNER**



The dinner is Wednesday 8th April at 8:00pm, at Restaurant Bar & Grill, 3 City Square, Leeds, LS1 2AN. Tel: 0113 244 9625. The cost will be £30:00 per person (plus supplement of £1.50 if steak is chosen) for 3 course meal.

Postgraduates may attend the dinner for a subsidised cost of £15.00. In this instance the Booking form must be accompanied by a statement from an EPS member confirming Postgraduate status.

Name.....	Please Tick
Starter	
Mushrooms on toast with garlic cream and chives (v)	
Chilli squid, Thai herbs, noodle salad	
Potted beef & bacon, piccalilli, sourdough toast	
Main	
Crispy duck, honey roast apples	
Mushroom risotto, cheese wafer, truffle oil (v)	
Sirloin steak (225g), Béarnaise sauce (a £1.50 supplement will apply)	
Salmon fishcakes, spinach, lemon & dill butter sauce	
<i>All dishes served with savoy cabbage & broccoli, house cut chips (v)</i>	
Dessert	
Vanilla crème brûlée, lemon shortbread (v)	
Bramley apple pie, vanilla custard	
Selection of homemade ice creams (v) (n)	

Please return this form, with your cheque (made payable to University of Leeds) to:
Dr Anna Weighall, School of Psychology, University of Leeds, Leeds, LS2 9JT by **Friday 30 March 2015.**
Email: a.r.weighall@leeds.ac.uk

**BOOKING FORM FOR CONFERENCE ACCOMMODATION
APRIL MEETING 8-10 APRIL, 2015**



Limited accommodation has been reserved for the nights of 08-10 April on campus at Storm Jameson Court, Leeds University.

There are 11 en-suite rooms available at a cost of £45.00 per person per night, including breakfast. These will be allocated on a first come/first served basis. Please check availability before sending through your payment.

Name	
Address line 1	
Address line 2	
Address line 3	
Postcode	
Telephone number	
Email address	

Accommodation	No of Rooms Required	Total
Wednesday 8 th April 2015		£
Thursday 9 th April 2015		£
TOTAL		£

Please return this form, with your cheque (made payable to University of Leeds) to:

Dr Pam Blundell, School of Psychology, University of Leeds, Leeds, LS2 9JT

Email: p.blundell@leeds.ac.uk

**BOOKING FORMS MUST BE RETURNED, TOGETHER WITH FULL PAYMENT BY:
FRIDAY 27th MARCH**

*The Thirteenth EPS
Mid-Career Prize*



will be delivered by

Professor Martin Pickering

Department of Psychology,
University of Edinburgh.

Producing and comprehending language in
monologue and dialogue



6.00pm, Thursday 9th April 2015

Rupert Beckett Lecture Theatre,
Michael Sadler Building,
University of Leeds.

The lecture will be open to the public

EPSExperimental
Psychology
Society

Membership Proposal Form

*Please use BLACK ink***Name:****Title:****Age:**

Full current professional address

	Email
	Telephone

Degrees:

Date

Degree

Class

University

--	--	--	--

Experience:

Dates

Post

--	--

Current research interests

--

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

--

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

--

Signature of applicant

Date

--	--

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

Proposer
SignatureSeconder
Signature

Print Name

Print Name

NOMINATIONS

Nominations for new members should be made using the form on the preceding page.

Entries should be made in clear black type, using one side of the form only.
All information should be included on the form, not on additional sheets.

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

Applicants must be nominated by two EPS members.

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

CRITERIA AND PROCEDURES

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

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

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

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



EXPERIMENTAL PSYCHOLOGY SOCIETY

April Meeting, 08-10 April 2015

The programme for the April meeting is enclosed with this mailing.

Conference dinner:

Booking forms are enclosed for the conference dinner at Restaurant, Bar & Grill at 3 City Square, Leeds on Wednesday 8 April at 8:00 pm. Please return the booking forms for the meal with payment to Dr Anna Weighall by Monday 30th March 2015. Some places at the dinner are available to postgraduate students at half-price: bookings for these must be accompanied by a letter from an EPS member confirming the student's status.

Accommodation at Leeds University:

Booking forms are also enclosed for the 11 en-suite rooms available on campus. Please return the booking forms for the campus accommodation with payment to Dr Pam Blundell by Friday 27th March.

The programme also includes:

Wednesday 8th April 5:00pm EPS 4th Frith Prize Lecture:

The neural mechanisms of relief: the role of safety signals in avoidance learning
(Dr Anushka Fernando)

Wednesday 8th April 2:00pm Symposium:

Right hemisphere contributions in language and semantics
(Dr Ekaterini Klepousniotou)

Thursday 9th April 9:00am Symposium:

Timescales of word learning: from immediate to long term representations across development
(Dr Anna Weighall)

Thursday 9th April 2:00pm Symposium:

Contact points between language production and comprehension
(Dr Robert Hartsuiker)
to accompany Professor Martin Pickering's Mid-Career Award Lecture.

Thursday 9 April 6:00pm EPS 13th Mid-Career Award Lecture:

Producing and comprehending language in monologue and dialogue
(Professor Martin Pickering)

Lincoln Meeting, 8-10 July 2015

The website for submissions to this meeting will open week commencing 13th April 2015.

The meeting will include the 22nd EPS Prize Lecture by Professor Manos Tsakiris entitled *The multisensory basis of the self: from body to identity to others* plus an accompanying symposium organised by Katerina Fotopoulou: *The Self Reloaded: From Body Parts to Social Identity*.

There will also be a symposium entitled *Sleep and Memory Consolidation*.

The local organiser is Timothy Hodgson.

A copy of the EPS Handbook 2015 is included in this mailing.

Dr John Towse
Hon Secretary

Business meeting will be held at 5:30pm on Thursday 9th April, 2015 in the Rupert Beckett Lecture theatre.

AGENDA

15/13 Minutes of the 67th Annual General Meeting held at University College London, 26 Bedford Way on Thursday 8 January 2015

15/14 Matters arising

15/15 Secretary's Report

15/15 Treasurer's Report

15/16 QJEP Editor's Report

15/17 Arrangements for future meetings

15/18 Any Other Business

Date, time and place of next meeting

EXPERIMENTAL PSYCHOLOGY SOCIETY

The 67th Annual General Meeting was held in the Ground Floor Lecture Theatre, Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, at 5pm on Thursday 8th January 2015.

MINUTES

Over 40 members were present and others joined later.

151 Minutes of the Business Meeting held at 5.30p.m. on Thursday 17 July 2014, at Newcastle University, Lecture Room 1.63, Ridley Building 2.

The Minutes of the July 2014 Business Meeting were approved and signed by the President.

The President welcomed Kevin Paterson as the incoming presently co-opted Conference Secretary and thanked Andrew Stewart who had sent his apologies due to paternity leave, for all his excellent organization over the past 3 years. The President was delighted to share Andrew's very happy news that a healthy baby boy and his mother were discharged from hospital on the same day, January 7th, and after very fast labour.

152 Matters arising

There were no matters arising.

153 Annual Reports

3.1 Annual Report of the Society (to be circulated)

The Hon Sec reported that each of the 2014 scientific meetings was marked by at least one keynote lecture delivered by one of the Society's award lecturers. These talks, and their accompanying symposia, continue to provide highlights at the meetings and boost attendance, particularly at meetings held outside London. Importantly, the Frith Prize continues to support the progression of early career researchers. This year the 3rd Frith Prize lecture was delivered by Dr Jennifer Cook at the meeting held in Newcastle. A large number of awards to support Members' research continue to be made under our various schemes. The full Annual Report will be made available on the EPS web page as soon as possible.

3.2 Treasurer's Report (summary accounts to be circulated)

The Treasurer presented a detailed report. The Society has a surplus of £47k for the last financial year, due to the cancellation of historical debts which previously showed as pending expenditure. Expenditure was £280k over the last financial year, as compared to £349k in 2013. Spending on management and administration appears to be down, but last year's figure for Hon Sec expenditure was somewhat higher than average. The Treasurer confirmed that whilst the Society had spent somewhat less on Grindley Grants, spending on Study Visits was slightly increased. Spending on Small Grants has not been radically reduced as would seem to be suggested by his summary report, as the drop in the 2014 figure is in part attributable to the cancellation of unclaimed awards. Income

was slightly down due to a change in how this figure is calculated. However, the Society's balance remains healthy and within the band required by the Charity Commission. The desired level of reserves is between one and two years' annual expenditure. The overall balance at this point in the cycle stands at £378,691 which is in line with other January figures.

The President thanked the Treasurer.

3.3 Editor's Report

The Editor reported that there were in total 391 submissions last year, this figure representing an increase of around 25 submissions compared with the previous year. It is unfortunate that the QJEP impact factor is now back to its long-term average. The impact factor was temporarily inflated by citations of Keith Rayner's Bartlett Lecture, as well as of a particularly successful special issue on Uta Frith's work. Nonetheless, the long-term average impact factor of the journal is a bit low and the Editor is reliant on authors to submit interesting papers to QJEP. The Editor noted that manuscript submissions from EPS members are a great help in raising the profile of the journal and show a real commitment to the Society, which may be taken into consideration when considering Members' other applications. The Editor invited questions and it was queried whether the Society benefits financially from gold open access publication in QJEP. The Editor confirmed that this money does indeed come back to the Society. Green open access is also an option for articles published in QJEP in that the authors' final version can be placed in the institutional repository as soon as the article is published, now that the Editor has successfully negotiated the removal of the 1 year embargo period. Additionally, Taylor & Francis would like to run an open access outlet in parallel with QJEP. The Editor invited Members to get in touch if they would be prepared to help with such an initiative. Finally, the Editor encouraged readers to submit short comments pertaining to any concerns with papers published in QJEP. Commentaries addressing general statistical or methodological issues are also encouraged.

The President thanked the Editor.

15/4-15/9 The President reminded Members of the option to nominate candidates for the various EPS prizes. Following final selection at EPS committee, the selected candidates are put to the AGM for ratification. The President mentioned the difficulty of making these decisions, in particular the Frith Prize attracts a highly competitive field of nominations. The following November committee-approved nominations were put to the 67th 2015 AGM -

Forty Fourth Bartlett Lecturer
Professor Jonathan Grainger

Fourteenth EPS Mid-Career Award
Professor Chris Jarrold

Twenty Third EPS Prize Lecturer
Professor Gaia Scerif

Fourth Frith Prize
Dr Anushka Fernando

Election of Officers and Committee Members 2015

Officers of the Society

Hon Treasurer
Hon Treasurer Elect
Hon President Elect

Professor Tim Hollins (formerly Perfect)
Professor Patrick Haggard
Professor Mike Burton

Ordinary Committee Members:

Dr Kaz Brandt
Dr Anthony McGregor
Dr Anna Woollams

Honorary Members

Professor Jonathan Evans
Professor John O'Keefe

15/10 Admission of Ordinary Members

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

15/11 Arrangements for future meetings

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

Lincoln, 8-10 July 2015. This meeting will include the 22nd EPS Prize Lecture by Manos Tsakiris plus an accompanying symposium to be organised by Katerina Fotopoulou. The Local Organiser is Timothy Hodgson.

UCL, January 2016.

Members were also advised that there will be an EPS-sponsored symposium to be held in honour of Andy Calder at the January 2016 meeting.

15/12 Any other business

Members are asked to allow some extra time for correspondence during the transition from Nottingham to Lancaster. The new Hon Sec, John Towse advised Members that he has appointed a new administrator and the new e-mail address will be eps@lancaster.ac.uk.

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