LANCASTER MEETING

10-12 APRIL 2013
A scientific meeting will be held at the Management School, Lancaster University, Lancaster, LA1 4YF on 10-12 April, 2013. The local organiser is Padraic Monaghan.

**Second Frith Prize**  
Wednesday 10 April 5.00pm  
The episodic nature of repetition priming  
Dr Aidan Horner, University College London  

**Eleventh EPS Mid-Career Award**  
Thursday 11 April 6.00pm  
Ways of thinking: From crows to children and back again  
Professor Nicola Clayton, University of Cambridge  

**Symposium** - To accompany the 11th EPS Mid-Career Award Lecture  
Thursday 11 April 2.00pm – 5.30pm  
Mental Time Travel  
Organiser: Professor Anthony Dickinson, University of Cambridge  

**Symposium** – Local Organiser  
Friday 12 April 9.30am – 12.30pm  
Sound symbolism and cross-modal correspondences  
Organiser: Professor Padraic Monaghan and Dr Peter Walker, University of Lancaster  

**Poster Session**

This will be held in conjunction with the drinks reception on Wednesday evening at 6pm at the Management School, Lancaster University. Drinks will be served in the area directly outside Lecture Theatres 1 and 2. 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 the Lecture Theatre 1 and Lecture Theatre 2 of the Management School, Lancaster University, Lancaster, LA1 4YF. Both theatres have data projectors available for Powerpoint presentations. Presenters may provide their own laptops and connector leads, or bring USB keys for the on-site computers which run Office XP under Windows NT/2000. Any queries about facilities in the theatres should be sent to the local organiser, Padraic Monaghan (p.monaghan@lancaster.ac.uk).

The conference dinner will be at 7.30pm at The Midland Hotel, Marine Road West, Morecambe, Lancashire LA4 4BU – (08458 501 240). A booking form is enclosed.
START OF PARALLEL SESSIONS

Session A

Lecture Theatre 1, Management School

1.30 Rebecca Lucas* and Courtenay Norbury (Royal Holloway, University of London)  
Orthography facilitates vocabulary learning for children with Autism Spectrum Disorders.

2.00 Keir X. X. Yong*, Jason D. Warren*, Elizabeth K. Warrington and Sebastian J. Crutch* (National Hospital for Neurology and Neurosurgery)  
The contribution of specific visual impairment towards dyslexia in Posterior Cortical Atrophy.

2.30 J. Richard Hanley (University of Essex)  
Concreteness and word production.

3.00 Gemma Learmonth* and Maria Garraffa* (University of Glasgow, University of Newcastle) (sponsor: Dr Monika Harvey)  
Sentence comprehension and memory load in aphasia: The role of interference during slower processing.

3.30 TEA

4.00 Anna M. Woollams and Helen Todman* (University of Manchester)  
The BRAIVE and the TROO: Semantic effects for pseudohomphones.

4.30 Padraic Monaghan, Richard Shillcock* and Simon Kirby* (Lancaster University, Edinburgh University)  
How arbitrary is language? Measuring the presence of sound symbolism in early and late vocabulary acquisition. Padraic Monaghan, Richard Shillcock, Simon Kirby

5.00 2nd Frith Prize - Aidan J. Horner (University College London)  
The episodic nature of repetition priming.  
(Lecture Theatre 1)

6.00 POSTERS AND DRINKS RECEPTION – Posters will be displayed and drinks will be served in the area directly outside Lecture Theatre 1 and Lecture Theatre 2.
START OF PARALLEL SESSIONS

Session B

Lecture Theatre 2, Management School

1.30  Stefan Vogt, Lauren Haythornthwaite*, Dan Eaves* and Aymeric Guillot* (Lancaster University, Teeside University, Université Claude Bernard Lyon)
Motor simulation in action observation and imagery.

2.00  Dan Eaves* and Stefan Vogt (Lancaster University, Teeside University)
Does incongruent motor imagery modulate automatic imitation effects in rhythmical actions?

2.30  Spencer J. Hayes*, Chris A. Dutoy*, Digby Elliott*, Emma Gowen and Simon J. Bennett* (Liverpool John Moores University, McMaster University, University of Manchester)
Imitation of biological and non-biological motion is modulated by selective attention.

3.30  Justin H. G. Williams*, Lieke Braadbaart*, Gordon D. Waiter* and David I. Perrett (University of Aberdeen, University of St Andrews)
Relationships between empathy and facial imitation ability.

3.30  TEA

4.00  Martin Edwards, Islam Mohamed Mustafa Salama* and Yves Vandermeeren* (Université catholique de Louvain, Al Azhar University, CHU Mont-Godinne)
An experimental investigation into the application of action observation-execution priming for neuropsychology treatment.

4.30  Emma Gowen, Elizabeth Evans* and Ellen Poliakoff (University of Manchester)
How “belief baggage” influences visuomotor priming.

5.00  2nd Frith Prize - Aidan J. Horner (University College London)
The episodic nature of repetition priming.
(Lecture Theatre 1)

6.00  POSTERS AND DRINKS RECEPTION – Posters will be displayed and drinks will be served in the area directly outside Lecture Theatre 1 and Lecture Theatre 2.
Session A

Lecture Theatre 1, Management School

9.00  Preethi Premkumar (Nottingham Trent University)
Greater dorsal anterior cingulate cortex amplitude during rejection in the early sensory processing stage is associated with greater schizotypal experiences.

9.30  Erika Nurmsoo, Hannah Dickerson* and Tara Griggs* (University of Kent)
Preschoolers’ sensitivity to testimony when learning generalisable vs non-generalisable information.

10.00 Angelique Eydam*, Victoria Leahy* and Erika Nurmsoo (Klinikum rechts der Isar of Technical University Munich, University of Kent)
The effect of pedagogy and model familiarity on infants’ imitation.

10.30  COFFEE

11.00  Christopher Jarrold and Eira Fomicheva* (University of Bristol)
Phonological recoding of visual information does not undergo substantial developmental change in children.

11.30  Donna Bayliss*, Jade Bogdanovs* and Christopher Jarrold (University of Western Australia, University of Bristol)
Exploring the developmental trajectory of visual and verbal short-term memory consolidation.

12.00  Aidan J. Horner and Neil Burgess (University College London)
The associative structure of memory for multi-element events.

12.30  Timothy J. Perfect, Nicholas Lange* and Ian Dennis (Plymouth University)
What’s yours is mine, what’s mine is yours: unconscious plagiarism and its opposite.

1.00  LUNCH
Session B

Lecture Theatre 2, Management School

9.00  
Claudio Tennie*, Victoria Vonau*, Daniel Hanus*, Josep Call* and Michael Tomasello* (University of Birmingham, Max Planck Institute for Evolutionary Anthropology) (sponsor: Sarah Beck)
Observational causal learning in chimpanzees.

9.30  
Sarah Hoar* and Karina Linnell (Goldsmiths, University of London)
Cognitive load eliminates the global perceptual bias for unlimited exposure-durations.

10.00  
Ines Jentzsch, Anahit McMktchian* and Nayantara Kansal* (University of St Andrews)
Effects of highly skilled motor abilities on the effectiveness of frontal brain functioning: Evidence for more effective response monitoring in amateur musicians.

10.30  
COFFEE

11.00  
Jie Sui, Pia Rotshtein* and Glyn Humphreys (University of Oxford, Tsinghua University, University of Birmingham)
A network for social saliency: The neural and functional creation of new personal significance.

11.30  
Glyn Humphreys, Minghui Liu*, Carmel Mevorach and Jie Sui (Oxford University, Tsinghua University, University of Birmingham)
Self-association generates ultra-fast alterations in perceptual salience.

12.00  
James A. Grange (Keele University)
Testing a SIMPLE simulation of temporal distinctiveness effects in task switching.

12.30  
Christopher Benwell*, Monika Harvey and Gregor Thut* (Glasgow University)
EEG correlates of the length effect in line bisection.

1.00  
LUNCH
Session A

Lecture Theatre 1, Management School

Symposium: Mental Time Travel
Organiser: Professor Anthony Dickinson

2.00 Daniel Gilbert* (Harvard University)
Some problems in human prospection.

3.00 Lucy Cheke* and Nicola Clayton (Cambridge University)
Are mental time travel researchers singing from the same hymn sheet?

3.30 TEA

4.00 Tom V. Smulders*, Michael Craig*, Adele Mazurek*, Colin J. Hamilton* and Peter Gallagher* (Newcastle University, Edinburgh University, Northumbria University)
The What-Where-When Paradigm: a novel way of testing human episodic memory?

4.30 Stephen E. G. Lea (University of Exeter)
Intertemporal choice, hyperbolic discounting, and mental time travel:
A comparative and evolutionary discussion.

5.00 Eleanor Maguire* (University College London)
The TARDIS within: Neural signatures of mental time travel.

End of Symposium

5.30 EPS Business Meeting - Members only (ROOM TBC)

6.00 Eleventh EPS Mid-Career Lecture – Professor Nicola Clayton (University of Cambridge)
Ways of thinking: From crows to children and back again (Biology Lecture Theatre)
Session B

Lecture Theatre 2, Management School

2.00  Fraser Milton*, Andy Wills, Ben Newell and Chris Moore*  
       (University of Exeter, University of Plymouth, University of New South Wales)  
       Does having more time to think improve performance on an “implicit” categorization task?  

2.30  Andy Wills and Fraser Milton* (University of Plymouth, University of Exeter)  
       Less is more? Is overall similarity classification less effortful than single-dimension classification?  

3.00  Rebecca P. Lawson*, Charlotte Howesn* and Jonathan P. Roiser*  
       (University College London) (sponsor: Aidan Horner)  
       Autism spectrum traits and adaptive coding mechanisms.  

3.30  TEA

4.00  Louise-Ann Leyland*, Hayward J. Godwin*, Valerie Benson* and Simon P. Liversedge  
       (University of Southampton)  
       Using eye movements to reveal underlying factors in hemispatial neglect: Why is information neglected?  

4.30  Julie M. Harris* (University of St Andrews) (sponsor: Ines Jentzsch)  
       Three-dimensional volume perception via binocular disparity.  

5.00  Duncan Guest*, Christina J. Howard*, Louise A. Brown* and Harriet Gleeson*  
       (Nottingham Trent University) (sponsor: Gary Jones)  
       Effects of ageing on the rate of visual information processing; a speed-accuracy trade-off (SAT) analysis.  

5.30  EPS Business Meeting - Members only (ROOM TBC)

6.00  Eleventh EPS Mid-Career Award Lecture – Professor Nicola Clayton  
       (University of Cambridge)  
       Ways of thinking: From crows to children and back again  
       (Biology Lecture Theatre)
**Session A**

**Lecture Theatre 1, Management School**

**Symposium:**  
**Sound symbolism and cross-modal correspondences**  
Organiser: Professor Padraic Monaghan and Peter Walker (Lancaster University)

9.30 **Peter Walker** (Lancaster University)  
Sound symbolism and cross-sensory correspondences.

10.00 **Cesare Parise*** (Max Planck Institute for Biological Cybernetics and Bernstein Center for Computational Neuroscience, Bielefeld University)  
Metaphors in the ear and in the world.

10.30 **COFFEE**

11.00 **Asifa Majid*** (Radboud University Nijmegen)  
Cross-modal correspondences in the language of perception.

11.30 **Zohar Eitan*** (Tel Aviv University)  
Music and sound symbolism: prospects and challenges of empirical research.

12.00 **David Reby*** (University of Sussex)  
Expression of body size in vertebrate vocalisations.

12.30 **Lawrence E. Marks*** and **Catherine M. Mulvenna*** (Yale University)  
Perceptual correspondences, across and within modalities.

**End of Symposium**

End of Meeting
Session B

Lecture Theatre 2, Management School

9.30  Gary Jones (Nottingham Trent University)
 Chunking as an explanation for why the span size of digits is superior to the span size of other stimuli.

10.00 James Rackie*, Karen Brandt and Michael Eysenck* (University of Roehampton)
 Interaction between mode of learning and subjective experience: Translation effects in long-term memory.

10.30  COFFEE

11.00 Scott Cole*, Catriona Morrison and Martin Conway (University of Leeds, City University, London)
 Deconstructing the differences between remembered and imagined events.

11.30 Christoph T. Weidemann* and Michael J. Kahana* (Swansea University, University of Pennsylvania) (sponsor: Andrew Stewart)
 Brain activity reflects "memory strength" better than introspective judgments.

12.00 Kelly Tate*, Andrew Stewart and Michael Daly* (University of Manchester, University of Stirling)
 The effect of priming on attitudes: an experimental approach.

End of parallel sessions

End of meeting
1. **Jumana Ahmad**, **Heather Ferguson** and **Howard Bowman** (University of Kent)
   Phonological working memory processing in developmental dyslexia

2. **Sarah R. Beck**, **Claire Williams** and **Nicola Cutting** (University of Birmingham)
   How does human children’s tool innovation really compare with that of corvids?

3. **James Bisby** and **Neil Burgess** (Institute of Cognitive Neuroscience, University College London)
   Negative affect impairs memory for context.

4. **Emma Blakey** and **Dan Carroll** (University of Sheffield) (sponsor: Tom Stafford)
   Can Inhibition or Working Memory Explain the Emergence of Cognitive Flexibility in Two-year-olds?

5. **Karen Brandt**, **Maria Kragh-Nielsen** and **Amanda Holmes** (University of Roehampton)
   Forgetting emotional and neutral words: An ERP study.

6. **Michael Craig**, **Michaela Dewar** and **Sergio Della Sala** (University of Edinburgh) (sponsor: Robert H Logie)
   Recalling the past and imagining the future interferes with verbal memory consolidation.

7. **Nicola Cutting**, **Sarah R. Beck** and **Ian A. Apperly** (University of Birmingham)
   What determines complexity in children’s tool making?

8. **Catherine Arianne Darnell** and **Sarah Beck** (University of Birmingham)
   Children’s Feeling of Confidence under Epistemic and Physical Uncertainty.

    (University of Sheffield, University of Liverpool)
    An Investigation into the Boundary Conditions of Optimal Decision Making.

10. **Jason M. Doherty** and **Robert H. Logie** (University of Edinburgh)
    Resource Sharing in a Multiple Component Memory System: Evidence for Specific Memory Resources.

11. **Roberta Etzi**, **Charles Spence** and **Alberto Gallace** (University of Milan-Bicocca, Oxford University)
    Is sandpaper ‘kiki’? Exploring crossmodal correspondences in touch.

12. **Lily FitzGibbon**, **Daniel J Carroll**, **Lucy Cragg** and **Danielle Matthews** (University of Sheffield, University of Nottingham)
    Preschool children’s cognitive flexibility is facilitated by a computerised task format, but their working memory is not.
13. **Sophie Hall*, John Maltby*, Ruth Filik and Kevin Paterson** (University of Leicester, University of Nottingham)
Secondary school students' science text understanding: The importance of 'cohesive' text designs and individual differences.

14. **Mark J. Horne*, Ian Deary*, Louise Brown and Robert H. Logie** (University of Edinburgh, Nottingham Trent University)
Differential use of verbal coding by young and older adults in static and dynamic visual tasks.

15. **Stephen Jeffs* and Theodora Duka*** (University of Sussex) (sponsor: Jamie Ward)
Outcome identity is necessary for cue-potentiated reward seeking; outcome value is not sufficient.

16. **Thomas Mitchell*, Rebecca Bull* and Sandie Cleland** (University of Aberdeen, Nanyang Technological University)
The influence of finger-counting preference and gender on number-to-position estimation.

17. **James Munro*, Jonathan Silas*, Margot Crossman* and Joseph P. Levy*** (University of Roehampton) (sponsor: Karen Brandt)
Localisation of the human mirror neuron system in single participants.

18. **Emma Portch*, Charity Brown, Jelena Havelka, Hannah Cook* and Rebecca Simpson*** (University of Leeds)
Is the semantic satiation paradigm a useful method for investigating the role of language in the interpretation of facial expressions?

Assessing feature binding in visual working memory using the change detection paradigm: Single probe vs. Whole display.

20. **Irene Senna*, Angelo Maravita*, Nadia Bolognini*, and Cesare V. Parise** (Milano-Bicocca University, IRCCS Istituto Auxologico Italiano, Max Plank Institute for Biological Cybernetics and Bernstein Center for Computational Neuroscience, Bielefeld University) (sponsor: Peter Walker)
The marble-hand illusion.

21. **Liz Smith* and Chris Jarrold** (University of Bristol)
Investigating item and order memory for phonologically similar/dissimilar items and high/low frequency items in Down syndrome.

22. **Gijsbert Stoet** (University of Glasgow)
PsyToolkit: A free web-based tool to learn about, design, and run experiments.

23. **Miriam Tresh* and Heather J. Ferguson** (University of Kent)
Modifying the brain’s response to language through uncertainty: Evidence from ERPs.
Orthography facilitates vocabulary learning for children with Autism Spectrum Disorders

Rebecca Lucas* and Courtenay Norbury
Royal Holloway University of London
Rebecca.Lucas.2010@live.rhul.ac.uk

This study investigated whether children with autism spectrum disorders (ASD) can use orthography to facilitate vocabulary learning, as is the case for typically developing children (TD). Fifty-one children aged 7-12; 26 with a formal diagnosis of ASD and 25 TD peers were taught 16 low frequency concrete science words, such as ‘breccia’. Half of the stimuli had the written word presented alongside a picture of the target item (orthography present, OP); the remaining items were taught with orthography absent (OA). Learning was assessed via three post-tests: picture naming, spoken word-picture matching and an orthographic choice task, which were administered immediately after learning and again after a 24 hour delay. Children with ASD and age-appropriate structural language skills learnt a similar number of items to their TD peers, whereas children with ASD and language impairments learnt fewer items. Accuracy on all three post-tests was greater for stimuli learnt with OP, for both the TD and ASD groups. For all groups, accuracy was either retained or increased after a consolidation period. The results suggest that orthography should be presented when teaching oral vocabulary, to provide an optimal learning environment.

The contribution of specific visual impairment towards dyslexia in Posterior Cortical Atrophy

Keir X. X. Yong*, Jason D. Warren*, Elizabeth K. Warrington and Sebastian J. Crutch*
National Hospital for Neurology and Neurosurgery
yong@drc.ion.ucl.ac.uk

Posterior Cortical Atrophy (PCA) involves a selective visual impairment while leaving language and memory functions relatively spared. A range of dyslexias has been identified in PCA, with reading dysfunction often presenting as one of the first symptoms of the disease. The current study intends to characterize acquired dyslexia as a consequence of PCA and clarify the impact deficits in areas of non-orthographic visual processing have on reading dysfunction. Individuals with PCA, typical Alzheimer’s Disease (tAD) and healthy controls were administered tests examining the effects of lexical and perceptual variables on single word reading. PCA patients were slower and less accurate than healthy controls and tAD patients; perceptual variables were the primary determinant of reading speed and accuracy in the PCA group but did not predict reading speed or accuracy in the tAD group. Results highlight the occurrence of an inverse size effect in PCA, whereby large words were read slower and less accurately than small words, an effect that is consistent with clinical observations of a restriction in the effective visual field. The data indicates that a combination of deficits in different areas of visual processing restrict reading ability in PCA, and provide tentative suggestions towards developing reading remedial techniques. Results replicated the prior evidence for non-conscious working memory. The imaging results showed that activity in anterior prefrontal cortex correlated with non-conscious working memory performance. We further report that delayed discrimination on unaware trials was modulated by tDCS of the left prefrontal cortex. These results suggest that the role of prefrontal cortex in
delayed working memory-based discrimination and perceptual decision making may not need to be contingent on conscious awareness of visual cues.


Concreteness and word production

J Richard Hanley
University of Essex
rhanley@essex.ac.uk

Two experiments investigate the effect of concreteness on the ability to generate words to fit sentence contexts. When participants attempted to retrieve words from dictionary definitions in Experiment 1, abstract words were associated with more omissions and more alternates than concrete words. These findings are consistent with the view that the semantic-lexical weights in the word production system are weaker for abstract than concrete words. There was no evidence that greater competition from semantic neighbors was an additional reason why abstract words were harder to produce. Participants also reported more positive tip-of-the-tongue states (TOTs) when attempting to produce abstract words from their definitions, consistent with more phonological retrieval problems for abstract than concrete words. In Experiment 2, participants attempted to generate words to fit into a sentence that described a specific event. The difference between the number of abstract and concrete words recalled was significantly smaller in the event condition than in the definition condition, and there was no longer evidence of greater phonological retrieval failure for abstract words. Overall, the results are consistent with the view that the semantic-lexical weights, but not the lexical-phonological weights, are weaker for abstract than for concrete words in the word production system.

Sentence comprehension and memory load in aphasia: The role of interference during slower processing

Gemma Learmonth1* and Maria Garraffa2*
1. University of Glasgow
2. University of Newcastle
gemmal@psy.gla.ac.uk

Sentence comprehension involves maintenance of linguistic information in memory whilst identification of the correct meaning is achieved. The precise nature of the memory resource involved remains a divisive issue, with two models proposed: 1) a general memory resource which supports comprehension (Gordon, Hendrick & Levine, 2002); 2) a sentence-specific working memory which exclusively facilitates processing (Caplan & Waters, 1999). An integrated “sentence-comprehension and memory load” task was presented to aphasic and non-aphasic stroke patients, as well as older healthy controls. Sentence complexity ranged from simple reversible actives to centre-embedded reversible subject-relatives (SRs). Recall task items were matched (Animate Nouns) or mismatched (Inanimate Nouns) to comprehension task sentences, to assess similarity-
based interference effects (Shulman, 1970; Lewis, 1996; Gordon, Hendrick & Johnston, 2001). Interference based on similarity was observed only for complex centre-embedded relatives in healthy controls. Aphasics comprehended centre-embedded SRs less proficiently than non-aphasic stroke patients and healthy controls, however memory load recall in aphasics improved on these trials, indicating resource competition. The overall reduction in verbal working memory capacity in aphasics, together with an interference effect for complex sentences in controls, supports the existence of a general, rather than sentence-specific, working memory resource.


The BRAIVE and the TROO: Semantic effects for pseudohomophones

Anna M. Woollams and Helen Todman*
University of Manchester
anna.woollams@manchester.ac.uk

It is widely assumed in current models of reading aloud and word recognition that semantic information does not contribute to the processing of novel letter strings. Yet in highly birectionally interactive systems, it would seem entirely possible for meaning of known words to influence the processing of nonwords similar in spelling and identical in sound (pseudohomophones). This hypothesis was directly tested in a visual lexical decision task. Imageability of the baseword was manipulated to provide an index of the influence of semantic activation, and frequency of the baseword was also manipulated. Consistent with previous studies of pseudohomophone processing in lexical decision, items with higher frequency basewords were rejected more easily than those with lower frequency basewords. Critically, there was also reliable effect of imageability such that items with higher imageability basewords were more easily rejected than those with lower imageability basewords. This novel result clearly demonstrates the key role of semantic activation in visual word recognition, and favours models in which semantic and phonological information can affect the orthographic comparison that informs lexical decision.
How arbitrary is language? Measuring the presence of sound symbolism in early and late vocabulary acquisition

Padraic Monaghan¹, Richard Shillcock²* and Simon Kirby²*
¹. Lancaster University
². Edinburgh University
p.monaghan@lancs.ac.uk

The relationship between the sound and the meaning of a word is assumed to be arbitrary. However, research on sound symbolism appears to contradict this conventional view: certain sound-meaning mappings appear to be systematic. It has been suggested that sound symbolism is critical for language acquisition by indicating to the child that words have reference, and has even been suggested to provide insight into the origins of language itself (Ramachandran & Hubbard, 2001). Yet, there is recent evidence that sound symbolism may constitute an impairment to learning by minimising information present in the environment for establishing reference (Monaghan et al., 2011). So how prevalent is sound symbolism in the language? We correlated the sound and meaning distances between pairs of monosyllabic words in the English language. We found that, for the whole language, the sound-meaning mapping is more systematic than is expected by chance. However, this was related to a word’s age of acquisition: earlier acquired words were more systematic than later acquired words. We suggest that systematicity is preserved in the language to assist in early stages of language acquisition, but that arbitrariness is dominant later in order to facilitate learning of nuanced meanings in adult language.


Motor simulation in action observation and imagery

Stefan Vogt¹, Lauren Haythornthwaite¹*, Dan Eaves¹,²* and Aymeric Guillot³*
¹. Lancaster University
². Teesside University
³. Université Claude Bernard Lyon
s.vogt@lancaster.ac.uk

From the viewpoint of application to motor rehabilitation, motor imagery and action observation are both promising therapeutic procedures. Typically, these two forms of non-physical practice have been studied in isolation, and often by different scientific communities. We briefly delineate these different research traditions and related key findings. We then propose that processes of motor imagery and of action observation can run in parallel and can potentially compete. In a recent pilot study, we asked participants to either imagine performing a rhythmical target action whilst they observed an irrelevant distractor action, or to imagine a static image of the target action which was to be performed after the observation period. Target and distractor actions were either in the
same plane or in orthogonal planes, and the speed of the distractor action was subtly manipulated across trials. We found an imitation bias towards the speed of the distractor action for both imagery instructions only when the two actions were in the same plane, whereas the effect was markedly reduced for the static imagery condition when the planes were different. This initial finding indicates that the effects of action observation on performance can be substantially altered by the content of concurrent imagery instructions.

Does incongruent motor imagery modulate automatic imitation effects in rhythmical actions?

Dan Eaves\textsuperscript{1,2}\textsuperscript{*} and Stefan Vogt\textsuperscript{1}
1. Lancaster University
2. Teesside University
D.Eaves@tees.ac.uk

Passively observing a task-irrelevant rhythmical action biases the cycle time of subsequent action execution (Eaves et al., 2012). This imitation bias was robust, but only a small fraction of the distractor speed modulations. Relative to a fully-compatible condition, the bias was reduced in three incompatible conditions, wherein observed and executed actions differed in type (e.g., tooth brushing vs. window wiping), plane of motion (horizontal vs. vertical), or both. We interpreted this in the framework of parallel and potentially competing sensorimotor representations. In the present study we tested the possible competition between imagery and observation by manipulating the content of the simultaneous action representations. Participants pantomimed an imperative rhythmical action after watching a distractor movie, and imperative and distractor action type were again either compatible or incompatible. During the movie, participants synchronised either a real or imagined action with the distractor which, under separate conditions, was instructed to be the same as: (1) the distractor action; (2) the imperative action; or (3) the imperative action but in the orthogonal plane. We predicted the lowest imitation bias for imperative actions following imagined distractor synchronisation, specifically when both action type and plane were incongruent (condition 3). Data are currently analysed and will be presented at the meeting.


Imitation of biological and non-biological motion is modulated by selective attention

Spencer J. Hayes\textsuperscript{1}\textsuperscript{*}, Chris A. Dutoy\textsuperscript{1}\textsuperscript{*}, Digby Elliott\textsuperscript{1,2}\textsuperscript{*}, Emma Gowen\textsuperscript{3} and Simon J. Bennett\textsuperscript{1}\textsuperscript{*}
1. Liverpool John Moores University
2. McMaster University
3. University of Manchester
s.hayes@ljmu.ac.uk

During complex imitation a person copies a novel action that is not already represented in their own repertoire. Depending on environmental context and nature of
the observed stimulus, goal-directed, as well as lower-level (sensorimotor) and top-down (attention) processes are engaged. Here, we examined whether selective attention and end-state goals influenced the imitation of a non-human agent displaying biological (unnatural or natural velocity) or non-biological (constant velocity) motion. Group 1 (specific) attended to an agent with the intention to imitate the exact motion trajectory. Group 2 (general) attended to the agent with the intention to imitate what they saw. Both groups observed the agent as goal-directed (moved to a target) or not (moved to no-target). The performance data indicated the general-group, irrespective of motion type and target presence, was more accurate at replicating movement time than the specific group. However, for the kinematic data, while both groups imitated the three motion types (unnatural, natural, constant velocity), the specific-group did so more accurately irrespective of target. These data confirm selective attention modulates complex imitation.

Relationships between empathy and facial imitation ability

Justin H G Williams¹*, Lkie Braadbaart¹*, Gordon D Waiter¹* and David I Perrett²
1. University of Aberdeen
2. University of St Andrews

Empathy is a capacity for both experiencing emotion vicariously, and for understanding the reasons for those emotions. It is thought to hold properties in common with imitation, as both involve shared representations for action. Nevertheless, little research has empirically demonstrated a link between empathy and imitation. We recently developed a facial imitation task that showed a correlation between imitation accuracy and Empathic Quotient (EQ). We hypothesized that this relationship would be mediated by the human mirror neuron system that serves to relate perceived to executed actions. During functional Magnetic Resonance Imaging (fMRI), 20 adults observed novel ‘blends’ of facial emotional expressions. According to instruction, they either imitated the expressions or executed an alternative, pre-prescribed action. The same imitation task was performed outside the scanner. We replicated the association between imitation accuracy and EQ. Differences in activity between imitation and control conditions correlated with EQ in hippocampus as well as inferior parietal lobe and precentral gyrus. Imitation accuracy also correlated with activity differences in precentral gyrus as well as cerebellum, insula and thalamus. The only overlapping voxels occurred in an area previously associated with action simulation and motor rehearsal, suggesting that empathy and facial imitation are both dependent on an ability to imagine action.

An experimental investigation into the application of action observation-execution priming for neuropsychology treatment

Martin Edwards¹, Islam Mohamed* Mustafa Salama²* and Yves Vandermeeren³*
1. Université catholique de Louvain
2. Al Azhar University
3. CHU Mont-Godinne

Martin.Edwards@UCLouvain.be
In the scientific literature, there are many publications reporting evidence that the observation of action moderates subsequent action execution performance. The effect has been explained by the observation of action activating the mirror neuron system (i.e., the areas of the brain used to execute action), and this activity moderating subsequent brain activity during the planning and execution of action. Here, we investigated whether action observation-execution priming could be adapted for efficient clinical use. For example, the observation-execution prime effect reported in the literature used a trial-by-trial valid versus invalid prime manipulation. Clinically, it may be more efficient to present periods of action observation prior to a patient performing physiotherapy exercises (enhancing the therapy, and reducing clinician time). We report a series of experiments that investigated the effects that sessions of action observation had on action execution performance. Each experiment used a repeated measures design that compared performance before and after observation, and manipulated action observation compared to control observation conditions, each presented on different occasions and counterbalanced across participants. The results consistently showed evidence of action observation-execution priming, for different types of action execution. We discuss the findings in relation to the clinical application of the experimental effects.

How “belief baggage” influences visuomotor priming.

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

Observation of human actions influences the observer’s own motor system, termed visuomotor priming, and is believed to be caused by automatic activation of mirror neurons. Although evidence suggests that priming effects are larger when viewing human as opposed to non-biological (NB) stimuli such as objects, some studies report similar priming for both stimulus types. In particular, priming for NB stimuli can be obtained when participants believe that the stimulus is based on human movement. In the current work, we examined whether this “belief effect” is a true form of priming, based on correspondence between the executed and observed action or merely due to increased attention to the NB stimulus. Results indicated the former possibility, although participants varied in their susceptibility to the belief effect. In a second experiment, we investigated the suggestion that differences in priming effects between human and NB stimuli may depend on whether they are presented in mixed or separate blocks. We found priming for the NB stimulus only in the blocked condition, but only for the participants who had first observed the block containing the human stimulus. Our results highlight the importance of participant’s prior knowledge in priming experiments.


Frith Prize Lecture

The episodic nature of repetition priming

Aidan J Horner
University College London
a.horner@ucl.ac.uk

Humans are remarkably adept at recognising and interacting with objects in their environment, an ability that is strongly modulated by experience. We are often faster and more accurate at responding to a stimulus on subsequent presentations relative to the first presentation. This change in behaviour (repetition priming) is frequently accompanied by decreases in neural activity within distinct neocortical regions (repetition suppression, RS). Priming and RS are ubiquitous phenomena observed across multiple sensory modalities and experimental tasks, and thus may reflect a fundamental form of learning that facilitates processing of repeated stimuli. Here, I describe how priming and RS are highly sensitive to changes in contextual details between stimulus presentations. Specifically, I show that a change in response made to a stimulus from first to second presentation dramatically affects the magnitude of priming and RS. I further show that the stimulus-response bindings needed to produce such effects can be encoded at multiple representational levels of both the stimulus and response. Thus, when we process an object for the first time we encode a wealth of information relating to the object and its surrounding context (e.g., task and response). These rapidly learnt ‘event-files’ or ‘episodes’ have profound effects on the way in which we both perceive and interact with that object on subsequent occasions. I discuss how such ‘episodes’ challenge traditional theories of priming/RS and how these phenomena can result from the interaction between the medial temporal lobe and neocortical regions.
Greater dorsal anterior cingulate cortex amplitude during rejection in the early sensory processing stage is associated with greater schizotypal experiences

Preethi Premkumar
Nottingham Trent University
preethi.premkumar@ntu.ac.uk

Experiencing rejection activates the dorsal anterior cingulate (dACC) that suggests conflict detection. Individuals with high schizotypy under-activate the dACC during rejection. Event-related potential (ERP) studies show greater negativity in the 400 and 500-900ms latencies during rejection, suggesting that the salience of stimuli is being evaluated. However, no study has shown whether discrimination between social interactions occurs in the early sensory processing stage (N1). Forty-one healthy participants (mean age 21±1.82 years) underwent electroencephalography while viewing rejection, acceptance and neutral scenes. Participants were assessed for schizotypy on the Oxford-Liverpool Inventory of Feelings and Experiences. Source localisation of amplitudes in the dACC, temporal pole and lingual gyrus at the 70-160ms latency was performed. Amplitude was higher during rejection compared to neutral scenes in the dACC and compared to acceptance in the left temporal pole. Smaller amplitude difference between rejection and neutral conditions in the dACC and right temporal pole correlated with greater schizotypal unusual experiences. Discriminating between social interactions occurs at the early attentional processing stage. A poorer ability to discriminate between rejection and non-rejection scenes at this early attention stage concomitant with greater schizotypal experiences is consistent with evidence of emotion recognition deficits at the severe end of the schizophrenia spectrum.

Preschoolers’ sensitivity to testimony when learning generalisable vs non-generalisable information

Erika Nurmsoo, Hannah Dickerson* and Tara Griggs*
University of Kent
e.nurmsoo@kent.ac.uk

Children judge whether to trust information from others based on the speakers’ prior reliability (Koenig & Harris, 2005), or access to the information (Nurmsoo & Robinson, 2009). When choosing who to ask, children seem appropriately selective when deciding between speakers differing on reliability (e.g., Koenig & Harris, 2005), but fail when speakers differ on information access (Robinson, Butterfill & Nurmsoo, 2011). This difference may be due to the type of information being learned; children appear to be more conservative when judging informants offering generalisable knowledge (Brosseau-Liard & Birch, 2011, see also Lucas & Lewis, 2010). We directly compared learning of generalisable (labels) v non-generalisable information (colours), when the testimony was unsolicited (Tell condition), and when children chose who to ask (Ask condition). Four- and 5-year-olds observed one puppet correctly identify the label or colour of three objects, while the other puppet was incorrect. At test the objects were hidden from the children, who chose which puppet to believe or to ask. Children were more discriminating between speakers when learning generalisable information, but also found the Ask condition more difficult than Tell regardless of the nature of the information being learned. We discuss the practical and theoretical implications of these findings.
The theory of Natural Pedagogy (Csibra & Gergely, 2006, 2009, 2011) states that early imitation is supported by ostensive-referential communication (e.g., eye contact and pointing). Research shows that infants are more likely to faithfully imitate a novel action after receiving communicative signals during demonstration (e.g., Gergely, Bekkering, & Király, 2002). However, it remains unclear whether these cues need to be present for a given teaching event, or whether infants take a ‘pedagogical stance’ towards a communicative model more generally. In the present study, 18-month-olds observed a demonstrator perform novel actions. The model was either familiar (playing and giving communicative cues before the demonstration), or unfamiliar (first meeting the child during demonstration). The novel actions were performed either with or without ostensive signals, and participants’ imitation behaviour was measured. Infants were more likely to imitate novel actions when the unfamiliar model used ostensive signals. However, when the model was familiar, children were equally likely to imitate irrespective of the presence or absence of cues. These results suggest that infants take the pedagogical stance with a teacher and maintain it over time without receiving additional cues. We discuss the practical and theoretical implications of these findings for imitation research.


**Phonological recoding of visual information does not undergo substantial developmental change in children**

Christopher Jarrold and Eira Fomicheva*

University of Bristol
c.jarrold@bristol.ac.uk

Whether children spontaneously recode a visual image into a phonological label is relevant to the question of how verbal short-term memory develops, as many would argue that this recoding depends on processes related to rehearsal. Existing evidence suggests that young children do not show a phonological similarity effect for visual material in short-term memory tasks, in contrast to clear effects in older individuals. In this study, 24 children in each of school years 1 and 4 were given four short-term memory tasks that were formed by crossing verbal and visual input modalities with verbal and visual recall modalities (verbal vs. visual). In each task the size of the phonological similarity effect was measured by presenting either phonologically similar or dissimilar memoranda. A recognition procedure was used, with different list lengths given to the two age groups. This allowed us to equate baseline levels of performance across these groups. Under these conditions, phonological similarity effects were equated across ages and tasks. This supports our contention that previous evidence for the development of phonological similarity effects is subject to floor and scaling effects, and undermines the view that phonological recoding undergoes a qualitative developmental change among children in this age range.

**Exploring the developmental trajectory of visual and verbal short-term memory consolidation**

Donna Bayliss¹*, Jade Bogdanovs¹*, and Christopher Jarrold²
1. University of Western Australia
2. University of Bristol
donna.bayliss@uwa.edu.au

The successful encoding of short-term memory traces is thought to involve a process of consolidation whereby fragile perceptual traces are transformed into more durable memory representations. Evidence suggests that the process of consolidation is evident in children, however, little is known about the development of this process or the relationship between consolidation efficiency and short-term/working memory performance. This study compared consolidation functions across 35 7-year-olds, 48 9-year-olds, and 39 11-year-olds using visual and verbal change-detection tasks designed to
measure short-term consolidation. The visual and verbal tasks both produced consolidation functions similar to that evidenced in adults. For the visual task, the older age-groups were faster overall, however, the consolidation functions did not differ across age-groups. In contrast, the verbal consolidation functions varied as a function of age. Associations were evident between estimates of visual consolidation efficiency and measures of working memory, however, associations were less consistent between estimates of verbal consolidation efficiency and measures of short-term/working memory. These results suggest that the consolidation of visual and verbal information may involve separate encoding mechanisms that follow different developmental trajectories. These findings have important implications for our understanding of the development of working memory.

The associative structure of memory for multi-element events

Aidan J Horner and Neil Burgess
University College London
a.horner@ucl.ac.uk

The hippocampus is thought to be an associative memory ‘convergence zone’, binding the multimodal elements of an event into a single engram. This predicts a degree of dependency between retrieval of the different elements comprising an event. We present data from three studies designed to address this prediction. Participants imagined person-location-object events, and memory for these events was assessed across multiple trials of cued retrieval. Consistent with the prediction, there is significant dependency between the retrieval of different elements from the same event. Furthermore, the level of dependency is sensitive to both retrieval task, with higher dependency during cued-recall than cued-recognition, and to subjective confidence. We propose a simple model, in which events are stored as multiple pairwise associations between event elements, and dependency is captured by a common factor that varies across events. The model predicts the pattern of dependency when changes in the level of guessing with retrieval task and confidence are taken into account. Thus we provide direct evidence that memory for multi-modal events depends on the pairwise associations of their constituent elements, and that retrieval of the elements corresponding to the same event reflects a common factor that varies from event to event.

What's yours is mine, what's mine is yours: unconscious plagiarism and its opposite.

Timothy J Perfect, Nicholas Lange* and Ian Dennis
Plymouth University
tperfect@plymouth.ac.uk

In standard studies of unconscious plagiarism in the laboratory, groups of participants initially generate solutions to a problem. Later individual participants are asked to recall only their own ideas, or to generate completely new ideas. The standard findings are that participants often recall other people’s ideas as their own, and generate old ideas as new. However, to date, the propensity to give away ideas has not been investigated. Here we report a series of experiments in which participants generate ideas with a partner, before either trying to recall only their own ideas, or only their partner’s ideas. Across these studies we found higher rates of “giving away” ideas during the
recall-partner task than of “stealing” ideas during the recall-own task. These data can be explained through two mechanisms: 1) a generation effect which renders our own ideas more available to us and 2) an error prone (but unbiased) source-monitoring process which is driven in part by the retrieval goals.

Observational causal learning in chimpanzees

Claudio Tennie¹*, Victoria Vonau²*, Daniel Hanus²*, Josep Call²* and Michael Tomasello²*
1. University of Birmingham
2. Max Planck Institute for Evolutionary Anthropology
c.tennie@bham.ac.uk

It has recently been shown that 24-month-old infants can distinguish correlations from genuine causal relations when merely observing goal-directed actions (“observational causal learning”; Meltzoff et al. 2012). Here we explore whether chimpanzees show similar abilities. We tested 22 chimpanzees (located at Leipzig Zoo, Germany) using a similar procedure as the one used by Meltzoff et al., but adapted for chimpanzees. A two-choice procedure was implemented: subjects were shown human demonstrations of two buttons being pressed in succession and - timed with each button press – juice being delivered to the subjects. The only difference between the two buttons consisted in the timing of juice delivery. Pressing of button A appeared causally related to the juice delivery as it coincided with juice onset (cause-then-effect), while the pressing of button B appeared causally unrelated to the juice delivery, because here the juice onset had already happened (effect-then-cause). Subjects observed five demonstrations for each button type before they could choose (and press) a button for themselves. In their first trials the chimpanzees significantly choose the causally relevant button, thereby showing observational causal learning abilities.


Cognitive load eliminates the global perceptual bias for unlimited exposure-durations.

Sarah Hoar* and Karina Linnell
Goldsmiths, University of London
s.hoar@gold.ac.uk

The present study used Navon-type (1977) hierarchical patterns to demonstrate that cognitive load eliminates a global perceptual bias and enhances the representation of local elements at unlimited exposure-durations. We added a cognitive-load manipulation to Kimchi and Palmer’s (1982) similarity-matching experiment with hierarchical patterns and presented stimuli for either unlimited or limited exposure-durations. When exposures were unlimited, we demonstrated that observers exhibited a global bias under low cognitive load, but not under high cognitive load (Experiment 2). When exposures were limited, however, cognitive load exerted no effect and the global bias remained (Experiment 1). We suggest that (i) these findings are best reconciled by proposing two stages in the representation of global structure, namely construction and maintenance; (ii)
construction and maintenance stages are isolated, respectively by limited-duration and unlimited-duration paradigms; and (iii) cognitive processes play an integral role only in the maintenance stage. Given that real-world vision is not driven by a series of brief stimulus exposures and is therefore likely to reflect maintenance processes, we argue that unlimited-exposure paradigms are more suitable for addressing real-world perceptual biases; when unlimited-exposure paradigms are used, cognitive load eliminates the commonly reported global bias.


**Effects of highly skilled motor abilities on the effectiveness of frontal brain functioning: Evidence for more effective response monitoring in Amateur Musicians**

Ines Jentzsch, Anahit McMrkhtchian* and Nayantara Kansal*
University of St Andrews
jj7@st-andrews.ac.uk

It has been suggested that highly skilled motor performance such as achieved through intensive musical practice can enhance executive functions both in children and adults (e.g., Bialystok & Depape, 2009; Hanna-Pladdy et al., 2011). Here we looked at the effects of musical practice on the ability to monitor our behaviour (e.g., error and conflict detection) and to implement necessary control adjustments (e.g., amount of posterror slowing) using both behavioural and neurophysiological measures. Participants were divided into 4 groups according to the number of lifetime accumulated hours of instrumental practice. All participants completed a Simon and Stroop task during which EEG was recorded. Musicians demonstrated faster overall performance, indicating more efficient information processing, and reduced slowing after an error, showing that musicians experience less processing interference after error commissions. Electrical brain activity linked to error monitoring was enhanced in highly trained musicians compared to non-musicians, suggesting a more efficient error detection mechanism in this group. Our results further support the idea that engagement in musical activity might be linked to enhanced cognitive control functioning.


A network for social saliency: The neural and functional creation of new personal significance

Jie Sui¹, ², Pia Rotshtein³* and Glyn Humphreys¹
¹. University of Oxford
². Tsinghua University
³. University of Birmingham
jie.sui@psy.ox.ac.uk

The ability to assign a stimulus with personal social significance is a basic human capacity that is currently poorly understood. Here we examined the neural basis of this assignment process using a newly developed associative learning procedure in which we ‘tag’ a neutral shape with self-relevance. We measured behavioural and neural responses to stimuli linked to the self vs. other people. The behavioural results demonstrated that self prioritization was rapidly established. This was associated with enhanced activity to self-associated stimuli over brain regions associated with self representation (the ventro-medial pre-frontal cortex, vmPFC) and with sensory-driven attentional control (the left posterior superior temporal sulcus, LpSTS). In contrast, associations formed to other people recruited a dorsal fronto-parietal attentional network. Effective connectivity analyses using dynamic causal modelling showed that regions responding to the self (vmPFC) and to the associated social cue (LpSTS) were functionally coupled to boost the behavioural bias for the self-tagged associations. The results demonstrate that the assignment of personal social significance is rapidly set up by coupling self-representations to brain regions modulated sensory-driven attentional control.

Self-association generates ultra-fast alterations in perceptual salience

Glyn Humphreys¹, Minghui Liu²*, Carmel Mevorach³ and Jie Sui¹, ²
¹. Oxford University
². Tsinghua University
³. Birmingham University
glyn.humphreys@psy.ox.ac.uk

Human perceptual learning is associated with slow changes in perceptual salience. Here we show that, in contrast, associating a stimulus to the self produces ultra-fast alterations in perceptual salience, changing the neural response to formerly neutral stimuli. Participants associated shapes with either themselves or a friend, over a short run of training trials. Subsequently the shapes were identified in hierarchical (global-local) forms. We first demonstrated effects of perceptual salience produced by blurring the shapes (to enhance global salience) and introducing color differences between high contrast shapes (to enhance local salience). Responses were slowed when the target had low salience and the distractor at the other level had high salience. These effects of perceptual salience were replicated when the original shapes were ‘tagged’ by associating to the self – responses to a shape associated with an unfamiliar person were slowed when the distractor was associated with the self. This effect was not found for associations to a friend. The effects of a self-associated distractor increased activation in the left posterior parietal cortex, linked previously to the suppression of perceptually salient distractors. The results show that elf-association rapidly modulates visual perception, consistent with social context affecting the way we see the world.
Testing a SIMPLE Simulation of Temporal Distinctiveness Effects in Task Switching

James A. Grange
Keele University
j.a.grange@keele.ac.uk

In task switching, extending the response–cue interval (RCI) has been shown to reduce the switch cost—the detriment to response time and accuracy when switching compared to repeating tasks. This reduction has been taken as evidence for the existence of task-set decay processes, a view recently challenged by the observation of sequential dependencies on the RCI effect: switch cost is only reduced at longer RCIs when the previous trial had a short RCI (Horoufchin et al., 2011). This trial-wise variation of RCI is thought to affect the temporal distinctiveness (TD) of a previous task’s episodic trace, thus affecting the probability of automatically retrieving this episode on the current trial. The present study sought to translate this verbal theory into a rudimentary computational simulation, which uses Brown et al.’s (2007) SIMPLE model of memory to estimate retrieval probabilities of task-sets. The simulation was able to produce the data pattern attributed to TD effects with its very basic assumptions. Instantiation of the simulation made predictions of the response-time distributions of different TD conditions which were tested in a new experiment. The implications for theories of task switching are discussed.


EEG correlates of the length effect in line bisection.

Christopher Benwell*, Monika Harvey and Gregor Thut*
Glasgow University
chrisb@psy.gla.ac.uk

A systematic leftward bias (pseudoneglect) is typically exhibited by healthy young adults during performance of line bisection tasks. However, the bias is modulated by stimulus factors such as line length. The processes underlying modulation of bias magnitude and direction remain unknown. A possible explanation is that bias level depends on the extent to which the spatially dominant right hemisphere is engaged by the combination of stimulus and endogenous state during performance of the task. During performance of a perceptual line bisection task in both long and short lines, we discovered long lines to induce an increased hemispheric asymmetry of electrophysiological processes implicated in visuospatial processing relative to short lines. Increased right hemisphere utilisation in long lines occurred within the P1/N1 ERP complex, and was found to correlate with line bisection bias direction/magnitude across participants. The results suggest that the common leftward bias displayed in pseudoneglect is a function of right hemisphere dominance during early stimulus-driven indices of visual processing.
Symposium: Mental Time Travel
Organiser: Professor Anthony Dickinson, University of Cambridge

Some Problems in Human Prospection

Daniel Gilbert*
Harvard University
gilbert@wjh.harvard.edu

One of the brain’s primary functions is to anticipate the future. Over the last decade, my colleagues and I have been investigating how and how well people can imagine their hedonic reactions to future events, and we have found that they are prone to four fundamental errors. Things rarely turn out just the way we think they will, and I will provide an overview of a program of research that attempts to explain why.

Are Mental Time Travel Researchers Singing from the Same Hymn Sheet?

Lucy Cheke* and Nicola Clayton
Cambridge University
lucy.cheke@gmail.com

As with any young field of research, research into Mental Time Travel is beset with debate. Much of this debate is limited by the lack of consensus as to how Mental Time Travel is assessed. A number of different philosophical, theoretical and empirical perspectives on Mental Time Travel have led to a proliferation of methods of assessing it. Although these tests putatively assess the same psychological capacity, they are, at least superficially, very different. Crucially, they have rarely if ever been tested in the same subjects. Here we present two studies that aimed to investigate the extent to which these different tests could be said to be assessing the same cognitive processes. The first investigates whether performance on these tests is related in developing children, and the second in adults.

The What-Where-When Paradigm: a novel way of testing human episodic memory?

Tom V. Smulders1*, Michael Craig1,2*, Adele Mazurek1*, Colin J. Hamilton3* and Peter Gallagher1*
1. Newcastle University
2. Edinburgh University
3. Northumbria University
tom.smulders@ncl.ac.uk

To study mental time travel and episodic-like memory in non-human animals, Clayton & Dickinson (1998) used a working definition of episodic memory: memories for What happened, Where and When. We have adapted the What-Where-When memory task to investigate episodic memory and mental time travel in adult humans with more ecological validity that typical list learning tasks. The task allows us not only to test memory for places, objects and times, but also for the binding between the different elements. Performance on the task correlates with traditional measures of episodic
memory (Rey AVLT – a word-list learning task). We have then compared What-Where-When memory performance in healthy older adults (65+) with healthy younger adults (18-25). Whereas we find that healthy older people show the expected decreases in performance in a number of different standardized cognitive tests (including Rey AVLT), they are not different in their performance on the What-Where-When memory task. This suggests that healthy ageing may not affect every day mental time travel abilities as much as it does standardized tests that require effortful memorization.

**Intertemporal choice, hyperbolic discounting, and mental time travel: A comparative and evolutionary discussion**

Stephen E. G. Lea  
University of Exeter  
s.e.g.lea@exeter.ac.uk

One of the most influential ideas that has entered behavioural economics from experimental psychology has been “hyperbolic discounting”. This concept derives from theoretical and empirical work by Herrnstein, Rachlin, Ainslie and others on instrumental conditioning, and in particular from the “quantitative law of effect” that Herrnstein used to explain the “matching law”, an empirical generalization about choice between certain schedules of reinforcement. Hyperbolic discounting explains several anomalies of economic choice, especially the phenomenon of increasing preference for the temporally closer of two positive outcomes as the time until the sooner of the two decreases. The animal experiments from which the idea of hyperbolic discounting sprang give good grounds for expecting that humans will show such a process over short delays when choices are made without conscious thought, and a good deal of economic behaviour falls into this category. However, it requires a substantial extrapolation to extend the predictions made from hyperbolic discounting to long-term deliberative decisions, such as those about saving. I will argue that to understand such choices we need to invoke the concept of mental time travel, which enables us to recall past events and envisage future event. But how far does it enable us to compare the value of events at different future times, or to choose consistently between them? Using evolutionary arguments, I will consider what processes might contribute to such choices, and suggest that hyperbolic discounting may have a role to play in them, even if it cannot be used to predict their outcomes directly.

**The TARDIS within: neural signatures of mental time travel**

Eleanor Maguire*  
University College London  
e.maguire@ucl.ac.uk

Human beings are not designed to live in the moment. We spend an inordinate amount of our time inhabiting the past, the future, other worlds, other minds. Why and how do we do this? Here, drawing on recent neuropsychological and neuroimaging evidence, I will address these questions, and consider some neural mechanisms that may permit this mental time travel.

**End of Symposium**
Does having more time to think improve performance on an “implicit” categorization task?

Fraser Milton¹*, Andy Wills², Ben Newell³ and Chris Moore³*
1. University of Exeter
2. University of Plymouth
3. University of New South Wales
f.n.milton@ex.ac.uk

A recent study by Filoteo, Lauritzen, and Maddox (2010) showed that the imposition of a concurrent working memory task improved performance on an information-integration categorization task. This finding is predicted by the Competition between Verbal and Implicit Systems (COVIS) model which holds that tying up working memory resources aids the transference of the categorization decision from the verbal to the implicit system. The implicit system yields superior accuracy for information-integration categorization because it predecisionally integrates information from the multiple dimensions of the category structure. One problem with this account, however, is that participants in the working memory condition had an extra 2500 ms inter-trial interval (ITI) compared to participants who learned only the categorization task. It is, therefore, possible that the extra time available to process the feedback was responsible for the better performance in the working memory load condition. We investigated these alternative explanations by manipulating the ITI (short, long) and the position of the working memory task (before or after categorization). Consistent with the “thinking time” hypothesis, we found that participants in the long ITI condition performed better than those in the short ITI condition. In contrast, the position of the working memory task had no effect on performance.

Less is more? Is overall similarity classification less effortful than single-dimension classification?

Andy Wills¹ and Fraser Milton²*
1. University of Plymouth
2. University of Exeter
andy.wills@plymouth.ac.uk

It is sometimes argued that the implementation of an overall similarity classification is less effortful than the implementation of a single-dimension classification, but there is also substantial evidence for the opposite proposition (e.g. Wills et al., in press). We report a series of large-scale replications of some of the classic experiments (e.g. Smith et al., 1984) taken to support the first, less-is-more, hypothesis and re-interpret the data through the use of a model-based analysis that overcomes an inherent ambiguity in the original analyses. Our results indicate that some previous experiments taken to support a less-is-more hypothesis are actually more consistent with a more-is-more hypothesis; but they also provide some indication that, under limited conditions, there may be some support for the less-is-more hypothesis.


**Autism Spectrum Traits and Adaptive Coding Mechanisms**

Rebecca P. Lawson*, Charlotte Howes*, and Jonathan P. Roiser*
University College London
rebecca.lawson@ucl.ac.uk

Adaptation is a means of self-calibration in the visual system, without which no perceptual constancy would exist and "an over-responsive and ever-amending process would arise" (Webster, 2011). Decreased adaptation aftereffects for facial identity stimuli have been reported in individuals with autism spectrum disorder (ASD) (Pellicano, Jeffery, Burr, & Rhodes, 2007) suggesting impaired adaptive coding as a possible factor underlying social/perceptual difficulties in ASD. The present study investigated whether individual differences in visual system adaptability relate to autistic traits (AQ score) in the normal population. Subjects (n=28) completed three simple direction judgement adaptation tasks involving social (eye-gaze and head direction) and non-social (chair direction) stimuli. The results showed negative correlations between adaptation magnitude and autistic trait level for all three tasks, supporting the hypothesis that compromised adaptive coding mechanisms go beyond social stimuli and may be a general feature of ASD. Furthermore, adaptation magnitude for the eye-gaze task was found to correlate with measures of sensory sensitivity, suggesting a mechanistic link to perceptual ‘overload’ symptomology commonly reported in ASD.


**Using Eye Movements to Reveal Underlying Factors in Hemispatial Neglect: Why is Information Neglected?**

Louise-Ann Leyland*, Hayward J. Godwin*, Valerie Benson*, and Simon P. Liversedge
University of Southampton
l1306@soton.ac.uk

It has not yet been established whether hemispatial neglect results from an information sampling deficit or impaired processing of contralesional information during fixation. We recorded eye movements of acute neglect patients (NPs), stroke controls (SCs), and older adult controls (OACs) whilst participants searched for two different target letters presented amongst distractor letters (dual-target search) or cancelled clocks displaying a predetermined time amongst distractor clocks (single-target search). The NPs’ poor target identification accuracy was restricted to contralesional regions but they made contralesional saccades to the same extent as controls. However, NPs spent less of
the total trial time fixating contralesional regions. This sampling deficit was exacerbated by increased task difficulty (i.e. dual-target search). Average contralesional gaze durations (sum of fixation durations before transgressing a region boundary) in the clock cancellation tasks, were significantly inflated in NPs, indicating problems associated with either encoding or representing that information. The results not only reveal biased visual sampling in neglect, but also demonstrate that during contralesional fixations, disruption in processing was evident. This has implications for the efficacy of interventions that shift involuntary eye movements into the neglected area, as even when NPs visually sample information, they may still fail to perceive it.

Three-dimensional volume perception via binocular disparity

Julie M. Harris*
University of St Andrews
jhh81@st-andrews.ac.uk

Binocular disparity is a robust source of visual information about three-dimensional (3-D) shape and location, and is thus considered a powerful visual depth cue. However, few studies have explored how binocular disparity contributes to depth perception for tasks requiring integration of depth information across a whole scene. Here we explored the role of binocular disparity in volume perception. Displays consisted of small line elements (size) presented throughout a volume at a range of different depths. The observer's task was to choose which of two volumes, presented side by side in a single interval (2s), was the thicker. Psychometric functions were fit to the resulting data and points of subjective equality extracted to obtain estimates of perceived volume. The number of elements affected the perceived depth of the volume, with more numerous volumes appearing to have less depth than sparser ones. Models of first-stage disparity processing predict that local disparity estimates may be compromised in dense displays with elements at different depths. Our results fit these predictions, and suggest that early visual processing limits the utility of disparity under conditions where depth varies rapidly.

Effects of ageing on the rate of visual information processing; a speed-accuracy trade-off (SAT) analysis

Duncan Guest*, Christina J. Howard*, Louise A. Brown* and Harriet Gleeson*
Nottingham Trent University
duncan.guest@ntu.ac.uk

Age related decline has been observed for a number of different types of processing speed (Salthouse, 2000), including psychophysical processing speed (the speed at which a representation of a physical stimulus can be formed). Although aging influences speed-accuracy trade-off (Starns & Ratcliff, 2010), rarely have estimates of psychophysical processing speed been derived from studies using a speed-accuracy trade-off methodology that examines the time course of task performance. In three experiments a speed-accuracy trade-off design was used that required identification of gabor patch orientation after differing amounts of stimulus exposure. Modelling speed-
accuracy trade-off functions enabled estimation of the rate of visual information processing in a task with a single stimulus (Experiment 1), distracting stimuli (Experiment 2) or two stimuli with the target being post cued on stimulus offset (Experiment 3). Older adults displayed a deficit in visual information processing only when interfering items were present, suggesting difficulties with inhibiting distracting items and encoding and maintaining multiple distinct object representations.


**EPS Mid-Career Award Lecture**

**Ways of Thinking: From crows to children and back again**

Nicola S Clayton  
University of Cambridge  
*nsc22@hermes.cam.ac.uk*

Food-caching corvids possess cognitive abilities that are thought to be on a par those found in apes. These abilities are not trivial for research on developmental cognition suggests that young children do not pass these tests until they are at least four years of age in the case of the social cognition experiments, and seven years of age in the case of the tasks that tap into physical cognition. At first sight this seems surprising for intuitively one might have thought that the social and planning tasks required more complex forms of cognitive process namely forethought and Theory of Mind. But perhaps the fact that children pass these tasks earlier than the water task is a reflection of cultural influences. In this regard it would be fascinating to carry out ethnographic studies of when these abilities develop in children in other cultures, as well as gaining a better understanding of the mechanisms controlling the various behavioural decisions that the children make in these and related tasks. The work also has implications for the crows. It may be taken to suggest that these abilities are not trivial in crows, given the surprising difficulties the children have. Future research will hope to identify what these cognitive milestones are by starting to develop tasks that might go someway towards understanding the mechanisms underlying these abilities in both crows and children, looking for both similarities and differences.
Symposium: Sound symbolism and cross-modal correspondences
Organiser: Professor Padraic Monaghan and Peter Walker, University of Lancaster

Sound Symbolism and Cross-Sensory Correspondences

Peter Walker
Lancaster University
p.walker@lancaster.ac.uk

Reflecting on some traditional and recent demonstrations of sound symbolism indicates that the semantic encoding of the elementary features of speech sounds helps to determine a word’s appropriateness for its referent. More specifically, like the elementary features of non-speech sounds and stimuli engaging other modalities, speech sounds can have a range of connotative meanings they are able to share with other stimuli. The notion that the sharing of connotative meanings can underpin sound symbolism converges with recent claims that cross-sensory correspondences also originate in the connotative meanings of elementary stimulus features. That is, different elementary stimulus features enter into correspondence to the extent they are similarly positioned on dimensions of connotative meaning. Observations of cross-sensory correspondences in infancy imply they are available to support the child’s exploitation of sound symbolism during language acquisition. Viewing sound symbolism as a form of cross-sensory correspondence predicts other types of symbolism (e.g., visual symbolism) in a broader range of situations, each warranting investigation from this perspective.

Metaphors in the ear and in the world

Cesare Parise¹,²
¹. Max Planck Institute for Biological Cybernetics and Bernstein Center for Computational Neuroscience
². Bielefeld University
cesare.parise@tuebingen.mpg.de

Crossmodal correspondences are “metaphorical” mappings of supposedly unrelated features between different sensory modalities. Although the scientific investigation of crossmodal correspondences, and the related phenomenon of sound symbolism, has a very long history, so far there is still no clear evidence to account for their origins. In the first part of my talk I will focus on the mapping of auditory pitch and spatial elevation, and demonstrate that, statistically speaking, such mapping is already present in both the distal and the proximal stimulus, and manifests behaviourally as biases in sound localization tasks. In the second part I will present experimental evidence of sound symbolism in a vocalization task where participants had to articulate the letter /a/ in response to simple visual stimuli. A phonological analysis of vocalizations revealed a systematic modulation of speech as a function of the visual stimulus triggering the vocalizations. The results of both experiments are discussed from an evolutionary standpoint.
Cross-modal correspondences in the language of perception

Asifa Majid*
Radboud University Nijmegen
asifa.majid@mpi.nl

What can language tell us about cross-modal correspondences? By considering how speakers from unrelated cultures across the globe talk about simple perceptual events, I show that the language of perception displays lavish cross-modal mappings. In one experiment, participants from 21 geographically, typologically and genetically diverse languages named simple perceptual stimuli depicting colours, shapes, sounds, tactile textures, tastes and smells. The data came from both small-scale communities, as well as large urban populations. The communities sampled were diverse in their mode of subsistence, including nomadic hunter-gatherers, pastoralists and members of a commercial economy. The data show that the degree to which sensory modalities are codable in specific languages is highly variable: some communities show high elaboration in the domain of colour, while others excel in expressing tastes. One noteworthy facet of the data is the use of cross-modal metaphor and sound-symbolism. In particular, sound showed a high prevalence of cross-modal metaphor, while smell displayed intriguing sound-symbolism. I argue that language patterning is part of the data that any adequate theory of cross-modal correspondences has to account for, and that the language of perception study suggests new avenues to explore in this regard.

Music and sound symbolism: prospects and challenges of empirical research

Zohar Eitan*
Tel Aviv University
zeitan@post.tau.ac.il

Across cultures and historical eras, in genres ranging from the liturgical to computer games soundtracks, music has been associated with texts, narratives, or descriptive content. Thus, music provides a unique domain for a systematic research of sound-meaning relationships in diverse cultural and historical contexts. Such research may use both quantitative corpus analysis and psychological experimentation. Quantitative/statistical analysis of musical corpora (notated or recorded) may suggest how musical or acoustic features are mapped onto extra-musical domains, examining how such features associate with the text a music sets, its titles, its narrative program, or its accompanying visuals. Correspondingly, experimental studies of listeners’ responses to music may suggest how musical features, such as pitch height or loudness, are associated perceptually or cognitively with extra-musical features, such as visual size, brightness or spatial height. In this presentation, I will survey recent empirical research of cross-domain mappings in musical contexts. The survey will point out distinctive aspects of investigating sound symbolism within complex musical contexts, as compared to research of similar phenomena in linguistic or psychophysical settings, discussing both the insights such music-related research may convey and its methodological hurdles. Finally, I discuss the reciprocal interaction of cross-modal and emotional connotations of sound in musical contexts, focusing on intriguing cases in which such connotations emphatically clash.
Expression of body size in vertebrate vocalisations

David Reby*
University of Sussex
D.Reby@sussex.ac.uk

I will review studies of sexual communication in polygynous deer to illustrate how vertebrates use vocal signals to express body size and related attributes. Our investigations of the anatomical bases, acoustic variation, and function of sexual calls have shown that: (i) both red deer and fallow deer males have a descended and mobile larynx, an anatomical innovation that enables callers to lower their formants during vocalising and exaggerate their apparent body size; (ii) minimum formant frequencies provide an honest indication of body size in red deer roars; (iii) stags use rivals’ minimum formant frequencies in assessment during male-male contests, and adjust the formants of their own replies in relation to what they hear; (iv) oestrus red deer hinds pay more attention to roars in which formant spacing indicates larger males, but prefer higher pitched roars. I will discuss the relevance of these observations for the evolution of vocal communication, including human speech.

Perceptual correspondences, across and within modalities

Lawrence E. Marks* and Catherine M. Mulvenna*
Yale University
lawrence.marks@yale.edu

Some cross-modal correspondences are doubtless learned, through language or from statistical regularities in the environment (for example, higher auditory pitch may become associated with smaller visual size because resonance frequency tends to decrease with size). Other cross-modal correspondences, however, likely rely on ‘natural’ perceptual similarities (for example, higher pitch to white colors and lower pitch to black). Here, we conceive of these cross-modal correspondences as inhabiting a broader domain of ‘natural’ perceptual correspondence, a domain that they share with the following three forms of intramodal correspondence: identity-correspondence (for example, when lights of physically different spectral composition appear identical); within-dimensional correspondence (for example, when sounds appear equivalent in loudness while differing in pitch); and cross-dimensional correspondence (for example, higher pitch to loud and lower pitch to soft). We propose a progression from identity-correspondence to within-dimensional to cross-dimensional to cross-modal correspondence, with each successive form of correspondence – and the similarities that underlie it – relying increasingly less on low-level sensory processes or partial identities. Inspired by theories of metaphor that transcend similarity (e.g., Black, 1962) and thereby accommodate processes of creativity, we propose developing an analogous theory of similarity in which correspondences, within and between modalities may act like primitive metaphors.


End of Symposium
Chunking as an explanation for why the span size of digits is superior to the span size of other stimuli

Gary Jones
Nottingham Trent University
gary.jones@ntu.ac.uk

Digit span is the archetypal test of (verbal) short-term memory capacity and yet span scores for digits are superior to all other stimuli. One obvious reason for digit superiority is chunking: because sequences of digits frequently occur in everyday life (e.g. times, dates) they are chunked more often than sequences of other stimuli (e.g. nouns) that are rarely encountered in everyday life. Eight and ten year old children were presented with sequences of digits, nouns, and child names, with span being significantly larger for digits than for both nouns and child names. A computational implementation of chunking trained on child-directed language input showed exactly the same effects, suggesting that digit superiority is caused by the presence of a greater number of chunked digit sequences than chunked non-digit sequences. The chunking account was further tested in adults, with results suggesting that learning only a few chunked digit sequences is sufficient to greatly improve span size. The results of both studies serve to suggest that digit span needs to be replaced by a span task involving stimuli that are not normally encountered in sequence.

Interaction between Mode of Learning and Subjective Experience; Translation Effects in Long-Term Memory

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

Conway and Gathercole (1990) suggested that writing auditorily presented words at encoding involves distinctive translation processes between visual and auditory domains. This translation mechanism leads to higher levels of recognition than the writing of visually presented words, a non-translation mechanism. The present research investigated whether writing and the other translation mechanism of vocalisation; (vocalising visually presented words) would be present in tests of recall, recognition memory and whether these effects are based on the subjective experience of remembering or knowing. Experiment 1 found translation effects in both the visual and auditory domains in recall, with the effect of writing yielding higher recall than both non-translation effects in the auditory domain. Experiment 2 also found translation effects in both the visual and auditory domains in recognition; with the effect of vocalisation yielding higher recognition than both non-translation effects in the visual domain. These translation effects were attributable to the subjective experience of remembering rather than knowing. The present research therefore demonstrates the beneficial effect of translation on both recall and recognition, that these effects are based on rich episodic remembering, and that such effects are stronger when writing in tests of recall and vocalisation in recognition memory.
Deconstructing the differences between Remembered and Imagined Events

Scott Cole¹*, Catriona Morrison¹ and Martin Conway²

1. University of Leeds
2. City University, London
cole.s.n80@gmail.com

A significant body of research has established key similarities and differences between remembering the past and imagining the future. However, although past and future thinking tasks draw upon autobiographical knowledge, only future thinking involves imagination. To elucidate whether past-future differences are attributable to imagination per se, an imagined past event condition was included. This study builds on prior neuroscience studies (Addis et al., 2009; Conway et al., 2003) and contributes important insights into the objective and subjective characteristics of imagined and remembered events. The study of young adults involved a think aloud task and adopted a 3 (Event Type; past, imagined past, imagined future) X 3 (Temporal Distance; week, 6-12 mo, 5-10 yr) repeated measures design. Coded event transcripts demonstrated that experienced events contained a greater proportion of details concerning the episode (in particular, greater temporal, emotional and spatial details) than either type of imagined event. Furthermore, imagined (past and future) events were experienced with less vivid imagery and emotion than memories. However, overall, one’s capacity to produce episodic detail was highly positively correlated across event types, indicating a common cognitive system. Wider theoretical implications will be discussed as well as the relevance to false memory and counterfactual thinking.


Brain Activity Reflects "Memory Strength" Better Than Introspective Judgments

Christoph T. Weidemann¹* and Michael J. Kahana²*

1. Swansea University
2. University of Pennsylvania
ctw@cogsci.info

Classification of stimuli into categories (such as “old” and “new” in tests of recognition memory --- our focus in this paper) requires the mapping of continuous signals to discrete responses. Attempts to measure properties of these signals have mostly focused on the collection of subjective ratings that qualify binary decisions. Using a novel approach, we show that brain activity qualifies recognition memory decisions with higher fidelity than introspective judgements or response times. We found that confidence ratings were disproportionately limited for “new” responses whereas brain activity reflected “memory strength” at similar and high levels for both response classes, yielding a particular advantage for items that were not recognized. Response latencies also reliably qualified recognition decisions, but with lower fidelity than confidence
ratings for both response classes. Our results demonstrate limits in the ability to explicitly discriminate low levels of evidence that represent an intriguing disconnect between consciously accessible information and related signals in brain activity that are less transparent to introspection.

The effect of priming on attitudes: an experimental approach

Kelly Tate\textsuperscript{1*}, Andrew Stewart\textsuperscript{1} and Michael Daly\textsuperscript{2*}
1. University of Manchester
2. University of Stirling
kelly.tate@postgrad.manchester.ac.uk

Attitudes do not always translate into action. We report two experiments examining participants’ attitudes towards the environment and the extent to which these attitudes predict choice behaviour. Experiment 1 examined the relationship between implicit attitudes, explicit attitudes and consumer choices using a binary choice task. Contrary to expectations, implicit and explicit attitudes towards environmentally negative and positive stimuli were strongly correlated, and in separate regression equations, both significantly predicted choice behaviour. Experiment 2 examined whether providing information about the environmental consequences of waste (ostensibly described as a ‘reading comprehension’ task) affected attitudes and choices towards environmentally friendly vs unfriendly stimuli compared to a control group who received a neutral prime. Results confirmed that implicit, but not explicit attitudes significantly differed between the environmental and neutral prime conditions, suggesting that the environmental prime influenced attitudes nonconsciously. Experimental participants made a significantly greater percentage of environmentally friendly choices than control participants. Mediation tests (Preacher & Hayes, 2004) confirmed that increased implicit positivity towards environmentally friendly stimuli in response to the environmental prime mediated the corresponding behaviour change, producing an increase in the choice of those stimuli. By priming participants through information exposure, attitudes and behaviour may therefore be changed in an experimental setting.

Phonological working memory processing in developmental dyslexia

Jumana Ahmad*, Heather Ferguson and Howard Bowman
University of Kent
ja337@kent.ac.uk

The current experiments aimed to explore the nature of the Working Memory (WM) impairment in dyslexia. Two studies were conducted, examining auditory WM during the N-back task. The first used letters as stimuli (Experiment 1), while the other examined auditory WM of words (Experiment 2), which were manipulated by Age of Acquisition (AoA). In both experiments, WM load increased from 0-back to 5-back. Analysis of accuracy for Experiment 1 demonstrated a main effect of WM load upon performance, alongside a main effect of group, and an interaction between N*group. Thus, as the demand upon WM processing became large enough, group effects emerged. Critically, this between group differences was driven predominantly by non-target trials, with dyslexic individuals displaying increased false alarms. Experiment 2 demonstrated an effect of WM load upon accuracy, however there was no interaction between N * Group. Furthermore we replicate experiment 1, with a main effect of group upon non-target performance, demonstrating increased false alarm rate in dyslexic individuals. AoA played a crucial role in reaction times (RTs), with shorter RTs for earlier learned words. These differences will be presented in terms of behavioural, signal detection and P300 analysis.

How does human children’s tool innovation really compare with that of corvids?

Sarah R Beck, Claire Williams, Nicola Cutting
University of Birmingham
s.r.beck@Bham.ac.uk

Innovating a novel tool to solve a problem reveals intelligent and creative problem solving. Beck et al. (2011) gave children a simple hook-making task. The solution was to bend a pipe cleaner into a hook to lift a bucket from the bottom of a tall tube. Three- and four-year-olds rarely solved the task and the majority of children under 8 years failed. What was particularly surprising was that corvids had apparently innovated a hook as a solution to a similar task (Bird & Emery, 2009; Weir et al., 2002). We noted that whereas the children had not used a hook in this context before being asked to innovate, the corvids had done so. We compared 4- to 7-year-olds’ performance (N=58) on the Beck et al. version of the task with a direct replication of that used by Weir et al. Children were significantly more likely to innovate a tool when they had previously used a hook on the same task (p<.001). We concluded that children perform as well as corvids when given a comparable task, yet they remain poor innovators; 2) the evidence for corvids’ innovation needs to be strengthened by testing individuals who have not had tool-use experience.


**Negative affect impairs memory for context**

James Bisby* and Neil Burgess  
Institute of Cognitive Neuroscience, University College London \  
*j.bisby@ucl.ac.uk*

Negative experiences can profoundly affect memory. The “dual-route” model suggests that increases in stress during a traumatic event can down-regulate hippocampal processing leading to weak contextual representations in the presence of spared lower-level sensory/affective representations. This imbalance results in the involuntary re-experiencing of imagery, as in posttraumatic stress disorder. We tested this model by presenting neutral and negative images in combination with background contexts. Memory for images and their associated context was later tested. Recognition of negative images was enhanced compared to neutral, whereas memory for the associated context was significantly reduced when paired with a negative image compared to neutral. In a second experiment, specific background contexts predicted a threat-of-shock or safety. During safety, results replicated Experiment 1 with reduced memory for the context when paired with a negative image. However, the presence of threat resulted in reduced memory for context when paired with neutral images. The results suggest that memory for context (but not content) is reduced by the presence of negative images or threat. Our findings support a model whereby stress can reduce context-dependent memory, whilst the storage of lower-level sensory/perceptual imagery is spared. These results provide insight into the potential mechanisms underpinning intrusive imagery in PTSD.

**Can Inhibition or Working Memory Explain the Emergence of Cognitive Flexibility in Two-year-olds?**

Emma Blakey* and Dan Carroll*  
University of Sheffield  
*e.blakey@sheffield.ac.uk*

Cognitive flexibility allows us to adapt our behaviour in response to changes in our environment. Two contrasting views seek to explain its development. One view posits that inhibition allows children to suppress inappropriate responses (Diamond & Kirkham, 2005). The other argues that working memory enables children to maintain and update representations of the current task rule (Munakata, 2001). The present study tested these accounts at a younger age than typically studied, using a new measure of cognitive flexibility (the SwIFT: Carroll et al., submitted). Sixty-seven two-year-olds matched coloured shapes on a touchscreen computer first according to one rule (colour, pattern or shape), then by a different rule. Children completed either a version requiring inhibition of the previous rule when the rule changed; or a version that reduced inhibitory demands by removing the previously sorted by dimension when the rule changed. Performance did not differ between conditions. However, the better children performed on a measure of working memory, the better their switching performance. These results suggest that at
Two years, cognitive flexibility is underpinned by the ability to maintain and update representations in working memory, and not by inhibitory control.

Carroll, D., Cragg, L., Blakey, E., Onetiu, V., Weyh, S. When getting it all wrong is a great improvement: The emergence of cognitive flexibility in preschool children (submitted to Psychological Science).


Forgetting emotional and neutral words: An ERP study

Karen Brandt, Maria Kragh-Nielsen* and Amanda Holmes*
University of Roehampton
karen.brandt@roehampton.ac.uk

Previous research has demonstrated that emotional material is more likely to be remembered than neutral material. The present study employed the item-method of directed-forgetting in order to examine whether emotionally negative words are not only easier to remember, but also harder to forget. Event-related potentials (ERPs) were additionally measured in order to investigate the processes of selective rehearsal and active inhibition in directed-forgetting. The results demonstrated directed-forgetting effects for both neutral and negative words, with a stronger effect for negative items. Late positive potentials (LPPs) for ‘to-be-remembered’ (TBR) relative to ‘to-be-forgotten’ (TBF) cues were enhanced when the cues followed negative in comparison to neutral words, indicating the greater selective rehearsal of TBR negative items. Frontal positivities to TBF relative to TBR cues were not modulated by word valence, indicating that inhibitory processes were unaffected by emotion. Taken together, the present research demonstrates for the first time that, not only are emotionally negative words prone to the same directed-forgetting effects as neutral words, but that these effects are in fact enhanced for negative words and due to increased selective rehearsal of TBR negative items.

Recalling the past and imagining the future interferes with verbal memory consolidation

Michael Craig*, Michaela Dewar* and Sergio Della Sala*
University of Edinburgh
M.Craig-4@sms.ed.ac.uk

People remember a higher level of new information when encoding is followed by a brief rest than if they attend to other new external information during this time (Cowan et al. 2004; Della Sala et al. 2005; Dewar et al. 2007, 2009, 2012). This benefit is thought to reflect superior memory consolidation during post-learning wakeful rest (Dewar et al. 2009, 2012). In everyday life we also use our memory system in an internally directed manor, e.g. recalling the past and imagining future scenarios. In this study we explored
whether such internal memory activities interfere with the consolidation of recent memory traces. We conducted two experiments in which verbal word learning was followed by three nine minute delay conditions: (i) Wakeful resting, (ii) Visual search task, (iii) Cued recall/imagination task succeeded by a surprise delayed recall test for learned words. We found a significantly lower level of material was retained when new learning was followed by both visual search and cued recall/imagination tasks compared to resting wakefully. We conclude that various activities of the episodic memory system are detrimental to memory consolidation of recent verbal memory traces and when such activities are minimised, an enhancement in memory retention is observed.


What determines complexity in children’s tool making?

Nicola Cutting*, Sarah R. Beck and Ian A. Apperly
University of Birmingham
n.cutting@bham.ac.uk

The belief that humans are experts at all tool-related behavior has been undermined by research showing children’s difficulty innovating novel tools. Experiment 1 investigated whether children’s tool making follows a hierarchy of difficulty proposed in non-human animals (Kacelnik et al., 2006). Four-to-seven-year-olds’ (N=192) ability to make tools by four different methods was tested in two tasks. Children showed poor innovation across modes of tool making. Experiment 2 (N=42) investigated the possibility that tool-making complexity is determined at a lower level. Two lower levels of tool-making were proposed; the transformation required to create each tool and the specific action needed for that transformation. Tasks were identical in transformation but differed in specific actions required. For example two tasks required unbending, but one required unbending a pipecleaner whereas the other required unbending novel material into a flat strip. McNemar tests found no difference between tasks requiring the same transformations but different actions suggesting complexity is not determined at the action level. Taken together the results of these experiments suggest that tool-making complexity is likely to be determined at the level of transformation rather than the broader level of tool-making mode or the more specific action level.

**Children’s Feeling of Confidence under Epistemic and Physical Uncertainty**

Catherine Arianne Darnell* and Sarah Beck  
University of Birmingham  
 cac615@bham.ac.uk

The imagination account (1), suggests children’s preference for guessing under epistemic uncertainty (uncertainty caused by an outcome that has occurred but of which the participant is unaware) results from a false sense of confidence not felt under physical uncertainty (uncertainty caused by an outcome yet to occur). In a series of 3 experiments, 5-7 year olds rated their confidence when guessing what number a die would land on both before (physical) and after (epistemic) it was rolled and then decided when they preferred to guess. In Experiments 1 and 2 (N=234), children preferred to guess under epistemic uncertainty (all p<0.02), yet demonstrated no difference in confidence ratings between epistemic and physical trials (ANOVA, all p>0.37). However, children were asked to rate their confidence after guessing, perhaps thus rating confidence in their guess rather than the confidence felt whilst guessing. However, in Experiment 3 (N=59), children in a ‘rate before’ group, again showed no difference in confidence ratings between epistemic and physical uncertainty (ANOVA, all p>0.15). Against the predictions of the imagination account children’s preference for guessing under epistemic uncertainty is not driven by feelings of explicit confidence. The implications for our understanding of children’s metacognition under uncertainty will be discussed.


**An Investigation into the Boundary Conditions of Optimal Decision Making**

Abigail Dickinson1*, Katherine Baker2*, James Marshall1* and Tom Stafford1  
1. University of Sheffield  
2. University of Liverpool  
 a.dickinson@shef.ac.uk

An optimal decision process can be defined as one that achieves a decision of specified accuracy in the shortest time possible (Bogacz, Brown, Moehlis, Holmes & Cohen, 2006). There is disagreement regarding whether human decision-making is optimal in this sense. Whilst optimal models such as the Drift Diffusion Model (DDM) have been found to closely match some simple perceptual decisions (Smith & Ratcliff, 2004), a large class of observed decisions are known to be sub-optimal (Kahneman, Slovic & Tversky, 1982). This study aimed to find the conditions under which decision making data could be collected in a standard decision making paradigm which the DDM was unable to fit. Fifteen participants took part in the random dot motion task in which
both the level of conflict and total signal was manipulated. Whilst the DDM predicts decision making processes are based on net evidence, our results indicate that total signal also has a significant effect. In addition, equal evidence conditions elicited longer reaction times, suggesting that decision making under high conflict follows a sub-optimal process. In order to offer a complete model of decision making processes, the DDM needs to be developed so that it can account for both of these findings.


**Resource Sharing in a Multiple Component Memory System: Evidence for Specific Memory Resources**

Jason M Doherty* and Robert H Logie

University of Edinburgh

j.m.doherty@sms.ed.ac.uk

Recent investigations into the structure of working memory have focussed on its unitary nature, with strong emphasis on a single attentional resource shared among concurrent tasks (e.g. Barrouillet Bernardin, & Camos, 2004; Barrouillet & Camos, 2001, 2007, 2010) rather than domain-specific approaches (e.g. Baddeley & Hitch, 1974; Baddeley & Logie, 1999). However, Logie (2011) argues that shared–resource effects are not incompatible with a multiple-component structure of working memory, theorising that domain-general effects may be observed when the capacity of individual components is exceeded. Here we report experiments in which participants complete processing and storage tasks simultaneously with no significant difference in performance compared to processing alone or memory alone provided that both tasks are set below participants’ span. Drops in on-line processing are observed when memory tasks are set at or above single-task memory span, but drops in memory are not observed when processing is set at or above single task processing span. We argue that once memory capacity is exceeded participants can draw upon domain-general processing resources to support memory, but that resources specific to memory are not able to support on-line processing when participants’ processing capacity is exceeded.


*Is sandpaper ‘kiki’? Exploring crossmodal correspondences in touch*

Roberta Etzi¹*, Charles Spence² and Alberto Gallace¹

1. University of Milan-Bicocca
2. Oxford University
roberta.etzi@unimib.it

Over the last decade, the scientific community working on multisensory processing has become increasingly interested in the topic of crossmodal correspondences. Nevertheless, little research in this area has investigated possible associations between touch and the other sensory modalities. Here, we provide a preliminary study in which we explore the nature of the associations between tactile sensations and the sound of words as well as people’s emotional states. We stimulated the participant’s forearm with five textures (keeping the speed of stimulation constant at 5 cm/sec in order to activate CT fibers which are specialized in conveying emotional tactile contents). The participants evaluated the tactile stimuli along several different dimensions. The results revealed that smooth textures were associated with non-words such as ‘Maluma’ and positive emotions, whereas rough textures were associated more strongly with sharp-transient non-words, such as ‘Takete’ and negative emotions. Furthermore, some of the crossmodal correspondences between the tactile surfaces and words that were documented related to visual-auditory contents. For example, smooth textures were associated with adjectives such as bright and quiet, by contrast rough textures were associated with adjectives such as dim and loud. Taken together, these results further our understanding of crossmodal correspondences involving touch.

*Preschool children’s cognitive flexibility is facilitated by a computerised task format, but their working memory is not*

Lily FitzGibbon¹*, Daniel J Carroll¹*, Lucy Cragg² and Danielle Matthews¹*

1. University of Sheffield
2. University of Nottingham
When asked to switch from sorting stimuli by shape to colour, three-year-olds typically continue sorting by the previously relevant rule. Previous research in our lab found that three-year-olds persevere more on the card-based DCCS (Zelazo, 2006) than on a computerised switching task (the SwIFT, Carroll et al., 2012) with comparable executive demands. This implies that non-executive task demands drive perseveration on the DCCS. Alternatively, actions performed on a computer may form weaker representations than actions with ‘real’ objects, like cards. On cognitive flexibility (CF) tasks, weaker representation of initial task rules promotes switching (Yerys & Munakata, 2006). Conversely, performance on working memory (WM) tasks ought to be impaired by weaker task representations (Munakata, 2004). To test the weaker representation hypothesis, thirty-seven preschoolers completed computer-based or object-based versions of CF and WM tasks. More children perseverated on the object-based CF task than the computer-based version, $\chi^2(1) = 6.68, p = 0.01$, replicating previous findings. Children’s performance did not differ between the computer-based and object-based WM tasks. These findings indicate that the computerised format does not necessarily lead to weaker representations than tasks with ‘real’ objects. These findings support the alternative hypothesis that non-executive task demands drive perseveration on the card-based DCCS.


Secondary school students' science text understanding: The importance of 'cohesive' text designs and individual differences.

Sophie Hall¹*, John Maltby¹*, Ruth Filik² and Kevin Paterson¹
1. University of Leicester
2. University of Nottingham
sh449@leicester.ac.uk

There is increasing awareness of declining interest in school science from 11 years of age, and the need to improve scientific literacy to enhance attainment in science (Norris & Phillips, 2003). To explore the factors influencing science literacy, we measured beginning secondary school student’s comprehension of different text design and measured individual difference predictors of their comprehension. In a classroom exercise students answered multiple choice questions (MCQs) after reading high and low cohesion text. Experiment 1 (104 students, 12.3 years ± 2.1) revealed that students were significantly more accurate in the MCQs after reading text that was high global cohesion
compared to low global cohesion. Reading ability was a unique predictor for performance with both text designs. Individual aspirations in science accounted for unique variance for the comprehension of high cohesion texts. In experiment 2 (60 students, 12.7 years ± .65) students achieved greater MCQ accuracy with high referential cohesion text, compared to low referential cohesion text. General intelligence was a significant predictor of performance with both text designs. ‘Dutifulness’ predicted learning from high cohesion text only. The importance of text cohesion and the role of individual differences in science learning have significant implications for the teaching of science.

Differential use of verbal coding by young and older adults in static and dynamic visual tasks.

Mark J. Horne*, Ian Deary*, Louise Brown and Robert H. Logie
1. University of Edinburgh
2. Nottingham Trent University
m.j.horne@sms.ed.ac.uk

This study assessed the effect of ‘easy to name’ and ‘hard to name’ patterns on younger (18-25, n=24) and older (60-75, n=24) adults’ performance on static and dynamic versions of the Visual Patterns task. Brown, Forbes and McConnell (2006) found that younger and older adults showed lower visual spans with hard to name than with easy to name static patterns. This indicated possible use of verbal codes by both groups to supplement visual coding of the square matrix patterns. Results from Johnson, Logie and Brockmole (2010) suggested that older adults might rely heavily on verbal coding when performing visual short-term memory tasks. In the current study, both younger and older adults showed a benefit from pattern nameability in the static condition. In the dynamic condition only the older participants showed a nameability benefit. This suggests that older adults are more reliant than are younger adults on verbal coding when performing visuospatial tasks, and, as suggested by Johnson et al. (2010), visuo-spatial tasks might be measuring different cognitive abilities in younger and older adults.


Outcome identity is necessary for cue-potentiated reward seeking; outcome value is not sufficient

Stephen Jeffs* and Theodora Duka*
University of Sussex
s.jeffs@sussex.ac.uk

Background – items associated with rewarding outcomes, e.g. a bottle with alcohol, evoke separate mental representations of the identity and value of the outcome. Research suggests that the identity component is sufficient to elicit reward-seeking, but
the role of the value component remains unclear. Method – participants completed a Pavlovian phase which associated one picture with winning 50p, and another picture with winning nothing. Participants' knowledge of these associations and liking of the pictures was recorded to measure their identity and value representations, respectively. In an instrumental phase participants learned that repeatedly pressing a button would win 50p. In the test phase participants were shown either picture and had the opportunity to press the button. Results – participants were classified as aware or unaware depending on their knowledge of the picture–outcome associations. Both groups liked the winning picture more than the non-winning picture. However, only aware participants increased their response rate after seeing the winning picture. Liking the winning picture did not correlate with responding. Conclusions – outcome identity representations are necessary for cues to influence reward seeking; outcome value representations are not sufficient. Investigation is currently underway to ascertain the level of conscious identity representation required to influence reward-seeking.

The influence of finger-counting preference and gender on number-to-position estimation

Thomas Mitchell¹*, Rebecca Bull¹,²* and Sandie Cleland¹
1. University of Aberdeen
2. Nanyang Technological University

Recent studies of embodied cognition within the numerical task domain have examined how egocentric (finger counting) and allocentric (reading and writing direction) spatial reference frames influence how we mentally represent number (Previtali et al., 2011). However, not all individuals show evidence of the typical effects seen for numerical-spatial associations (e.g., SNARC, Numerical Distance Effects), and the reasons for these individual differences are still debated (Wood et al., 2008). Some spatial judgement tasks make use of parietal brain areas commonly associated with numerical processing decisions (Semrud-Clikeman et al., 2012); whilst sex differences at the neural level within such spatial tasks are reported, evidence for a behavioural difference during numerical judgement is sparse (Bull et al., in press). This study looks at the impact of gender and egocentric embodiment of number on estimation error using a number-to-position task. Seventy-two undergraduate students were assessed on a computerised number-line estimation task. Data showed that females were significantly less accurate than males, and that right-start finger-counting direction resulted in greater estimation error than left-finger starting. The results are discussed with relation to patterns of proportional judgement model fit (Barth & Paladino, 2011) and contour analysis of response times and error (Ashcraft & Moore, 2012).


Localisation of the Human Mirror Neuron System in Single Participants

James Munro*, Jonathan Silas*, Margot Crossman* and Joseph P. Levy*
University of Roehampton
james.munro@roehampton.ac.uk

Attempts to study the mirror neuron system (MNS) using functional magnetic resonance imaging (fMRI) have suffered from a lack of accurate and consistent localisation in the human brain. Previous research frequently involved only the observation of movement (with no corresponding execution task), and assumed that any premotor or parietal lobe activation represented MNS activity. Meta-analyses have provided coarse boundaries at group level, but they ignore single participants. The plasticity of the motor system may mean that localisation at the group level is too approximate to accurately map MNS regions in individuals. The aim of the current research was to define cortical areas that show functional overlap during the observation and execution of action. Participants were instructed to observe videos of individuals reaching and grasping a cup, and to make the same actions towards a cup they had with them in the scanner. The findings identified areas that were active during each condition in both premotor and parietal regions across all participants. These brain areas were also identifiable within each individual participant. These findings demonstrate the feasibility of localising MNS regions on a participant-by-participant basis using a task involving both execution and observation.

Is the semantic satiation paradigm a useful method for investigating the role of language in the interpretation of facial expressions?

Emma Portch*, Charity Brown, Jelena Havelka, Hannah Cook* and Rebecca Simpson*
University of Leeds
e.s.portch@leeds.ac.uk

Lindquist et al., (2006) reported semantic satiation effects in the interpretation of facial expressions. Emotion perception was less accurate after participants had repeated an emotion label 30 vs. 3 times (e.g. ‘sad’). Emotion labels may play a role in shaping conceptual knowledge important for emotion perception. Within trials participants were required to repeat emotion labels which matched or mismatched the emotional expression at test. Theories about the structure of conceptual knowledge would be informed by
comparing decision accuracy after satiation of a relevant vs. irrelevant label. Interpretation errors after repetition of any label would support a broad, unitary network of conceptual knowledge. Conversely, a modular, emotion-dependent model would be supported by errors following emotion-relevant repetitions. Findings did not conclusively support either account. Adding a ‘baseline’ condition, where non-emotion words are repeated, may develop theories. A 2(word repetition: 3 vs. 30) × 2(word relevance: emotion relevant vs. control) within-subjects design was employed. Face decision accuracy was analysed. Matched control words were selected from the MRC Psycholinguistic Database. Critical comparisons assessed face decision accuracy after satiation of an emotion-relevant versus irrelevant word. Results enabled new conclusions about the strength of satiation effects in emotion perception and the structure of supporting conceptual information.


Assessing feature binding in visual working memory using the change detection paradigm: Single probe vs. Whole display

Stephen P. Rhodes*, Robert H. Logie and Mario A. Parra Rodriguez*
University of Edinburgh
S.Rhodes@sms.ed.ac.uk

Does visual working memory (VWM) store integrated objects or independent features? This question is fundamental to understanding the representational format of VWM. Wheeler and Treisman (2002) addressed this question using two versions of the change detection task examining memory for shape, colour, and their binding. Under single probe conditions memory for binding (proportion correct) was equivalent to memory for shape alone, suggesting that VWM stores integrated objects. However, the whole display version showed that memory for shape-colour binding was poorer than memory for the features individually. To explain this discrepancy Wheeler and Treisman proposed that multiple test objects divert attention causing feature bindings to ‘disintegrate’. However, an alternative interpretation is offered via the fixed-capacity ‘slots’ model of VWM (Cowan et al., in press; Rouder et al., 2008). The single probe task requires a larger VWM capacity for individual features than bindings to ensure equivalent levels of performance. This is not the case for the whole display task. The present study replicates Wheeler and Treisman’s pattern of results when expressing performance as proportion correct. However, capacity estimates derived from the fixed-capacity model of VWM show that participants can store significantly fewer bindings than individual shapes or colours regardless of probe type.


The Marble-Hand illusion

Irene Senna1*, Angelo Maravita1*, Nadia Bolognini1,2*, and Cesare V. Parise3,4*
1. Milano-Bicocca University
2. IRCCS Istituto Auxologico Italiano
3. Max Planck Institute for Biological Cybernetics and Bernstein Center for Computational Neuroscience
4. Bielefeld University
i.senna@campus.unimib.it

Our body is made of flesh and bones. We know it, and in our daily lives all the senses—including touch, vision, and audition—constantly provide converging information about this simple, factual truth. But is this necessarily always the case? Here we report a surprising bodily illusion demonstrating that human observers rapidly update their assumptions about the material qualities of their body, based on their recent multisensory perceptual experience. To induce an illusory misperception of the material properties of the hand, whereby the hand feels like hanging its perceived material properties, we repeatedly gently hit participants’ hand, while progressively replacing the natural sound of the hammer against the skin with the sound of a hammer hitting a piece of marble. After five minutes, the hand started feeling stiffer, heavier, less sensitive, and unnatural, and showed enhanced Galvanic skin response to threatening stimuli. This novel bodily illusion, the ‘Marble-Hand Illusion’, demonstrates that the experience of the material of our body, surely the most stable attribute of our bodily self, can be quickly updated through multisensory integration.

Investigating item and order memory for phonologically similar/dissimilar items and high/low frequency items in Down syndrome

Liz Smith* and Chris Jarrold
University of Bristol
liz.smith@bristol.ac.uk

Down syndrome (DS) is associated with a verbal short-term memory (vSTM) deficit. This study explored whether item frequency and phonological similarity enhanced vSTM and differentially affected item and order memory in a group of 15 children/young adults with DS compared to 15 typically developing vocabulary-matched children. Process dissociation was used to obtain pure measures of item and order memory. Participants completed an inclusion task, requiring serial recall, and an exclusion task, requiring recall of all items except for one item ‘at position x’. Recall of the item in position ‘x’, reflects intact item memory, but erroneous order memory. Item and order memory proportions can then be computed by comparing these conditions. Items in each trial were either all phonologically similar or all dissimilar/ all high frequency or all low frequency. A significant phonological similarity x item/order memory interaction was found in both populations, with phonologically similar items improving item memory but reducing order memory. In both populations recall was
significantly enhanced for high frequency compared to low frequency items, with improvements in item and order memory. Thus, despite poorer vSTM in DS, similar effects were observed in the two populations, highlighting that frequency/similarity information could form the basis for interventions.

PsyToolkit: A free web-based tool to learn about, design, and run experiments

Gijsbert Stoet
University of Glasgow, UK
gijsbert.stoet@glasgow.ac.uk

PsyToolkit is a software package for programming and running experiments typical in Cognitive Psychology. This presentation reviews the features of the package, with a focus on the web-based tools that have recently been developed to facilitate the sharing of experiments and the use of PsyToolkit in education. One of the main aims of the software is to facilitate the teaching of experiments with working examples and the option to change experiments. The software's core feature is a Domain Specific Language and a cross-compiler which produces either Linux executables or Java byte code, which can run on all major desktop computers. Users can register for and freely use an interactive website to write and compile PsyToolkit scripts, store experiments, and publish experiments in a library. The main advantage of the freely accessible web-based system is that it makes PsyToolkit available on all major operating systems. Further, a library with well-known psychological experiments written in PsyToolkit is available and aims to educate about common experimental paradigms in cognitive psychology. Students and academics have responded positively to the service, and further usability studies are planned.

Modifying the brain’s response to language through uncertainty: Evidence from ERPs

Miriam Tresh* and Heather J Ferguson
University of Kent
mt368@kent.ac.uk

Research on the experiential nature of language suggests that understanding can be facilitated through the construction of mental simulations. However, this research has focused on the comprehension of concrete language, and thus little is known about how certainty influences the nature of these mental simulations. We report a sentence-picture verification study in which certainty was manipulated through the verb (knows vs. thinks). Sentences such as, “The old lady [knows/thinks] that the picnic basket is open” were presented word-by-word and preceded an image of the described object (picnic basket) in a state that either matched or mismatched that described in the sentence (open/closed). Participants (N=24) indicated whether this image had been mentioned/ not mentioned, while EEG was continuously recorded from 23 electrodes. Response accuracy and reaction times revealed facilitation effects for matching compared to mismatching images. Analyses of ERPs time-locked to the sentence-final word showed increased N400 amplitude for critical words within contexts that included ‘thinks’ versus ‘knows’. This pattern is interpreted as evidence of increased cognitive effort when representing uncertain language. In contrast, ERPs time-locked to the image onset showed no effects of verb (knows/thinks) or image (match/mismatch) in the N400 amplitude.
Local Information

Accommodation

On campus, there are university halls of residence accommodation at Cartmel College Halls of Residence, Lancaster University, Lancaster LA2 0LT. Rooms cost £42 per night for a single en suite room including breakfast. Please book via the accommodation form by 28th March.

Also on campus is the University House Hotel, Green Lane, Lancaster, LA1 4GJ, Tel: 08458 509508, http://englishlakes.co.uk/hotels/lancashire-hotels/lancaster-house-hotel/. Mention that you are visiting the university for the special university rate of £85 per night.

In the city, 15 minutes bus ride away are several options, for full list ask Tourist Information 01524 582394, http://www.visitlancaster.co.uk, or try a dedicated hotel booking website, e.g., http://www.hotels.com

The Sun Hotel and Bar, 63-65 Church Street, Lancaster, Lancs, LA1 1ET, 01524 66006, http://www.thesunhotelandbar.co.uk. Lovely rooms, fabulous breakfast, from £65 per night.

Lancaster Central Hotel Travelodge, King Street, Lancaster LA1 1RE, http://www.travelodge.co.uk, from £25 per night.

Penny Street Bridge, Penny Street, Lancaster LA1 1XT, 01524 599900, http://www.pennystreetbridge.co.uk/, from £79 per night.

Royal Kings Arms, Market Street, Lancaster LA1 1HP, 0843 1787161, http://www.bespokehotels.com/royalkingsarmshotel, Charles Dickens once ate cake here apparently, rooms from £52 per night.

Two nice bed and breakfasts:

The Shakespeare, 96 St Leonards Gate, Lancaster LA1 1NN, 01524 841041, http://www.theshakespearelancaster.co.uk/, from £33 per person per night.

The Old Station House, 25 Meeting House Lane, Lancaster LA1 1TX, 01524 381060, http://www.oldstationhouse.info/, from £40 per night.

Conference Dinner

The dinner will be at the Midland Hotel, Morecambe, LA4 4BU, at 7:30pm on Thursday 11th April. A bus will leave campus after the mid-career lecture at 7pm and return to campus after the meal. The Hotel can also easily be reached by local service buses and taxis.

The cost will be £30.00 for 3 courses. EPS members please reserve our place and indicate any dietary requirements on the enclosed form which should be returned to Helen Metcalfe, EPS Meeting Organisation, Department of Psychology, Lancaster University, Lancaster LA1 4YF before 28th March 2013.
Travel

By Air: Manchester airport is closest to Lancaster. An hourly rail link runs directly between Manchester airport and Lancaster, and takes approximately 85 minutes. Liverpool airport is also a possibility, but travelling from the airport is a mini-adventure (bus to Liverpool centre, then train).

By Rail: There are direct rail links between Lancaster and many of the UK's major cities and airports. For train times, visit http://www.nationalrail.co.uk. The X1 bus service runs every 20 minutes between the University and the Railway Station (hourly on Sunday afternoons and evenings).

Local Taxis: Local taxi services can be contacted on: +44 (0)1524 32090; +44 (0)1524 35666 and +44 (0)1524 848848.

By Car: Leave the M6 motorway at Junction 33 and take the A6 north towards Lancaster. For Lancaster University main campus - turn right at the third set of traffic lights on the A6 into the University main drive. Take the first exit left from the roundabout at the top of the main drive, then the first avenue on your right. This brings you to the Reception Lodge where security staff will direct you to your destination on campus. If using an online route planner or satnav, please note that the university postcode is LA1 4YW.

Visitor Car Parking: Visitor car parking is available on campus 24/7 and is free after 6pm. If you’re visiting campus during the day then parking charges do apply and can be purchased from any of the 11 pay and display machines across campus a cost of £2 for two hours. Wheelchair accessible spaces are clearly marked across all car parking areas on campus. Blue Badge holders should park in Bowland Avenue. A car parking permit is included if you stay in University accommodation.

By Bus: In the City: The bus station is situated on Damside Street in the City Centre. Buses (services 2, 2A, 3, 4) leave for the University every five minutes on weekdays and most services also stop at Common Garden Street. Additionally, the X1 bus service runs every 20 minutes between the Railway Station and the University (hourly on Sunday afternoons and evenings) - this service does not route via the main bus station but does have various pick-up points through the city centre.

On Campus: All buses drop off and collect passengers in the Underpass, situated underneath Alexandra Square. Additionally, services 3 and 4 serve the southern perimeter road around Alexandra Park and service X1 serve the northern perimeter road. There is also a bus stop directly outside the Sports Centre on the main drive. There is also a daily National Express (http://www.nationalexpress.com) service from the campus to Birmingham and London.

By Bicycle: Lancaster was recently a Cycling Demonstration Town (2005-2011) which means it benefited from increased investment in facilities and initiatives for cyclists. It takes 30 minutes or so to cycle from the city centre to campus on the two University signed routes.
Local Information

Eating and Drinking on Campus

Each college in the University has its own café bar. There is also a café in the Management School building. Other choices right by the conference venue: Wong’s Chinese Restaurant (as authentic as you like), Wibbly Wobbly Burger bar. Left from the conference venue is Pizzetta Republic, and The Sultan Indian Restaurant.

Evening Meal

Most of Lancaster’s restaurants are within 5 minutes walk of the City Centre. Nearly all are inexpensive. You could try:

Mung Mee Thai Restaurant, 6A Chapel Street, 01524 64107
The Gatehouse Restaurant (various), White Cross St, 01524 849111
Quite Simply French, 27A St George’s Quay, 01524 843199
The Borough (various), 3 Dalton Sq, 01524 64170
The Sultan of Lancaster (Indian), The Old Church, Brock St, 01524 61188
The Water Witch, Canal Tow Path, 01524 63828
Etna’s Ristorante Italiano, 22 New St, 01524 69551
The Sun Hotel (lovely cheese), 63-65 Church St, 01524 66006
Miyabi Japanese Restaurant, 6 Cable St, 01524 848356

Places of Interest

See http://www.visitlancaster.co.uk for details of local places to visit.

Lancaster has a famous old castle and priory church which are worth visiting.

Williamson Park is a beautiful park, and good place to reflect on experimental psychology, containing the Ashton Memorial (Lancaster’s answer to the Taj Mahal) and a Butterfly House.

Lancaster City Museum and the Maritime Museum are both quaint. Alternatively, see how Lancastrians lived then, and in some cases now, by visiting the Cottage Museum. The Judges Lodgings contains the Museum of Childhood, as well as a famous collection of Gillow’s furniture.

At Heysham (a direct bus ride from Lancaster) are two beautiful old churches. St Peters was founded in the 8th century (current building dates from 1340). Just next to it, overlooking the sea and the Lake District mountains is St Patrick’s chapel, which dates from the 9th century, with some fascinating rock-cut tombs in the vicinity.

Lancaster is surrounded by spectacular scenery, hiking and climbing country. The Yorkshire Dales national park is 10 miles away. The Lake District national park is 20
Local Information

miles away, http://www.nationalparks.gov.uk. The stagecoach 555 bus (http://www.stagecoachbus.com) takes you directly from Lancaster through the heart of the Lakes. The Trough of Bowland Area of Outstanding Natural Beauty is 2 miles away. For exceptional bird-watching, and bird-watcher watching, the RSPB centre at Silverdale is a short train ride away (www.rspb.org.uk/reserves/guide/l/leightonmoss/).
The Dinner is on Thursday 11th April at 7:30pm, at The Midland Hotel, Morecambe. The cost will be £30.00 per person, including 3 courses, wine and water and gratuity.

A bus will be leaving Lancaster University campus at 7pm for the hotel, and will return delegates to campus after the meal.

Postgraduates may attend the dinner for a subsidised cost of £15. In this instance the Booking form must be accompanied by a statement from an EPS member confirming Postgraduate status.

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<th>Conference Dinner – Thursday 11th April 2013</th>
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<td><strong>Menu A</strong></td>
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<td>Port of Lancaster smoked salmon and cream cheese roulade with frisée and radish salad and rémoulade</td>
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<td>Corn fed chicken breast with wild mushrooms wrapped in smoked bacon, sautéed potatoes and port jus</td>
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<td>Midland sticky toffee pudding, butterscotch sauce and vanilla seed ice cream</td>
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<td>Coffee and petit fours</td>
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| **Menu B**                                  |             |
| Asparagus and smoked Allerdale cheese tart with red onion and plum tomato salad |             |
| Wild mushroom strudel with chestnut veloute |             |
| Midland sticky toffee pudding, butterscotch sauce and vanilla seed ice cream |             |
| Coffee and petit fours                      |             |

Special dietary requirements:

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Please return this form, with your cheque (made payable to Lancaster University) to: Helen Metcalfe, EPS Meeting Organisation, Department of Psychology, Lancaster University, Lancaster LA1 4YF

BOOKING FORMS MUST BE RETURNED, TOGETHER WITH FULL PAYMENT BY Friday 28th March 2013
The Eleventh EPS Mid-Career Lecture

will be delivered by

Professor Nicola Clayton
University of Cambridge

Ways of thinking: From crows to children and back again

6.00pm
Thursday 11th April 2013

Biology Lecture Theatre, Lancaster University,
Lancaster, LA1 4YF

The lecture will be open to the public
The Second Frith Prize Lecture

will be delivered by

Dr Aidan Horner
University College London

The episodic nature of repetition priming

5.00pm
Wednesday 10th April 2013

Lecture Theatre 1, Management School
Lancaster University, Lancaster, LA1 4YF

The lecture will be open to the public
## Membership Proposal Form

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Full current professional address

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Degrees:

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Current research interests

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

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

Signature of applicant

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

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Print Name

| 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; some 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 1 September to the EPS Assistant: Michelle Dorman, School of Psychology, University of Nottingham, University Park, Nottingham, NG7 2RD.

CRITERIA AND PROCEDURES

Soon after the closing date of 1 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, ie 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.
Lancaster Meeting, 10-12 April 2013

The programme for the Lancaster meeting is enclosed with this mailing. A booking form is enclosed for the conference dinner at The Midland Hotel, Morecambe, Lancaster, LA4 4BU on Thursday 11 April at 7.30pm. If you wish to come to the dinner, the booking form should be completed and returned with payment to Helen Metcalfe by Friday 28 March 2013. Some places at the dinner are available to postgraduate students at half-price: bookings for these must be accompanied by a letter from an EPS member confirming the student’s status.

The Business Meeting will be on Thursday 11 April at 5.30pm.

The programme also includes:

Wednesday 10 April, 5.00pm. Second Frith Prize Lecture by Dr Aidan Horner entitled *The episodic nature of repetition priming*.

Thursday 11 April, 2.00pm; Symposium: *Mental Time Travel* (Prof. Anthony Dickinson) speakers to include D Gilbert, L Cheke, T Smulders, S E G Lea and E Maguire.

Thursday 11 April, 6.00pm. Eleventh EPS Mid-Career Prize Lecture by Professor Nicola Clayton entitled *Ways of Thinking: From crows to children and back again*.

Friday 12 April, 9.30am; Symposium: *Sound symbolism and cross-modal correspondences* (Professor Padraic Monaghan and Dr Peter Walker) speakers to include P Walker, C Parise, A Majid, Z Eitan, D Reby and L E Marks.

Bangor Meeting, 3-5 July 2013

The website for submissions to this meeting will open on Wednesday 3 April 2013.

The meeting will include the 20th EPS Prize Lecture by Dr Antonia Hamilton entitled *Social Interaction – the brain and cognitive systems for getting along with each other* plus an accompanying Symposium organised by Dr Emily Cross on *Sensorimotor foundations of understanding others*.

This meeting will include the 21st EPS/British Science Association *Undergraduate Project Prize* - Amy Gibb

This meeting will also include a symposium on Object recognition and representation in man and machine to be organised by C Leek.

A copy of the EPS Handbook 2012 is included in this mailing.

Dr Helen Cassaday
Hon. Secretary

March 2013
A Business Meeting will be held at 5.30pm on Thursday 11th April 2013, at Management School, Lancaster University, Lancaster, LA1 4YF in Lecture Theatre 1.

AGENDA

12/14 Minutes of the Annual General Meeting Business Meeting held on Thursday 3rd January 2013, in the Ground Floor Lecture Theatre, University College London, at 5.00pm.

12/15 Matters arising

12/16 Treasurer’s Report

12/17 Editor’s Report

12/18 Arrangements for future meetings

12/19 Any other business

Date, time and place of next meeting
EXPERIMENTAL PSYCHOLOGY SOCIETY

The 65th Annual General Meeting was held in the Ground Floor Lecture Theatre, Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, at 5 pm on Thursday 3 January 2013.

The meeting was well-attended with some 40 members present.

The 65th AGM followed shortly after the death, in late December, of Alan Cowey, University of Oxford. As many members were unaware, the President passed on this sad news to those present. Alan Cowey was EPS President in 1990 and 1991, he presented the Bartlett Lecture in 2002, and he was a Fellow of the Royal Society. He was an outstanding scientist and a wonderful person.

MINUTES

131 Minutes of the Business Meeting held at 5.30p.m. on Thursday 12th July 2012, at the University of Bristol in Lecture Theatre 2D2, School of Experimental Psychology.

The Minutes of the July 2012 Business meeting were approved and signed by the President.

132 Matters arising

Following on from discussions of the EPS surplus of funds at the July meeting, the President outlined several suggestions for increased expenditure to the membership, all of which were approved at the October Committee meeting. The following suggestions were approved at the AGM. The value of study visits will be increased to £2000. EPS will provide additional early career support, specifically to junior lecturers and post docs within 6 years of their PhD, using the existing small grants scheme. There will be an additional funding stream for early career support and those eligible should make this clear on the application form under ‘benefit to member’ (using the existing form). The salary of the EPS Finance Assistant, Dr Frances Lyons, will be increased by 5%. Dr Lyons works exceptionally hard for the Society on a part time basis. Additionally, subsistence expenses, within agreed limits, may in future be allowable for members of committee, symposium participants, prize lecturers, and officers of the Society, when engaged on EPS business. No objections to any of these suggestions were raised. Professor David Shanks made the additional suggestion that the number of deadlines per year for study visits could usefully be raised from two to three. This suggestion was welcomed.
3.1 Annual Report of the Society

The Hon Sec reminded members that this was circulated electronically with the December mailing and took the opportunity to apologise for problems experienced with the mail list over the past year. Members were advised that paper copies of the Annual Report are available on request.

3.2 Treasurer’s Report

The Treasurer presented a number of slides to illustrate the Society’s overall financial position. He also clarified an anomaly in the reporting of administrative costs over the period of Hon Sec transition from Bristol to Nottingham. The draft accounts were also circulated electronically with the December mailing and will appear on the web pages in due course. The Treasurer also put forward the suggestion to move Society funds to the Charity Bank. No objections were raised. Professor Mark Haggard asked about the applicable interest rate. The Treasurer explained that in the current economic climate business rates are very low and some tie in is required to secure higher rates, which are still low at below 2%.

3.3 Editor’s Report

The Editor sent apologies due to illness and his report was delivered by the President. The total number of submissions in 2012 was 413, of these 321 were standard and 92 were Rapid Communication articles. The source of submissions was 26% from the UK, 21% from North America, 34% from Europe and 19% from the rest of the world. Time to first editorial decision was 61 days for standard articles and 29 days for Rapid Communications. Production backlog from acceptance to publication was 8 months; the time from acceptance to online publication (i-first) was 10 weeks. Rejection rates were approximately 55%. The citation impact is 1.964.

The following October Committee Nominations were put to the AGM

*Election of Forty Second Bartlett Lecturer*  
Professor Gordon Logan

*Twelfth Mid-Career Award*  
Professor Martin Eimer

*Election of Twenty First EPS Prize Lecturer*  
Dr Matthew Longo

*Election to Second Frith Prize*  
Dr Aidan Horner

*Election of Officers and Committee Members 2013*
Officer of the Society
President Elect Professor Karalyn Patterson
Hon Secretary Dr Helen Cassaday
Hon Treasurer Professor Tim Perfect
Ordinary Committee Members
Dr Ines Jentzsch

Honorary Members
Emeritus Professor Don Mitchell

The nominations, which had previously been approved by the EPS Committee in October 2012, were all ratified at the AGM.

13/10 Admission of Ordinary Members

The list recommended by the Committee for admission to Ordinary Membership, under Rule 7 had been circulated electronically. Hard copies of this list and the candidate-by-candidate eligibility checks were distributed at the meeting.

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

13/11 Arrangements for future meetings

The Conference Secretary advised that the abstract submission portal for the spring meeting in Lancaster will open on Monday 7th February and that campus-based accommodation can only be held until the 15th February. A number of conveniently located en suite rooms are available on campus but members will need to book and pay for these in advance (by 15th February). A reminder will be included in the January membership mailing.

13/12 Any other business

Members were invited to raise any other business.

The President thanked the outgoing Editor Professor Steve Tipper. The President thanked Jenni Rodd for doing a fantastic job as Local Organiser. Retiring Committee member, Dr Monika Harvey, was also thanked for all her hard work on behalf of the Society.