EPS

Experimental Psychology Society

LIVERPOOL MEETING

9-11 JULY 2008

A scientific meeting will be held at the School of Psychology in the Eleanor Rathbone Building, University of Liverpool on 9-11 July, 2008. The local organisers are Dr. Marco Bertamini and Dr. Rebecca Lawson.

Thirty-sixth Bartlett Lecture
Professor John Pearce (Cardiff University)

An associative analysis of spatial learning

The Bartlett Prize Lecture will take place at 5.30pm on Thursday 10th July in the Hearnshaw Lecture Theatre in the Eleanor Rathbone Building, University of Liverpool.

Symposia
Wednesday 9th July, 2.00pm – 5.30pm

Three-dimensional object representation, recognition and categorisation
Organisers: Dr Rebecca Lawson and Dr Charles Leek

Thursday 10th July, 2.30pm – 5.00pm

Mechanisms of Associative Learning
Organiser: Professor Simon Killcross

Poster Session and Drinks Reception
Posters will be held in conjunction with a drinks reception on Wednesday evening from 5.30-7.30pm. Hopefully the poster session and drinks will be in the newly-refurbished Victoria Building on campus. However, if this venue is not ready in time the posters will be displayed in the foyer of the Eleanor Rathbone Building. The location of the posters and drinks will be advertised at the start of the conference. If you wish to know in advance, please email Ali Prescott, Ali.Prescott@bristol.ac.uk, in the week before the start of the conference. Poster presenters should be by their posters from 5.30-6.30pm. Posters should fit an area 3 ft wide x 6 ft high and presenters should bring pins to fix their posters to the boards.

Oral Presentations
Sessions will be held in the Hearnshaw Lecture Theatre and Room 2.71 which are located on the ground and the second floor respectively of the Eleanor Rathbone Building. Both rooms have data projectors available for Powerpoint presentations. Presenters can bring their talks on CDs or USB sticks or they may use their own laptops but must ensure they have all necessary connector leads. Any queries about facilities in the lecture theatres should be sent to Marco Bertamini (m.bertamini@liv.ac.uk).

Further information
The conference dinner is at Number 5, Abercromby Square, less than 5 minutes walk from the conference venue, on Thursday 10th July at 7.30pm. A booking form is enclosed. Coffee and tea will be served in the entrance foyer of the Eleanor Rathbone Building. The University Sports Centre is booked for a friendly five-a-side football match from 9-10am on Thursday - all welcome, mixed sex and all abilities! If you think you will play, email Rebecca, rlawson@liv.ac.uk, or tick the box on the booking form. We have also arranged a visit to the tower of the Anglican Cathedral and then to Antony Gormley's installation "Another Place" on Crosby beach leaving from the Eleanor Rathbone Building on Friday at 4.15pm. More information about accommodation, travel, eating and attractions and events in Liverpool is given at the back of this programme.

START OF PARALLEL SESSIONS

Session A

Hearnshaw Lecture Theatre, Ground Floor, Eleanor Rathbone Building

1.30 COFFEE

Symposium: **Three-dimensional object representation, recognition and categorisation**
Organisers: Dr Rebecca Lawson and Dr Charles Leek

2.00 **Irving Biederman*** (University of Southern California)
The neural basis of object recognition

2.30 **Quoc C. Vuong*** (University of Newcastle)
How the brain might see in 3D? Neural evidence for cue-based object processing

3.00 **Johan Wagemans*** (Catholic University of Leuven)
Perceptual and neural representation of within-category similarity of everyday objects

3.30 TEA

4.00 **Charles Leek** (University of Wales)
Beyond the viewpoint debate: Putting structure back into theories of 3D object representation in human vision.

4.30 **Martin Jüttner*, Dean Petters*, Elley Wakui*, Ingo Rentschler* and Jules Davidoff** (Aston University, Goldsmiths College, University of München)
The development of object representations into adolescence

5.00 **Rebecca Lawson** (University of Liverpool)
Achieving object constancy for visual versus haptic presentation

End of Symposium

5.30-7.30 POSTERS AND DRINKS RECEPTION. Venue to be confirmed.

START OF PARALLEL SESSIONS

Session B

1.30 COFFEE

Room 2.71, Second Floor, Eleanor Rathbone Building

2.00 **Tiina Eilola* and Jelena Havelka** (University of Kent, University of Leeds)
Bilingual and monolingual speakers' responses to emotionally charged words in a lexical decision task

2.30 **Jelena Havelka and Kathleen Rastle** (University of Leeds, University of London)
Masked repetition priming effects in transparent orthography

3.00 **Debra Malpass* and Antje S. Meyer** (University of Birmingham)
The cost of parallel processing in multiple object naming: Evidence from eye tracking studies

3.30 TEA

4.00 **Mirjana Bozic, Lorraine Tyler and William Marslen-Wilson (**University of Cambridge)
Hemispheric laterality and derivational morphology

4.30 **Mary-Jane Budd*, J Richard Hanley and Yvonne Griffiths*** (University of Essex)
Simulating children's speech errors in picture naming.

5.00 **Eva Belke*** (University of Bielefeld)
(Sponsored by Antje S Meyer)
Semantic context effects in object naming and semantic classification tasks

5.30-7.30 POSTERS AND DRINKS RECEPTION. Venue to be confirmed.

Session A

9.00 Five-a-side football match – University Sports Centre

Hearnshaw Lecture Theatre, Ground Floor, Eleanor Rathbone Building

10.30 **Laura Lee*, Andy Young, Tim Andrews and Gary Green*** (University of York)
Investigating STS responses to social attention using fMRI and MEG

11.00 **Anna S Law and Stephen R. H. Langton** (Liverpool John Moores University, University of Stirling)
Gaze-cueing is not modulated by working memory load

11.30 COFFEE

12.00 **David Soto*, Alice Wriglesworth* , Alex Bahrami-Balani* and Glyn W. Humphreys** (Imperial College London, University of Birmingham)
Working memory enhances visual perception: Evidence from signal detection analysis

12.30 **Christopher Kent* and Koen Lamberts** (University of Bristol, University of Warwick)
Memory load affects the time course of object feature retrieval

1-2 LUNCH

Session B

9.00 Five-a-side football match – University Sports Centre

Room 2.71, Second Floor, Eleanor Rathbone Building

10.30 **Carlo Fantoni* and Walter Gerbino*** (University of Trieste)
(Sponsored by Marco Bertamini)
3D-orientation indeterminacy accounts for a slant by tilt co-variation

11.00 **Marco Bertamini and Lauren Wynne*** (University of Liverpool)
The overestimation of what is visible in a planar mirror is present in young adults but not in Primary School children

11.30 COFFEE

12.00 **Catherine G. O'Hanlon** (University of Newcastle)
Shape, colour or texture? A follow up study of O'Hanlon & Roberson (2006, 2007)

12.30 **Michelle C. St. Clair* and Padraic Monaghan (**University of Manchester, University of Lancaster)
Abstraction of language structure during sleep

1-2 LUNCH

Session A

Hearnshaw Lecture Theatre, Ground Floor, Eleanor Rathbone Building

2.00 **Mark Haselgrove and Lisa H. Evans*** (University of Nottingham, University of Cardiff)
Variations in competitive and non-competitive prediction-error learning with a dimension of schizotypy

Symposium: **Mechanisms of Associative Learning**
Organiser: Professor Simon Killcross

2.30 **Peter Holland*** (John Hopkins University)
Mechanisms of attention in associative learning

3.00 **Rob C. Honey** (Cardiff University)
Configural learning

3.30 TEA

4.00 **Mark E. Bouton*** (University of Vermont)
Parallel asymmetries in discrimination learning with temporal and explicit predictors of food.

4.30 **Mike E. Le Pelley and Thomas Beesley*** (Cardiff University)
Predictive accuracy and stimulus associability: Testing the Pearce-Hall model in humans

End of Symposium

5.00 EPS Business Meeting**.** (Room 2.71, Second Floor, Eleanor Rathbone Building)

5.30 **Bartlett Lecture – Professor John Pearce** (Cardiff University)
An associative analysis of spatial learning (Hearnshaw Lecture Theatre, Eleanor Rathbone Building)

7.30 CONFERENCE DINNER – No 5, Abercromby Square

Session B

Room 2.71, Second Floor, Eleanor Rathbone Building

2.00 **Jasna Martinovic*, Georg Meyer* and Sophie Wuerger***
(University of Liverpool)
(Sponsored by Rebecca Lawson)
S cone signals invisible to the motion system can improve motion discrimination via surface segmentation

2.30 **Sophie Wuerger*, Alexander Crocker-Buque* and Georg Meyer***(University of Liverpool)
(Sponsored by Marco Bertamini)
Auditory-visual integration of biological motion

3.00 **Gaia Scerif *** (University of Oxford)
(Sponsored by Chris Jarrold)
Unimodal and crossmodal attentional limits: insights from development

3.30 TEA

4.00 **Angus Gellatly, Mike Pilling and Peter Naish** (Oxford Brooks University, Open University)
Object substitution masking with long duration targets

4.30 **Johan Hulleman*** (University of Hull)
(Sponsored by Marco Bertamini)
Is amodal completion early?

5.00 EPS Business Meeting (Room 2.71, Second Floor, Eleanor Rathbone Building)

5.30 **Bartlett Lecture – Professor John Pearce** (Cardiff University)
An associative analysis of spatial learning (Hearnshaw Lecture Theatre, Eleanor Rathbone Building)

7.30 CONFERENCE DINNER – No 5, Abercromby Square

Session A

Hearnshaw Lecture Theatre, Ground Floor, Eleanor Rathbone Building

10.00 **Irving Biederman*, Michael Mangini*, Xiaomin Yue* and Christoph von der Malsburg*** (University of Southern California, University of Notre Dame, Harvard University, Massachusetts General Hospital, Frankfurt Institute for Advanced Studies)
(Sponsored by Rebecca Lawson)
The neurocomputational basis of face recognition

10.30 **Richard Kemp, Mark Howard* and Ross McCall*** (University of New South Wales)
The passport problem: Improving performance on a face matching task by training and modifications to image format.

11.00 **Kirin F. Hilliar* and Richard I. Kemp** (University of New South Wales)
Is that Matthew Brown or Zhu Wen Xiong? Inducing the cross-race effect in the recognition of ambiguous faces using racially-stereotypical names

11.30 COFFEE

12.00 **Bernard Harper* and Richard Latto** (University of Liverpool)
Sexual dimorphism in photographic portraiture: Why males are flattered but females are fattened under identical photographic conditions.

12.30 **Kate M Bennett* and Richard M Latto** (University of Liverpool)
The importance of lateral organisation in Bewick's woodcuts

1-2 LUNCH

Session B

Room 2.71, Second Floor, Eleanor Rathbone Building

10.00 **Karen Wise* and John Sloboda** (University of Keele)
Perceptual and productive skills in the 'tone deaf': A componential analysis

10.30 **Evan Livesey*, Irina Harris*, and Justin Harris*** (University of Sydney)
(Sponsored by Mike Le Pelley)
Attentional changes during implicit learning: Signal validity protects a target stimulus from the attentional blink

11.00 **Tom Beesley*, Mike Le Pelley, Lewis Bott* and Christina Howard*** (Cardiff University, University of Bristol)
Attention guides sequence learning: Evidence from eye tracking

11.30 COFFEE

12.00 **Paul N Wilson and Tim Alexander*** (University of Hull)
Blocking of spatial learning between enclosure walls and a local landmark

12.30 **Tom Hartley*, Rachel Buckley* and Ursula Scott-Wilson*** (University of York)
(Sponsored by Gerry Altmann)
Efficient view independent recognition of landmarks

1-2 LUNCH

Session A

Hearnshaw Lecture Theatre, Ground Floor, Eleanor Rathbone Building

2.00 **Glyn W. Humphreys, Eun Young Yoon*, Sanjay Kumar*, Vaia Lestou* and M. Jane Riddoch** (University of Birimgham)
The union of hand and object: Attention and the visuo-motor response to hand grasp.

2.30 **Georg Meyer*, Sophie Wuerger*, Roland Rutschmann* and Mark Greenlee* (**University of Liverpool, University of Regensburg**)** (Sponsored by Rebecca Lawson)
The 'active/passive' perception controversy - 40 years on

3.00 **Xierong Liu* and Gerry T.M. Altmann** (University of York)
Language interferes with attentional control of smooth pursuit eye movements

3.30 **Katherine Humphrey* and Geoffrey Underwood** (University of Nottingham)
Fixation sequences in imagery and in recognition during the processing of pictures of real-world scenes

4.00 TEA

End of parallel sessions

End of meeting

4.15 Visit to Cathedral Tower and Gormley's "Another place"

Session B

Room 2.71, Second Floor, Eleanor Rathbone Building

2.00 **Nicholas M. Almond*, Christopher J. A. Moulin and Catriona M. Morrison** (University of Leeds)
Episodic intertrial learning of younger and older participants when studying words which differ on word frequency and age of acquisition.

2.30 **Mirjam van den Bos* and Andrew Rutherford** (University of Keele)
Environmental context-dependent recognition memory: Effects of repetition

3.00 **Hannie van Hooff*, Aisling Whitaker* and Ruth Ford*** (University of Kent, Griffith University)
(Sponsored by Jelena Havelka)
Directed forgetting in direct and indirect tests of memory: An electrophysiological investigation into the role of selective rehearsal and inhibition

3.30 **Susan M. Sherman* and Emily Moran*** (University of Keele)
(Sponsored by John Wearden)
Creating false memories for brand names

4.00 TEA

End of parallel sessions

End of meeting

4.15 Visit to Cathedral Tower and Gormley's "Another place"

1. Pamela J. Arnold* and E. Charles Leek (University of Bangor)
Shadows, shape, and novel 3D object recognition

2. Daniel Avery* and Chris Jarrold (University of Bristol)
The effects of semantic and phonological similarity on short list recall under varying processing load

3. Marketa Caravolas, Lydia Vencelova* and Marina Mikulajova* (University of Liverpool, Comenius University)
The acquisition of graphotactic vs. morphological spelling patterns in Slovak children with dyslexia

4. Matt Craddock* and Rebecca Lawson (University of Liverpool)
Comparing haptic and visual size constancy in old/new object recognition

5. Helena Drury*, Marina Martinos*, Mary M. Robertson*, Mike Orth*, Sarah Crawford* and Shelley Channon (University College London, University College London School of Medicine, St George's Hospital, National Hospital for Neurology and Neurosurgery)
Tourette's syndrome (TS): Inhibitory performance in adults with uncomplicated TS

6. Lisa Evans*, Julian Breeze* and Jane Herron* (Cardiff University) (Sponsored by Mark Haselgrove)
An electrophysiological study of memory for perceived and imagined events and the effects of schizotypy.

7. Sian Fitzpatrick*, Shelley Channon and David Lagnado* (University College London)
The effects of foreseeability on everyday judgments of cause and blame.

8. Saeideh Ghahghaei Abadi*, Karina J Linnell, Martin H Fischer, Amit Dubey*, Mike Griffith and Rob Davis (Goldsmiths College, University of Dundee)
On probing the labile stage of saccade programming in reading

9. Christine Haecker*, Antje Meyer and Kimberly Quinn* (University of Birmingham)
The persistence of gender-stereotypes: Evidence from a reading study.

10. Neil Harrison*, Georg Meyer* and Sophie Wuerger* (University of Liverpool) (Sponsored by Rebecca Lawson)
Bimodal reaction time facilitation for auditory-visual moving stimuli

11. Helen M. Hodgetts*, John E. Marsh*, Katie O'Neill*, Sonia Packwood*, Dylan M. Jones (Cardiff University, Laval University)
Sorry, what did I say? Constant interruption impairs verbal fluency and output monitoring

12. Robert Wyn Hughes*, Katherine Guerard* and Sebastien Tremblay* (Cardiff University , Laval University) (Sponsored by William John Macken)
Role of perceptual salience in the isolation effect

13. Magdalena Krol* and Wael El-Deredy* (University of Manchester)
(Sponsored by Ellen Poliakoff)
The role of semantic and visual cues in facilitating object recognition

14. John E. Marsh*, Helen M. Hodgetts*, Sarah Thomas*, and Dylan M. Jones (Cardiff University)
Auditory distraction removes retrieval induced forgetting

15. Katja Martina Mayer* and Quoc C. Vuong* (University of Newcastle)
(Sponsored by Cathrine O'Hanlon)
Interaction of colour, shape, and motion in dynamic object recognition

16. Paula McDonald, Alan Slater and Christopher Longmore (University of Exeter)
Covert detection of facial familiarity and attractiveness

17. Alan O'Donoghue* (Keele University)
(Sponsored by John Wearden)
Reconsidering duration estimates as measures of perceived time rate

18. Noreen O'Sullivan* and Glyn W. Humphreys (University of Birmingham)
Proactive interference is not a unitary phenomenon: Implications for working memory theory

19. Shekeila Palmer*, Jelena Havelka and Hannie van Hooff* (University of Kent, University of Leeds)
Language representation and processing in fluent bilinguals: Electrophysiological support for the revised hierarchical model of bilingual memory

20. Megan H. Papesh* and Stephen D. Goldinger* (Arizona State University)
(Sponsored by Rebecca Lawson)
Deficits in cross-race face recognition: No evidence for encoding-based effects

21. Nick Perham*, John Marsh* and Dylan Jones (Cardiff University)
Syntactical order in serial recall of semantic information

22. Irene Reppa* and Charles Leek (University of Swansea, University of Bangor)
Surface connectivity effects in three-dimensional object recognition.

23. Irene Reppa* and Emmanuel Pothos* (University of Swansea)
(Sponsored by Toby Lloyd-Jones)
Linear separability in object perception

24. Kristine Uzule*, Linda Wheeldon and Antje Meyer (University of Birmingham)
Priming local syntactic structures in speech production: An online study

25. Alice Varnava*, Richard Wise* and Derek Jones* (Cardiff University)
(Sponsored by Mark Haselgrove)
The neural basis of left attentional bias on judgements of linear extent as assessed by fMRI and DT-MRI

Symposium: Three-dimensional object representation, recognition and categorisation
Organisers : Dr Rebecca Lawson and Dr Charles Leek

The Neural Basis of Object Recognition

Irving Biederman
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About 20 years ago, a proposal was advanced suggesting that a considerable range of behavioural phenomena associated with human object recognition could be understood in terms of a representation positing an arrangement of simple part primitives distinguished by viewpoint invariant properties (= geons). Recent research using optical imaging as well as single unit activity of cells in macaque IT and behavioral and fMRI studies in humans provide a surprisingly strong confirmation of this proposal.

How the brain might see in 3D? Neural evidence for cue-based object processing

Quoc C Vuong
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Observers interact with a complex and often chaotic visual environment populated by three-dimensional objects. Fortunately, there are different object-specific cues (e.g., shape, view-specific features, and motion) which can be used for recognition. Several behavioural studies have shown that observers encode these cues into the object representation to help them recognize objects across changes in viewpoint or illumination. Here I present event-related potential (ERP) and functional magnetic resonance imaging (fMRI) results which suggest that the visual system encodes these cues early in temporal processing and in a distributed fashion across different brain regions. In the ERP study, we trained observers to individually name static 3D objects from a training viewpoint. We then tested observers at unfamiliar viewpoints and found that both naming times and early ERP components in occipital regions were modulated by viewpoint. In two fMRI studies, we tested observers with rigidly rotating novel objects, as motion is a strong cue to 3D structure. We found that different regions interactively process shape and motion cues in a shape and motion priming task, and in a shape discrimination task. Together, these results point to the neural encoding of cues which integrates 2D and 3D information.

Perceptual and neural representation of within-category similarity of everyday objects

Johan Wagemans
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Theories of object recognition and categorization agree upon the importance of similarity between stimuli. We used 257 line drawings of everyday objects, consisting of 7-12 exemplars within 24 basic-level categories (Op de Beeck & Wagemans, 2001, Perception, 30, 1337-1361). We manipulated similarity using a morphing procedure that created intermediate stimuli between the four extremes in a two-dimensional space derived from similarity ratings on the original line drawings, as well as contour and silhouette versions. Contour stimuli within this semi-parameterized stimulus space were then used in a sequential matching task, in which subjects had to judge whether both objects belong to the same category. Basic-level categorization performance, reaction times and error rate, deteriorated with increasing amount of morphing transformation between two successively presented category members. Using event-related fMRI-adaptation, in which two objects are shown in each trial, we showed that human LOC also represents shape similarity: Results showed that the amount of recovery of adaptation in LOC was monotonically related to the transformational distance between the two objects in each trial.

Beyond the viewpoint debate: Putting structure back into theories of 3-D object representation in human vision.

Charles Leek
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Over the last twenty years research into three-dimensional (3D) object recognition in human vision has been largely dominated by the viewpoint debate; that is, in determining whether object recognition is viewpoint-invariant or viewpoint-dependent. Almost, inevitably, this work has shown that recognition may be both viewpoint-invariant and viewpoint-dependent depending on a variety of stimulus and task variables. One consequence of this focus is the emergence of image- or view-based approaches which, it has been argued, provide an explanation for the patterns of viewpoint effects that have been found. Here I will argue that another consequence is that several key issues in understanding object recognition have been overlooked in recent years, and that the image-based approach does not provide an adequate framework for understanding the organisation and structure of 3D object representations. I present empirical evidence from psychophysics and studies of eye movements to support the view that recognition is mediated by highly complex decompositional 3D shape representations that encode geometric properties of object shapes and their spatial configuration in the form of a surface-based structural description.

The development of object representations into adolescence

Martin Jüttner [1], Dean Petters [1], Elley Wakui [2], Ingo Rentschler [3] and Jules Davidoff [2]
1. Aston University
2. Goldsmiths College
3. University of München

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Theories of object recognition have traditionally been divided into two classes based on either structural or image-based object representations. We present data from two experiments that assessed, for school children aged 6 to 16 years, different predictions of each representational assumption concerning generalisation to changes in perspective and object shape. Experiment 1 tested spatial generalization with regard to unfamiliar objects that had been previously learned in a cross-modal priming and learning paradigm involving touch and vision. A developmental dissociation was observed, with younger children recognizing objects only from previously learnt perspectives indicative of primarily image-based representations. Only the oldest children (15-16 years) generalized object knowledge to novel viewpoints and showed strong facilitation by haptic priming, thus suggesting viewpoint-independent, structural object descriptions. Experiment 2 asked about the correct appearance of animals and artefacts that children as young as 6 could name successfully. While even the youngest children were close to adult levels for the correct recognition of a part change, it was not until 15-16 years that they achieved similar level of performance with regard to altered part relations. The data obtained in these very different paradigms provide converging evidence for multiple, dissociable object formats in the developing mind.

Achieving object constancy for visual versus haptic presentation

Rebecca Lawson
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There are significant differences in the ease with which the human visual object recognition system copes with changes to the input image produced by a given object. These differences result from varying the relationship between the object and the viewer (e.g., by altering observer-object position, lighting and the object's orientation in depth and plane), changing task and altering variables such as the visual similarity and familiarity of the objects presented. There has been considerable disagreement as to the theoretical interpretation of these differences in terms of both the nature of the long-term stored representations of familiar objects and on-line access to these representations. One means of moving this debate forward is to examine the achievement of object constancy in a different modality in order to determine whether the results observed for visual object recognition generalise or whether they are, instead, a consequence of idiosyncrasies of the visual system. I will present the results of several series of studies which have tested the effects of changes such as depth rotation and size changes on haptic object recognition. These investigations have directly compared visual versus haptic object recognition and have also tested the cross-modal transfer of learning to compensate for input variation. These experiments suggest that similar (but not identical) processes underlie the achievement of object constancy in the visual and the haptic modality.

End of symposium

Bilingual and monolingual speakers' responses to emotionally charged words in a lexical decision task

Tiina Eilola[1] & Jelena Havelka[2]
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Bilinguals frequently report greater emotionality associated with their first (L1) than second language (L2). Yet, this has not always been replicated in studies using single word stimuli (e.g. Eilola, Havelka & Sharma, 2007). The aim of the present study was to investigate emotional word processing in L1 and L2 using the lexical decision task. Finnish-English bilinguals and English monolinguals were presented with neutral, positive, negative and taboo words. The bilingual participants responded to both Finnish (L1) and English (L2) words, while native English speakers only responded to English words. Faster RTs were found in both groups of participants and in both languages to positive when compared to neutral words. Bilinguals' RTs to negative words differed between L1 and L2; they were significantly faster when responding to L1 (Finnish) negative words, while this was not found in L2 (English). No difference between negative and neutral words was found in native English speakers. Our study extends previous findings of faster RTs to positive words (e.g. Kanske & Kotz, 2007) by showing that this effect is replicable across languages and present in both L1 and L2. However, the impact of negative valance on word processing is less clear.

Eilola, T.M., Havelka, J., & Sharma, D. (2007). Emotional activation in the first and second language. Cognition & Emotion, 21, 1064- 1076.

Kanske, P., & Kotz, S.A. (2007). Concreteness in emotional words: ERP evidence from a hemifield study. Brain Research, 1148, 138-148.

Masked repetition priming effects in transparent orthography

Jelena Havelka[1] & Kathleen Rastle[2]
1. University of Leeds
2. University of London
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Masked repetition priming effects in Serbian were investigated in two experiments. Experiment 1 used a reading aloud task to investigate the effect of within-alphabet (WA) priming (prime and target share the same orthography and phonology) and cross-alphabet (CA) priming (prime and target share the same phonology but differ in orthography). Primes were always words that could be uniquely identified as Cyrillic (CA) or Roman (WA) and targets were always words that could be uniquely identified as Roman. Results revealed robust repetition priming effects that were equivalent across WA and CA conditions. Experiment 2 was similar except that CA primes were bivalent words consisting of letters sharing orthographic representations across alphabets but having different phonological representations in each. Results revealed that the robust CA priming effect observed in Experiment 1 vanished under these conditions, suggesting that masked repetition priming in Serbian is influenced by the rapid generation of multiple phonological codes.

The cost of parallel processing in multiple object naming: Evidence from eye tracking studies

Debra Malpass and Antje S. Meyer
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The goal of the project was to examine whether speakers naming object pairs process them sequentially or in parallel. To this end, we asked participants to name object pairs and orthogonally varied the ease of access to the names of the two objects. In Experiment 1, the objects appeared next to each other, and in Experiment 2 they appeared underneath each other. The participants' eye movements and speech onset latencies were recorded. As expected, they looked significantly longer at the first object of a pair and named it more slowly when its name was difficult than when it was easy to access. More importantly, the gaze duration for the first object also depended on the ease of name retrieval for the second object: Gazes to the first object were longer when the second object's name was easy than when it was difficult to retrieve. This held regardless of the difficulty of the first object and for both spatial configurations. This effect of the difficulty of the extrafoveal object's name on the gaze duration for the foveated object constitutes strong evidence for parallel processing of the two objects. However, rather than being facilitatory, parallel processing interferes with name retrieval.

Hemispheric laterality and derivational morphology

Mirjana Bozic[1], Lorraine Tyler[2] and William Marslen-Wilson[1]
1.MRC Cognition and Brain Sciences Unit
2. University of Cambridge

Lexical complexity plays a prominent role in modulating the activity of the fronto-temporal language network. Studies with regularly inflected words show that processing morpho-phonological complexity (e.g. stem + inflectional affix) activates left-lateralised areas, while lexical-semantic complexity (e.g. competition due to presence of embedded stems – e.g., *clay/claim*) engages bilateral frontal regions. The current efMRI experiment asked whether similar left-lateralised decomposition and bilateral competition processes hold for derivationally complex words, where the stem-affix relationship is strongly lexicalised and less semantically predictable. In a set of single spoken words we manipulated the presence of embedded stems and derivational suffixes with varying degrees of productivity, forming a gradient in the extent they are predicted to trigger competition and decomposition processes. Words were contrasted with a complex auditory baseline that does not trigger a speech percept ('musical rain', Uppenkamp et al, 2006). We found that stem competition generated by derivational complexity engages bilateral fronto-temporal language regions, but with no hemispheric dissociation comparable to that observed for inflections. This is arguably because derivational affixes do not trigger decompositional processes in the same way as inflectional affixes. We suggest a neuro-cognitive account of the representation and processing of derivationally complex forms in English.

Simulating children's speech errors in picture naming.

Mary-Jane Budd, J Richard Hanley, Yvonne Griffiths
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It has been argued that Dell's weight-decay computational model of speech production is able to provide a satisfactory explanation of the speech errors made by both children and adults (Stemberger, 1989). However, recent research has shown that speech errors in aphasia can be more readily accommodated by Foygel and Dell's (2000) semantic-phonological model than by the original weight-decay model. The present study shows that the semantic-phonological model also performs much better than the weight-decay model at simulating the types of errors that children aged between 4 and 11 years make in picture naming. However neither model fared well at explaining the performance of the youngest children who made more semantic errors than either model would predict. Possible reasons for this discrepancy betwen the data and the models will be discussed.

Foygel, D., & Dell, G. S. (2000). Models of impaired lexical access in speech production. Journal of Memory and Language, 43, 182-216.

Stemberger, J. M. (1989). Speech errors in early child language production. Journal of Memory and Language, 28, 164-188.

Semantic context effects in object naming and semantic classification tasks

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Speakers are slower when naming objects in semantically related than in unrelated object sets. This context effect is generally thought to arise because members of semantically related sets activate each other at the conceptual level and therefore compete more vigorously for selection at the lemma level than members of unrelated sets. According to this account, semantic context effects should also surface in semantic classification tasks. Experimentally, this is difficult to assess because objects in related contexts are typically response-congruent in semantic classification. Using an orientation judgment task, which arguably requires conceptual processing, Damian and colleagues (2001) found no context effects. Using a variant of the semantic blocking paradigm that can be combined with a man-made/natural classification task I obtained significant facilitatory context effects on semantic classification times along with similar-sized inhibitory effects on object naming latencies. Further experimentation yielded no semantic context effects on response latencies in a word-plus-determiner naming task requiring participants to access the lemma representation but not the conceptual representation of the word. Together, these data suggest that semantic context effects are conceptually mediated and that processing at the lemma level alone is not sufficient to produce the effect.

Damian, M.F., Vigliocco, G., & Levelt, W.J.M. (2001). Effects of semantic context in the naming of pictures and words. Cognition, 81, B77-B86.

Investigating STS responses to social attention using fMRI and MEG

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By perceiving another individual's focus of attention, one gains information about what is important to that individual in their surrounding environment. Such information is important when inferring the motivations and intentions of the observed individual. Functional imaging and neurophysiological studies highlight the contribution of the superior temporal sulcus (STS) in the perception and interpretation of social attention stimuli. The present study used functional magnetic resonance imaging (fMRI) and magnetoencephalography (MEG) to investigate the STS responses elicited when participants viewed video clips in which actors made a head turn to simulated a shift in attention, as compared to viewing a static face that remained oriented away from the participant throughout stimulus presentation or a scrambled video that displayed directional motion. fMRI and MEG analyses revealed a network of activations (including the STS) that showed a greater response to turning heads compared to the static faces or scrambled movement conditions. MEG beamforming found that the STS response involved a change in the oscillatory activity within the gamma range, which was linked to the onset of motion and was more prominent in the left hemisphere. These results demonstrate the important role of the STS in processing facial cues involved in social attention.

Gaze-cueing is not modulated by working memory load

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Observers tend to respond more quickly to peripheral stimuli that are being gazed at by a centrally presented face, than to stimuli that are not being gazed at. While this gaze-cueing effect was initially seen as reflexive (e.g., Langton & Bruce, 1999), a few recent studies have raised the possibility that some form of voluntary control may operate (e.g., Vecera & Rizzo, 2006). Therefore, the present investigation employed a dual-task paradigm to attempt to disrupt control processes involved in gaze-cueing. Two experiments examined the impact of working memory load on a standard gaze-cueing task. In the first experiment, participants were required to hold a set of digits in working memory during each gaze trial. In the second, the gaze task was combined with an executively-demanding auditory n-back task. Gaze-cueing effects were observed, but they were not modulated by working memory load in either experiment. These results may be more consistent with a reflexive rather than a voluntary account of gaze-cueing.

Langton, S. R. H., & Bruce, V. (1999). Reflexive visual orienting in respone to the social attention of others. Visual Cognition, 6, 541-567.

Vecera, S. P., & Rizzo, M. (2006). Eye gaze does not produce reflexive shifts of attention: Evidence from frontal-lobe damage. Neuropsychologia, 44, 150-159.

Working memory enhances visual perception: Evidence from signal detection analysis

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We show that perceptual sensitivity to visual stimuli can be modulated by matches between the contents of working memory (WM) and stimuli in the visual field. Observers were presented with an object cue (to hold in WM or to merely attend) and subsequently had to identify a brief target presented within a colored shape. The cue could be re-presented in the display, where it either surrounded the target (on valid trials) or a distractor (on invalid trials). Perceptual identification of the target, as indexed by A', was enhanced on valid relative to invalid trials, but only when the cue was kept in WM. There was minimal effect of the cue when it was merely attended but not kept in WM. Interestingly, verbal cues were as effective as visual cues at modulating perceptual identification and this happened even with salient targets that 'pop out' in visual search. In contrast to the effects on sensitivity, there were no effects of WM on decisional criteria. The findings suggest that re-entrant feedback from WM can affect early stages of perceptual processing.

Memory load affects the time course of object feature retrieval

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Previous attempts to investigate the time course of retrieval of information about visual object features have provided contradictory conclusions. In a speeded delayed object matching task, Kent & Lamberts (2006a) found evidence that the rate of information retrieval was constant across the different features of an object. However, in a speeded cued-object recall matching task, Kent & Lamberts (2006b) found evidence for feature-dependent retrieval rates. In the study reported, we replicated both findings in a speeded delayed object matching task. Retrieval rate differences are observed when memory load was increased beyond a threshold: when participants were required to maintain information about only one object in memory, no retrieval rate differences were found between the features of the to-be-matched object (replicating Kent & Lamberts, 2006a); when two objects had to be maintained in memory, retrieval rate differences were observed between the features of the to-be-match object (replicating Kent & Lamberts, 2006b). Further, the rate of feature information retrieval was positively related to the rate of feature perception, such that information about features that were relatively quickly perceived was also relatively quickly retrieved. The results are discussed in relation to a simulation-based account of retrieval and focus of attention models.

Kent, C. & Lamberts, K. (2006a). The time course of perception and retrieval in matching and recognition. Journal of Experimental Psychology: Human Perception and Performance, 32, 920-931

Kent, C. & Lamberts, K. (2006b). Modeling the time course of feature perception and feature information retrieval. Journal of Memory and Language, 55, 553-571

3D-orientation indeterminacy accounts for a slant by tilt co-variation

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The disparity field from two orthographic views of an inclined planar surface is analyzed, and a new tool to extract the patch orientation is provided: the function coupling the average orientation of each pair of corresponding surface contours with their orientation disparity. This function allows identifying the tilt of the surface, and two indeterminacy functions describing the set of surface inclinations (around the vertical and horizontal axes) over convergence angle values compatible with the disparity field. We measured slant sensitivity for oblique slanted surface patches covered by different types of back-projected textures in two experiments (straight lines in 1 vs. random dots in 2). Observers judged whether a reference patch was more-less slanted than a test patch with the same tilt but a variable amount of disparity. Both experiments showed a slant by tilt covariation with slant sensitivity decreasing as the tilt of the reference increased from 113 to 143 deg. Results are consistent with a model that (regardless of surface texture) extracts 3D surface orientation via the implicit knowledge of 3D-orientation indeterminacy (modeled through indeterminacy functions); while they cannot be explained by either the linear combination of simulated parameters or the amount of disparity present in the image.

The overestimation of what is visible in a planar mirror is present in young adults but not in Primary School children

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Research in naive physics has documented several cases of mistaken beliefs about simple mechanical phenomena (e.g. the trajectory of a projectile). More recently, optical phenomena have been added to the list. In particular, many adults believe that they would be able to see their own image in a mirror before they are in front of it. Similarly, they expect objects to become visible in mirrors before they actually do. We refer to this overestimation of what is visible as the early error (e.g. Bertamini, Spooner & Hecht, 2003). With respect to mechanics, it has been suggested that incorrect models, and therefore erroneous beliefs, develop over time, as evidenced by good performance in young children (e.g. Kaiser, McCloskey & Proffitt, 1986). With respect to knowledge about what is visible in mirrors we report here the first developmental data. We confirmed an effect for prospective University students between the age of 17 and 22 (N=47) but found no evidence of any early error in children between the age of 5 and 11 (N=76). It appears that erroneous beliefs about mirrors develop during the later school years.

Bertamini, M., Spooner, A., & Hecht, H. (2003). Naive optics: Predicting and perceiving reflections in mirrors. Journal of Experimental Psychology: Human Perception and Performance, 29, 5, 982-1002.

Kaiser, M., McCloskey, M., & Proffitt, D. (1986). Development of intuitive theories of motion: curvilinear motion in the absence of external forces. Developmental Psychology, 22, 67-71.

Shape, colour or texture? A follow up study of O'Hanlon & Roberson (2006, 2007)

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O'Hanlon and Roberson (2006, 2007) investigated 3-year-olds' learning of new colour and shape categories by corrective, semantic and referential linguistic contrast, using computerised tasks. An advantage was found of corrective over referential contrast, although both kinds of feedback provide contextual information converging on a single hypothesis about the meaning of a new word. In referential contrast divided attention may slow down learning. The current study investigated this hypothesis by varying the number of objects on display during the 'learning games'. O'Hanlon and Roberson also reported more learning of shapes than colours. By introducing a texture dimension within the learning games, and comparing learning outcomes across the three domains, the current project asked whether a 'shape bias' facilitates acquisition in the shape domain per se, or whether there is an intrinsic difficulty in learning about the colour domain. Results show better learning with lower attention loads and a clear advantage in learning about shapes; colours were the hardest to learn. This pattern confirms a focusing of attention on the shape of objects, and an apparent difficulty in the conceptual segmentation of the colour spectrum. Adaptive cognitive functions may underpin an attentional preference for shape in the categorisation of the perceived environment.

O'Hanlon, C.G. & Roberson, D. (2007). What constrains the learning of shape terms? Journal of Experimental Child Psychology, 97, 138-148.

O'Hanlon, C.G. & Roberson, D. (2006). Learning in context: Attentional and linguistic constraints on children's color term learning. Journal of Experimental Child Psychology, 94, 274-300.

Abstraction of language structure during sleep

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Sleep has recently come under focus in terms of how it can influence cognitive processes. In particular, the potential role of sleep in the consolidation and generalisation of information has been investigated across a wide range of tasks, from memory to language learning (i.e., Gomez, Bootzin, & Nadel, 2006; Wagner, Gais, Haider, Verleger, & Born, 2004; Walker, 2005). The current research investigated how sleep influences grammatical category generalisation by training participants on an artificial language containing two categories of words and then testing their knowledge of these categories after 12 hours. The sleep group received training at 9pm and the wake group at 9am. The two categories were differentiated by both consistent distributional cues as well as within category phonological characteristics that differed between the two categories of words.

Participants were tested on their categorisation of the training words as well as their ability to generalize to novel, but phonologically consistent category words. While the wake group learned the training category words, only the sleep group was able to generalise beyond the known category words to the novel category words. This finding indicates that a sleep-dependent abstraction mechanism may be important in the acquisition of natural language.

Gomez, R. L., Bootzin, R. R., & Nadel, L. (2006). Naps Promote Abstraction in Language-Learning Infants. Psychological Science, 17, 670-674.

Wagner, U., Gais, S., Haider, H., Verleger, R., & Born, J. (2004). Sleep inspires insight. Nature, 427, 352-355.

Walker, M. P. (2005). A refined model of sleep and the time course of memory formation. Behavioral and Brain Sciences, 28, 51-104.

Variations in competitive and non-competitive prediction-error learning with a dimension of schizotypy

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Two human associative learning experiments investigated the relationship between a dimension of schizotypy and competitive and non-competitive prediction-error learning. Experiment 1 demonstrates that individuals low, but not high, on the introvertive anhedonia dimension of schizotypy demonstrate Kamin blocking, which has been taken to reflect the operation of competitive learning (Rescorla & Wagner, 1972). In complement, Experiment 2 demonstrates that individuals high, but not low on the same dimension demonstrate asymmetrical learning about the components of a compound stimulus that differ in their associative history, which has been suggested to reflect the operation of non-competitive learning (Rescorla, 2000). The implications of this double-dissociation for theories of learning will be considered.

Rescorla, R. A. (2000). Associative changes in excitors and inhibitors differ when they are conditioned in compound. Journal of Experimental Psychology: Animal Behavior Processes, 26, 428-438.

Rescorla R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In: Classical Conditioning II: Current Research and Theory (Eds. Black A. H., & Prokasy, W. F.) New York: Appleton Century Crofts, pp. 64-99.

Symposium: Mechanisms of associative learning
Organiser: Professor Simon Killcross

Mechanisms of attention in associative learning.

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In 1980, John Pearce and Geoffrey Hall published a model of Pavlovian learning, which combined novel ways of computing the associability of conditioned stimuli and of representing and calculating the effectiveness of overexpected unconditioned stimuli. Several but not all aspects of this model receive strong support from a series of brain lesion experiments my colleagues and I have conducted over the past 15 years. I will summarize the results of these studies, which reveal brain mechanisms underlying changes in event processing, and further specify the conditions under which those changes occur.

Pearce, J. M. & Hall, G. (1980). A model for Pavlovian learning: variations in the effectiveness of conditioned but not of unconditioned stimuli. Psychological Review, 87, 532-552.

Configural learning.

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According to the Pearce's (1994) connectionist model, associative learning is inherently configural: When an animal encounters a new pattern of stimulation (e.g., an auditory stimulus presented in a visual context), a configural representation of that pattern is rapidly acquired and it is this representation that enters into association with the memories of other stimuli (e.g., the delivery of food). This model provides a coherent analysis for a variety of phenomena including those (e.g., negative patterning) that have proven troublesome for competing, elemental analyses (e.g., Rescorla & Wagner, 1972). The explanatory power of Pearce's model is remarkable given the fact that it makes few assumptions about the principles governing the recruitment and formation of configural representations. Here, I will present the results of recent research that both underscore the configural nature of associative learning and extend our understanding of the principles and neural mechanisms that underpin configural learning and representation.

Pearce, J. M. (1994). Similarity and discrimination: A selective review and a connectionist model. Psychological Review, 101, 587-607.

Rescorla, R.A., & Wagner, A.R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A.H. Black & W.F. Prokasy (Eds.), Classical conditioning II: Current research and theory (pp. 64-99). New York: Appleton-Century-Crofts.

Parallel asymmetries in discrimination learning with temporal and explicit predictors of food.

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We have discovered two asymmetries in how rats use temporal cues to predict whether or not a Pavlovian signal will be paired with food. First, when rats are given either long or short intervals between successive extinction trials, extinction with long intervals generalizes to a short retention interval, but extinction with short intervals does not generalize to long. Second, when a long intertrial interval predicts that the next signal will be reinforced, and a shorter interval signals that it will not be reinforced, rats learn the discrimination rapidly. But when the short interval predicts that the signal will be reinforced and the long interval predicts that it will not, the discrimination is learned slowly. The passage of time can be conceptualized as a series of hypothetical elements, such that a short interval involves exposure to one element, A, and a longer interval involves exposure to two stimuli, A then B. To test this view, we have run parallel experiments in which explicit CSs, rather than temporal interval, played the role of A and B. These experiments produced the same asymmetries, whether A and B were presented simultaneously or sequentially. The results are consistent with the temporal element view and have implications for theories of timing and associative learning, including the Pearce generalization model.

Pearce, J. M. (1994). Similarity and discrimination: A selective review and a connectionist model. Psychological Review, 101, 587-607.

Predictive accuracy and stimulus associability: Testing the Pearce-Hall model in humans

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Aside from his contributions to the study of stimulus representation, Pearce has also informed our understanding of the mechanism by which associative learning occurs. Pearce and Hall (1980) developed a model of conditioning in which the associability of a CS was influenced by the prior predictive accuracy of that CS. Specifically, they argued that the associability of a CS will be high to the extent that the events with which it is paired are surprising. While this view ran counter to the prevailing wisdom, it proved farsighted as Pearce and colleagues went on to gather empirical evidence that provided unique support for the Pearce-Hall model (e.g. Swan & Pearce, 1988, Wilson, Boumphrey & Pearce, 1992). We review this evidence and ways in which the ideas encapsulated in the Pearce-Hall model might be integrated with alternative views of associability, before going on to test whether similar processes might also be at work in human associative learning.

Pearce, J. M., & Hall, G. (1980). A model for Pavlovian conditioning: Variations in the effectiveness of conditioned but not of unconditioned stimuli. Psychological Review, 87, 532-552.

Swan, J. A., & Pearce, J. M. (1988). The orienting response as an index of stimulus associability in rats. Journal of Experimental Psychology: Animal Behavior Processes, 4, 292-301.

Wilson, P. N., Boumphrey, P., & Pearce, J. M. (1992). Restoration of the orienting response to a light by a change in its predictive accuracy. Quarterly Journal of Experimental Psychology, 44B, 17-36.

End of symposium

Thirty-sixth Bartlett Lecture

An associative analysis of spatial learning

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The ability of animals to find important goals in their environment has been said to require a form of learning that is qualitatively different from that normally studied in the conditioning laboratory. Such spatial learning has been said to depend upon the construction of a global representation of the environment, and the acquisition of knowledge about the position of goals with reference to this representation is said to be unaffected by the presence of other cues or landmarks. Experiments will be described which evaluate both of these claims. In order to examine whether animals navigate with reference to a global representation of their environment, we investigated the extent to which the effects of training in one environment transfer to another. In order to investigate whether learning about the global representation is affected by the presence of other cues, we studied whether cue competition effects normally found in conditioning studies can be found in spatial tasks. Overall, the results indicate that most of the phenomena of spatial leaning can be explained by the principles of associative learning. The implication of this conclusion for our understanding of the neural mechanisms of spatial learning will be considered.

S cone signals invisible to the motion system can improve motion discrimination via surface segmentation

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Global motion extraction does not automatically benefit from correlations between colour and motion although small improvements in performance occur with attentional focusing. But what is the nature of such attentional enhancement? Random dot kinematograms of 50% coherence containing two colours differing only in their S-cone signal were generated. Spatial and temporal parameters were chosen such that global motion processing relied solely on the L-M component but the S-cone component still affected the colour appearance of the local motion signals. In our first, psychophysical experiment, participants discriminated between coherent and random motion and d's were measured for 'uncorrelated', 'uncued correlated' and 'cued correlated' conditions. In our second, electroencephalographic experiment, participants discriminated the direction of

coherent motion for 'uncued correlated' and 'cued correlated' conditions. We found that cueing led to an improvement in motion discrimination. The attentional modulation was found to occur at the N1 component of the event-related potential, with a peak latency of approximately 240 ms. In conclusion, S cone signals that are invisible to a global motion system can improve motion discrimination performance by aiding segmentation based on colour. This attention-related performance increase probably relies on top-down feedback from colour-selective areas into the medial temporal lobe (MT).

Auditory-visual integration of biological motion

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In natural environments, biological motion is usually defined by highly correlated sensory signals from more than one modality. A walker, for instance, will not only have a visual representation, but also a synchronous auditory signal, the walker's footsteps. We investigated whether special integration mechanisms exist for the integration of biologically relevant auditory and visual motion signals. We tested this hypothesis by measuring reaction times and sensitivity for motion discrimination using either a point-light walker (PLW) or a scrambled PLW together with consistent or inconsistent auditory footsteps. Both signals, auditory footsteps and the PLW, could either convey looming or receding motion. Our main finding is that motion congruency has a differential effect on biological versus scrambled visual motion: for biological visual motion, a concurrent but incongruent auditory stimulus has a larger detrimental effect than is found for scrambled motion. Our results suggest that different physical constraints govern the multisensorial integration of biological and non-biological motion signals; only the integration mechanisms for biologically-meaningful motion signals are direction-selective.

Unimodal and crossmodal attentional limits: insights from development

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Limits to attentional capacity have been investigated by measuring distractor interference when attentional demands of a central task vary (Lavie, 1995). However, it remains debated whether such capacity limits are specific to individual modalities, and whether adults' ability to allocate resources efficiently within and across modalities is the outcome of developmental change. We examined the effects of distracter modality and of task load on selective attention. Thirty young adults (19 years, 8 months) and thirty two children (mean age: 10 years, 9 months; range: 9 years, 11 months – 11 years, 7 months) performed a visual search task flanked by visual, auditory and audiovisual distracters. For adults, the effects of visual distractors decreased when the attentional demands of the central visual search task increased, but for auditory and audiovisual distractors influences persisted regardless of visual attentional demands. As expected, children suffered from distractor interference more than adults when the central task was less attentionally demanding and with audiovisual distractors. However, unimodal distractors affected their performance in a similar way to adults. These findings suggest separate and similar unimodal limits to attention over development, but age-related

changes in participants' ability to resist interference from irrelevant stimuli, especially when these carry crossmodal information.

Lavie, N. (1995) Perceptual load as a necessary condition for selective attention. Journal of Experimental Psychology: Human Perception and Performance, 21(3), 451–468.

Object substitution masking with long duration targets

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Object substitution masking (OSM) is a recently discovered form of masking that has been conceptualised in terms of continuous and recurrent communication between neurons at different levels within the visual system. According to the theory of DiLollo et al (2000) a newly appearing object stimulates lower level cells with spatially local receptive fields and geometrically simple stimulus requirements. Output from these cells feeds forward to higher level neurons which have larger receptive fields and are tuned to more complex stimulus properties. Competing pattern hypotheses are generated at the higher level and OSM is thought to arise during resolution of competition between these hypotheses involving feedback sweeps to the lower level. In keeping with the traditions of research on visual masking, studies of OSM have employed to-be-reported-upon target items for very short durations of between 10 ms and 50 ms. In this paper we report experiments in which targets are presented for considerably longer durations under a range of OSM conditions. Our results indicate that OSM can arise during the transition from a pre-attentive representation to an attended representation rather than as a function of the initial response of the visual system to target and mask onset.

DiLollo, V., Enns, J. T., & Rensink, R. A. (2000). Competition for consciousness among visual events: the psychophysics of reentrant visual processes. Journal of Experimental Psychology: General, 129, 481-507.

Is amodal completion early?

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Four visual search experiments tested whether there is amodal completion in early vision. In our experiments, the search rates slowed down both for displays where amodal completion would and, critically, for displays where amodal completion would not interfere with the distinction between target and distractor. Any effect on search rates previously attributed to early amodal completion might therefore be better described by a more parsimonious account of early vision. In this account, early vision is not capable of assigning relative depth to objects that are seemingly occupying the same position in space (as indicated by T-junctions), and focal attention is needed to determine what is in front and what is behind. It might be that once attention is more focused, amodal completion gets the opportunity to exert its influence and reduce the distinction between target and distractor, slowing search down further. Note however that under this account

it is the presence of T-junctions that is responsible for the initial need for more focused attention, and that the influence of amodal completion is contingent on this.

The neurocomputational basis of face recognition

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Whereas people can readily describe the differences between two highly similar objects (such as birds on the same page in a bird guide), they are at a loss in describing the difference between the faces of Tom Cruise and John Travolta. A remarkably simple account, based on early cortical (i.e., Gabor-jet) spatial filtering, may be able to explain the ineffability of faces and a wide variety of other phenomena distinguishing face from object recognition, such as why the recognition of faces, but not objects, is so severely disrupted by contrast negation (as when viewing a photographic negative) and orientation inversion, why faces, but not objects, are represented "configurally" (and what could "configural" possibly mean in neurocomputational terms?), and the nature of the deficit in prosopagnosia whereby the afflicted individual complains not that faces look blurry or otherwise degraded but that they all look the same.

The passport problem: Improving performance on a face matching task by training and modifications to image format.

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It is surprisingly difficult to determine whether two photographs are of the same unfamiliar person, and participants asked to undertake this task typically make both false positive and false negative errors. This has important practical implications, for example at border crossings where security staff are required to confirm the identity of a traveller by checking their appearance against the photograph contained in their passport. In this paper we will report the results of a series of studies designed to test possible methods for improving performance on this face matching task. We show that changes to the format of the images and a simple training program both result in a small increase in accuracy. We discuss both the theoretical and practical implications of these findings.

Is that Matthew Brown or Zhu Wen Xiong? Inducing the cross-race effect in the recognition of ambiguous faces using racially-stereotypical names

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Most explanations of the cross-race effect (CRE) are based on a perceptual-expertise framework, which suggests people are better at recognising own- than cross-race faces because the comparatively low contact with cross-race faces prevents them from developing the necessary expertise to accurately encode these faces. According to this framework it should not be possible to induce a CRE for two groups of faces that differ only in regards to non-physical cues that indicate their group membership. We present a series of experiments designed to test this prediction. We sought to induce a CRE for the recognition of racially-ambiguous faces labelled with racially-stereotypical names. Participants were presented with Asian, Caucasian and Ambiguous faces (morphs which combined an Asian face with a Caucasian face) each labelled with either a typically Asian or typically Caucasian name. In one study Ambiguous faces given Asian names were subsequently recognised better by Asian than Caucasian participants, but the reverse was true when these same faces were given Caucasian names. However, follow-up studies suggest this name-induced CRE is partly dependent on experimental design. The practical and theoretical implications of these results will be discussed.

Sexual dimorphism in photographic portraiture: Why males are flattered but females are fattened under identical photographic conditions.

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It has been reported previously that photographic portraiture is intrinsically fattening because of the loss of stereoscopic disparity (Harper & Latto, 2001; Latto & Harper, 2007). The same study also found that apparent bodyweight rises with increasing camera to subject distances. However, when a larger group of participants (controlled for body mass index) was photographed and the data were separated by sex, a significant sex dependent effect was observed. Although the previous finding of rising weight estimations with longer focal length lenses was reproduced, only the female portraits showed significant fattening effects. Males were either not fattened by the same photographic conditions or their bodyweight was underestimated. The likely causes for this effect are discussed, as are improved methodologies for making perceptually accurate photographic portraits.

Harper, B., & Latto, R. (2001). Cyclopean vision, size estimation and presence in orthostereoscopic images. Presence, 10(3), 312-330.

Latto, R., & Harper, B. (2007). The non-realistic nature of photography: Some more reasons why Turner was wrong. Leonardo, 40(3), 243-247.

The importance of lateral organisation in Bewick's woodcuts

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This paper examines the impact of left-right orientation using woodcuts by Thomas Bewick (1753-1828). The back of the drawing was blacked and then fixed over the block so that the image could be transferred on to the wood by tracing the lines. These marks were then used for the engraving process. Thus the print would be a left-right

reversal of the drawing. However, there are prints which replicate the orientation of the original drawing. In these cases Bewick went to the trouble of reversing the design before transfer and in sometimes he did this specifically to change the appearance of the image. We examine whether observers make different judgements dependent on whether the image is as Bewick intended it or reversed. We tested eight woodcuts of animals, four right-facing and four left-facing, on ten characteristics. Half the participants saw the images in the original orientation, the other half saw the reverse orientation. Observers chose different ratings for different animals. However, they consistently rated the original orientation as possessing stronger characteristics. Thus, it appears the Bewick was right in believing that orientation was important. We explore reasons why this might be the case.

Perceptual and productive skills in the 'tone deaf': A componential analysis

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Around 17% of adults believe themselves to be 'tone deaf' (Cuddy, Balkwill, Peretz, & Holden, 2005). The term 'tone deafness' suggests a perceptual difficulty, and a small minority of people do possess a dense impairment of basic music processing functions, termed 'congenital amusia' (Ayotte, Peretz, & Hyde, 2002). However, most people who claim to be tone deaf score normally on the standard assessment measure for congenital amusia (Cuddy et al., 2005; Wise & Sloboda, 2008). Our research is aimed at determining whether self-defined tone-deaf (STD) people are simply mistaken about their abilities, or whether they display deficiencies not tapped by the standard measures. Interviews show that the main reason people give for believing themselves tone deaf is a perceived inability to sing (Sloboda, Wise, & Peretz, 2005). This paper reports results from an assessment battery designed to provide a detailed profile of adult singing skills. Results show that STDs experience real singing difficulties, but that the pattern of difficulties is distinct from that shown by most congenital amusics. Comparisons between these groups and a group of normal controls allows some detailed conclusions to be drawn about deficit patterns in singing skill, and their relative remediability.

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Attentional changes during implicit learning: Signal validity protects a target stimulus from the attentional blink

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Participants in a series of experiments performed two simultaneous tasks: one a dual-target detection task presented in rapid serial visual presentation (RSVP); the other a cued reaction time task requiring participants to make a cued left/right response immediately after each RSVP sequence. On some trials, the appearance of certain targets or distractors predicted which response would be required on that trial. Participants showed faster reaction times on trials with a predictive target, indicating learning of the target-response association, and in each experiment this priming effect appeared to be independent of conscious knowledge of the target-response contingencies assessed by post-experiment questionnaires. Participants also displayed a detection advantage for the predictive target when it was temporally positioned to be susceptible to post-target processing deficits (i.e. the attentional blink). The results suggest that implicit learning of the association between a predictive target and its outcome can automatically facilitate target recognition during the attentional blink. The relationship between associative learning and attentional mechanisms will be discussed in light of these results.

Attention guides sequence learning: evidence from eye tracking

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Recent experiments from human contingency learning (e.g. Le Pelley & McLaren, 2003) have shown that the prior predictive history of a cue governs the rate of learning about that cue in the future. In this paper we extend recent findings from our lab suggesting that these 'associability' effects occur automatically in human learning (Beesley & Le Pelley, submitted). One view of associability is that predictive cues will be allocated more attentional resources (e.g. Mackintosh, 1975), resulting in rapid learning about those cues in the future. Eye tracking has recently been shown to be a sensitive measure of sequence learning in the serial reaction time task (e.g. Kinder, Rolfs & Kliegl, 2008). We demonstrate further evidence to this end, but moreover demonstrate that eye tracking is also able to offer a sensitive measure of attentional processes in this task. Our findings suggest that attentional processes operate to guide learning about relevant features within the task.

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Blocking of spatial learning between enclosure walls and a local landmark

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In three experiments conducted in virtual environments, blocking of spatial learning to locate an invisible target was found reciprocally between a distinctively shaped enclosure and a local landmark within its walls. The blocking effect was significantly stronger when the enclosure walls rather than the landmark served as the blocking cue. However, the extent to which the landmark blocked learning about the enclosure walls was not influenced by increasing the salience of the landmark. The data are the first to suggest that cue-interaction effects, commonly found in human and animal contingency learning experiments, are also found in human spatial learning based on landmarks and enclosure walls.

Efficient view independent recognition of landmarks

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Objects encountered at navigational decision points (junctions within a maze-like environment) are later recognized with increased efficiency when the presented devoid of spatial context and intermixed with unseen items. We compared recognition of novel objects seen from the perspective in which they were originally encountered in the maze or from the opposite direction. Objects previously seen at decision points were recognized more rapidly from incongruent views than objects seen at non-decision points. The results suggest that objects relevant to navigation are selectively represented in view independent form.

The union of hand and object: Attention and the visuo-motor response to hand grasp.

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We examined whether congruent and incongruent hand grasps influenced responses to objects. We show that grasp congruency influences object decision, even when the grasp is irrelevant to the response. Grasp congruency influences early components of the ERP (N1), and is associated with neural change bilaterally in occipital cortex along with early changes in motor and pre-motor cortex. We also show that, in

parietal patients, extinction for reporting object-hand pairs is reduced when hands are grasped correctly. The data suggest that the visual system responds to the union of a hand correctly grasping an object and that this is associated also with an early motor response to the hand-object pairing. Attention is also more likely to be allocated to the hand and object together when the hand grasps the object correctly. The implications for understanding visual object recognition and attention are discussed.

The 'active/passive' perception controversy - 40 years on.

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MacKay (1968) observed that perception can either be considered a passive, signal-driven, process where incoming data is categorised by feature detectors or as an active, hypothesis-driven, process that matches signals to internally generated hypotheses. Mirror neurones, which respond equally to observed and performed actions, provide the neural substrate for the link between action and perception. We report results from an fMRI experiment where we compared the response to speech, human motion and meaningless signals presented audio-visually, visually and auditorily. We find that all signals drive shared neural systems to varying degree. Auditory-alone signals drive predominantly a ventral network drawing on superior temporal areas (Brodmann Area 42 and 22) while visual and audiovisual signal presentation activates a dorsal network including premotor cortex (BA 6) and areas linked to mirror neurone systems: the inferior temporal (BA 45) and superior parietal areas (BA 7). We discuss the implications of the imaging data for models of speech and biological motion perception and propose a model that suggests passive perception in the ventral processing stream and active perception, drawing on mirror neurone systems, in the ventral stream for visual and low intelligibility signals.

Mackay, D. M. (1968). The 'active/passive' controversy. Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung, 21, 40-42

Language interferes with attentional control of smooth pursuit eye movements

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We investigated whether verbs whose meanings implied directionality would affect smooth pursuit eye movements. Participants tracked a dot moving smoothly in one of two directions, upward or downward. Verbs denoting upward or downward motion (e.g. 'rise' and 'sink') were presented auditorily during the movement. Eye velocity was systematically modified by an interaction between the directionality implied by the language (up or down) and the location of the eyes relative to the pursuit target (ahead or behind). We propose that eye velocity was sensitive to the conflicts created when the language directed attention in one direction but the pursuit target required attention in the other (hence the interaction with the location of the eye relative to the target). These results demonstrate that low-level oculomotor control can be influenced by higher

cognitive functioning, such as language comprehension, even when the content of the cognitive function is irrelevant to the oculomotor task.

Fixation sequences in imagery and in recognition during the processing of pictures of real-world scenes

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How do eye fixation scan patterns ("scanpaths") compare with the initial encoding of a picture during a second viewing of a picture or when trying to imagine that picture using memory? Initially, 30 real-world scenes were presented for encoding, and half the participants then performed a recognition test, saying whether each of 60 images were old (from the original set) or new. The other participants performed an imagery task immediately after encoding each of the 30 images. After completing this task, the recognition group then performed the imagery task in response to prompts that were unique verbal descriptors, and the imagery group performed the recognition task. All participants returned 2 days later, and the imagery test repeated. Eye movements were recorded during all phases. Scan patterns were compared using a string-editing algorithm, Closer similarities were observed between phases that involved more similar tasks (e.g., initial encoding vs. recognition, and immediate imagery vs. delayed imagery), and the scan patterns were equally similar when the task was presented immediately or after 2 days. The possibility raised by these results is that images can be retrieved from memory by re-instating the sequence of fixations made during their initial encoding.

Episodic intertrial learning of younger and older participants when studying words which differ on word frequency and age of acquisition.

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The study had three aims, firstly to replicate the findings that older adults have deficits in recall, encoding and consolidation or retrieval relative to younger adults. Secondly, to investigate whether stimuli characteristics affect recall, encoding or consolidation or retrieval when using a within-subjects technique when focusing on episodic memory. Finally the study investigated whether cognitive atrophy affected recall, encoding or consolidation or retrieval of words that differed in terms of either word frequency and or age of acquisition. A multitrial within-subjects technique was used recruiting eighty-four participants. Our findings show that older adults have deficits in recall, encoding, consolidation or retrieval when studying words using the multitrial technique. The results also show that high frequency and early acquired words are recalled and encoded significantly better than low frequency and late acquired words. Finally the results show that across trial older adults encoded early acquired words at a greater rate then late acquired words compared to younger adults.

Environmental context-dependent recognition memory: Effects of repetition

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Dual-process models of recognition propose that two distinct memory retrieval processes underlie recognition memory performance: recollection and familiarity. Local environmental context (local-EC) reinstatement effects are observed with recollective, but not familiarity based retrieval (Van den Bos & Rutherford, 2006; Macken, 2002). In the present study, a two-step remember-know with guess option paradigm provided recollective and familiarity based estimates to investigate the influence of presentation time, type of task and repetition on local-EC recollective recognition reinstatement effects. In line with Murnane and Phelps (1995), Malmberg and Shiffrin (2005) and Russo, Parkin, Taylor, and Wilks (1998) in Experiment 1 and 2 local-EC effects on recollective recognition increased in magnitude only with an increased number of repetitions under graphemic encoding conditions. Furthermore, the increase in magnitude of local-EC effect was enlarged even more when the local-ECs employed were made up of a greater number of visual elements (Experiment 2). Implications for the one-shot hypothesis of contextual storage (Malmberg & Shiffrin, 2005) and the outshining hypothesis (Smith, 1988) are discussed.

Directed forgetting in direct and indirect tests of memory: An electrophysiological investigation into the role of selective rehearsal and inhibition

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The main aim of our study was to examine the brain and functional mechanisms that are involved in stopping unwanted memories from entering consciousness, using a directed forgetting procedure. Specifically, we aimed to identify whether these processes rely primarily on inhibition of unwanted information or, alternatively, selective rehearsal of relevant materials. During study, participants (N=24) were instructed to remember half of the presented words (TBR) and forget the other half (TBF), as indicated by a subsequent instruction cue. Behavioural data from recognition and lexical decision tasks were supplemented with event-related brain potentials (ERP). TBR items were recognized quicker and more accurately than TBF items. In contrast, lexical decision speed and accuracy were similar for the two types of studied items. These results suggest that selective rehearsal may be the main mechanism underlying directed forgetting in this experiment. ERPs also provided no evidence for the presence of an inhibitory mechanism, demonstrating quantitative rather than qualitative differences between TBR and TBF items. Moreover, TBR items elicited a larger parietal old/new effect then TBF items, while the earlier and more frontal part of the old/new effect was largely similar. This suggests that remember/forget instructions affect recollection processes more than familiarity processes.

Creating false memories for brand names

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The Deese-Roediger-McDermott (DRM) paradigm (Deese, 1959; Roediger & McDermott, 1995) enables the creation of false memories for non-presented stimuli in a laboratory setting. Participants are presented with word lists such as bed, rest, awake, tired, dream etc. which give rise to memories for the non-presented but related word "sleep". We used the DRM paradigm to investigate creating false memories for brand names. Participants studied plain font or brand font lists of brand names (e.g., Lloyds TSB, HSBC, Barclays, Halifax) before completing either a free recall or maths task, followed by a Remember/Know/Guess recognition memory task presented in either plain font or brand font. Key related but non-presented brand names (e.g., NatWest) were both falsely recalled and falsely recognised. In the recall task, there were more brand names falsely remembered following plain font than brand font presentation. In the recognition task, Remember responses to all test items and familiarity (Know responses) for non-presented brands increased when the study and test fonts matched.

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Shadows, shape, and novel 3D object recognition

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In three experiments we explored the effect of shadows on recognition of novel 3D objects. Experiment 1 used 24 novel 3D objects to examine whether masked primes rendered with no cast shadow, object shadow, or shadow cast onto a ground plane would facilitate recognition of 4 previously learnt targets rendered with object shadow. Results show recognition performance was affected by changes in shadows; the addition of ground shadow produced a reaction time cost and the removal of cast object shadow resulted in a greater RT cost. In Experiments 2 and 3 participants judged whether two sequentially presented objects were the same regardless of shadow. Experiment 2 used the stimuli from Experiment 1 whilst Experiment 3 used a new set of 12 objects each with systematically manipulated distractors: same-parts different-configuration, different-parts same-configuration, and different-parts different-configuration. All objects were rendered with no shadow, object shadow, and ground shadow. Performance was sensitive to the changes in shape and shadow, and although participants were faster to match identical stimuli, manipulations of parts and configuration produced no additive effect on RTs. Overall, these results suggest a shadow specific shape effect and implications for view based and structural decomposition models of object recognition are discussed.

The effects of semantic and phonological similarity on short list recall under varying processing load

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In working memory paradigms participants attempt to maintain information despite potentially disruptive processing. If processing demands allow, storage material may be held active in short-term memory, but if processing is rapid and demanding then information at recall may have to be recalled from passive long-term memory (Unsworth & Engle, 2007). This study examined these issues in a sample of 30 participants by exploring the relationship between different types of storage content and degree of processing load. Given that the active system deals principally with phonological information while the passive system deals principally with semantic information, it was posited that the manipulation of processing load would result in a shift in how successfully each type of content was recalled. Specifically, we predicted a reduction in phonological similarity effects and an increase in semantic similarity effects with increased processing load. To-be-remembered items consisted of a pre-load of four word lists, which were related either semantically, phonetically, or not at all. Processing load was manipulated by varying the pace of presentation in a Barrouillet et al. (2004) counting task. While evidence for multiple memory systems was not found, differential behaviour between the content types was found, and findings suggest directions for future studies.

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The acquisition of graphotactic vs. morphological spelling patterns in Slovak children with dyslexia

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The ability to learn orthography-based (graphotactic) and language-based (morphological) spelling rules was investigated among typically developing Slovak 1st to 4th graders (n: 100 to 115) and 3rd (n = 23) and 4th (n =31) graders with dyslexia. Spelling tests focusing on knowledge of graphotactic rules and on morphological rules were administered. We examined whether dyslexic learners of the shallow orthography of Slovak find it easier to learn graphotactic rules that require first- and second-order letter sequencing knowledge, than morphological rules that require linguistic analysis. On the assumption that graphotactic rules rely on basic associative learning of letter patterns, which may not be specifically impaired in dyslexia, while morphological rules require linguistic analysis skills that are specifically impaired, we predicted that the children with dyslexia would show faster learning and smaller lags in the graphotactic than in the morphological measures. Preliminary analyses support our predictions. It seems that dyslexic learners of shallow orthographies show similar patterns of difficulty in spelling to their peers learning deep orthographies: in particular, they show stronger deficits in acquiring language-based spelling rules.

Comparing haptic and visual size constancy in old/new object recognition

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Size differences are usually irrelevant to object identity, but variations in perceptual input due to size changes can disrupt object recognition. We investigated how the visual and haptic modalities compare in their attainment of size constancy, since size may be a more reliable identity cue for haptics. Size changes disrupt visual old/new recognition of novel and familiar objects (e.g. Jolicoeur, 1987; Biederman & Cooper, 1992; Uttl, Graf, & Siegenthaler, 2007), and haptic and visual old/new recognition of 2D, novel, symbolic stimuli (Srinivas, Greene, & Easton, 1997). However, no experiments have examined how size changes affect haptic recognition of familiar objects. Two experiments compared the effects of size changes on visual and haptic old/new recognition of familiar objects. The first presented real 3D objects haptically, while the second presented greyscale photographs of the same objects. In both experiments, participants first named one of three (standard, different size, and different shape) exemplars of 36 familiar object categories. Old/new recognition was then assessed for the standard exemplars of each of the 36 old, studied categories and for 25 new object categories. Size changes disrupted visual and haptic old/new object recognition similarly, suggesting that haptics does not rely on size more than vision does.

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Jolicoeur, P. (1987). A size-congruency effect in memory for visual shape. Memory & Cognition, 15(6), 531-543.

Srinivas, K., Greene, A. J., & Easton, R. D. (1997). Visual and tactile memory for 2-D patterns: Effects of changes in size and left/right orientation. Psychonomic Bulletin & Review, 4(4), 535-540.

Uttl, B., Graf, P., & Siegenthaler, A. L. (2007). Influence of object size on baseline identification, priming, and explicit memory. Scandinavian Journal of Psychology, 48, 281-288

Tourette's syndrome (TS): Inhibitory performance in adults with uncomplicated TS

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Tourette's syndrome (TS) is a neurodevelopmental disorder linked with frontostriatal dysfunction. Previous work has shown some evidence of mild performance deficits on a range of different tasks that involve inhibitory processes. The present study evaluated this in adult participants with uncomplicated TS. Interference control was measured using the Stroop and flanker tasks, and a Stroop-flanker task that combined the inhibitory demands of both. Motor inhibition was measured using a letter CPT task, and a word CPT task that manipulated the inhibitory demands using compatible and incompatible words. The TS group was found to be slower than the control group on most measures, but showed differential slowing under conditions with enhanced inhibitory demands on the combined Stroop-flanker and the compatible-incompatible CPT tasks. The findings suggest that TS-alone is linked to mild impairments in aspects of inhibitory function, and that these can be detected by relatively powerful inhibitory manipulations. A range of different types of inhibitory tasks may be sensitive to TS- alone, and this may depend upon both the type of inhibition and the strength of the inhibitory manipulation.

An electrophysiological study of memory for perceived and imagined events and the effects of schizotypy.

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Some of the symptoms seen in schizophrenia, such as hallucinations and delusions, could result from a reality monitoring deficit. This is a memory process which allows individuals to discriminate memories of internally and externally generated information. There is now compelling evidence that psychotic experiences exist on a continuum and psychosis-like experiences can be measured in healthy volunteers, traits called

schizotypy. The aim of this study was to examine the behavioural and neural data obtained in a reality monitoring and location judgement task. This was achieved by presenting participants with complete or incomplete wordpairs on the left or right side of the screen in the study phase. Participants had to say the wordpair aloud, filling in the missing word if necessary. In the test phase the first word of the pair appeared in the centre of the screen and participants had to make a reality monitoring (perceived,imagined,new) or a location judgement (left,right,new). Contrary to expectation there were no differences behaviourally between individuals high and low in schizotypy on either the reality monitoring or location task. There were however differences in the event-related potentials (ERPs) between the two tasks as a function of schizotypy. The implications of these results will be considered.

The effects of foreseeability on everyday judgments of cause and blame

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This paper describes the results from two tasks which examined different components of foreseeability in relation to judgments of cause and blame. In one task the temporality of foreseeability was manipulated. A medical scenario was described where a negative outcome was always known to occur, never known to occur or only known to occur after the event had happened. The results demonstrated that this manipulation influenced cause as well as blame judgments, both in expected and unexpected directions. In the second task, the type of foreseeability (objective or subjective) was manipulated. The findings suggested that both types of foreseeability influenced cause and blame, and that outcomes that were higher in probability were linked to inflated cause and blame judgments. The significance of these findings is considered in relation to the theories of Alicke (2000) and Shaver (1985).

Alicke, M.D. (2000) Culpable control and the psychology of blame. Psychological Bulletin, 126, 556-574.

Shaver, K. (1985) The Attribution of Blame: Causality, Responsibility & Blameworthiness. Springer, New York.

On probing the labile stage of saccade programming in reading

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Models of eye movement control postulate that saccade programming consists of a labile followed by a non-labile stage. Here we estimated the duration of the labile stage in reading. We examined the effect of luminance probes on saccade length using eye-contingent display changes. Probes were presented at different spatial offsets (+3, +6, and +9 characters) around a randomly chosen fixation and with different temporal delays after fixation onset (50, 100, 150, and 200 ms). For forward saccades where the probe also occurred in the forward direction, there was a significant linear effect of probe offset

(saccades were significantly shorter for +3 than +9 char probes), but only at probe delays of 50 and 100 ms. This suggests that saccade programming in reading starts within 100 ms into a fixation and enters a non-labile stage by 200 ms. These estimates constrain existing models of eye movement control in reading.

The persistence of gender-stereotypes: Evidence from a reading study.

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Previous eye tracking studies have shown that readers looked longer at pronouns that were inconsistent with the stereotypical gender of the antecedent than at stereotype-consistent pronouns (e.g., "The babysitter hurt himself/herself..."). The present study aimed to replicate this mismatch effect and to determine whether readers would generate and maintain a mental representation of the antecedent that would include the gender information provided by the pronoun. The participants read sentence pairs. The first sentence introduced an agent and a gender-matching or -mismatching pronoun. The second sentence repeated the antecedent and the pronoun and referred to either the same person or a different person ("The next day, the babysitter/the new babysitter blamed herself..."). Fixation and gaze durations for the pronoun and the spill-over region were measured. As expected, there were gender mismatch effects for the pronoun regions in the first sentence. There were also mismatch effects in the second sentence, regardless of whether it referred to the same person as the first sentence or to a different person. This suggests that the readers processed the first pronoun, but did not incorporate the information it provided into their discourse representation. The implications for psycholinguistics and social psychology will be discussed.

Bimodal reaction time facilitation for auditory-visual moving stimuli

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Reaction times to stationary stimuli presented in two modalities are shorter compared to unimodal RTs (redundant signals effect (Miller, 1982)). For moving targets, strong crossmodal integration effects have been demonstrated in studies measuring sensory thresholds, but it is unclear whether analogous reaction time facilitation is observed for auditory-visual motion stimuli. Here we tested whether RT gains are revealed for bimodal motion stimuli at near threshold and suprathreshold stimulus levels. We found that bimodal motion cues resulted in significant RT facilitation at threshold level which could not be explained using an independent decisions model (race model). No bimodal facilitation was observed at suprathreshold levels, however this may be explained by differences between unimodal RTs. In two subsequent experiments, RTs for suprathreshold unimodal stimuli were roughly equated, and significant RT gains were observed for both a direction-discrimination task and a non direction-selective task. In conclusion, moving auditory-visual cues produce faster response times than the unimodal equivalents and this facilitation cannot be explained by assuming independent processing in the auditory and visual modalities, and occurs for simple and choice reaction times. Finally, our results highlight the importance of matching the unimodal reaction times to achieve a powerful test for the race model.

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Sorry, what did I say? Constant interruption impairs verbal fluency and output monitoring

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If interrupted whilst speaking, we may "lose track" of what we were about to say or what we have already said. The current experiment provides a laboratory analogue of this phenomenon by interrupting phonemic and semantic verbal-fluency tasks with a simple 10-second counting task. Five interruptions introduced during the one-minute task significantly reduced the number of words generated - and increased the number of repetitions - in both semantic and phonemic fluency tasks. Despite the set size being potentially larger for the phonemic task significantly fewer words were produced, perhaps reflecting the idea that phonemic fluency involves controlled processing whilst semantic is more automatic. In the phonemic but not the semantic task, there was a negative correlation between working memory (WM) span and the time taken to resume the fluency task following interruption. This indicates that for low WM capacity participants, the disruption caused by interruption is greater in a task that relies on controlled executive processing than one that is more automatic. The results suggest that interruption affects both speech-planning and output-monitoring, and that interruption may have a greater effect on executive tasks.

Role of perceptual salience in the isolation effect

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The isolation effect refers to the enhanced recall of an item (e.g., a red letter) that differs in some way from an otherwise homogeneous set of to-be-remembered items (e.g., black letters). The now commonly-held assumption that the perceptual salience of the isolated item during encoding plays no necessary role in the isolation effect is based largely on the finding that the effect is found even when the isolated item occurs at early serial positions and hence at a point at which it could not be perceived as salient against any previously-established context (early-isolation effect). However, using a verbal serial recall task, we replicate the early-isolation effect (Experiment 1) but demonstrate that this effect may indeed depend upon the isolate's perceptual salience, but its salience within the global (or across-trial) not local (within-trial) context: When an early-isolate was stripped of its global salience (i.e. still distinct compared to the items in the same list but not compared to the items across the wider experimental context), the early-isolation effect was abolished and the isolation effect generally was far less compelling (Experiment 2). We conclude that a necessary role for perceptual salience in the isolation effect may have been dismissed prematurely.

The role of semantic and visual cues in facilitating object recognition

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Predictive coding framework presupposes that the brain uses different sources of information to predict the upcoming input in a top-down manner. It has been shown that if top-down predictions were strong but incorrect, then misperceptions might occur. We manipulated the validity and strength of predictions by preceding target images with semantic cues or by varying the images' global form. We compared the speed and classification accuracy of both meaningful and meaningless images. We demonstrate that an informative semantic cue preceding an image or an informative global form (given by low frequency spatial information as proposed by Bar, 2003) were equivalent in that they predicted the input image, such that the latency of classification is shorter and with improved accuracy. However, informative but incorrect cues (semantic or visual) resulted in higher error rates, but with shorter reaction times compared to uninformative cues. Misperceptions occurred when incorrect cues triggered strong predictions but were followed by a meaningless image. The results suggest that semantic cues or rapidly extracted image global form generate predictions of incoming sensory information in atop-down manner. This system facilitates object recognition, but could also lead to perceptual mistakes, if the prediction turns out to be wrong.

Bar, M. (2003). A cortical mechanism for triggering top-down facilitation in visual object recognition. Journal of Cognitive Neuroscience, 15(4), 600-609.

Auditory Distraction Removes Retrieval Induced Forgetting

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When a subset of a just-presented list is repeatedly-retrieved, later recall of that "practiced" subset is facilitated but recall of non-practiced items from the same subset is impaired (Anderson et al., 1994). One explanation for this Retrieval-Induced-Forgetting (RIF) is that it is due to target-competitor-inhibition: Non-practiced items compete with same-subset to-be-practiced items for recall and are suppressed, which inhibits their later recall. The target-competitor-inhibition process has also been implicated as a cause of semantic auditory-distraction whereby to-be-ignored auditory items that are drawn from the same, as opposed to different, semantic-category as the to-be-recalled items produce more disruption to free recall performance (Marsh et al., 2008). Here, we use the RIF paradigm to investigate if related to-be-ignored auditory items undergo inhibition. The auditory-distraction manipulation involved presenting participants with either: The non-practiced subset of items from a practiced category (Related condition); items drawn from an unrelated category (Unrelated condition); or no irrelevant sound (Quiet condition) during the practice stage of the task. RIF was shown in the Quiet and Unrelated condition but was absent from the Related condition. These results are inconsistent with the notion that related to-be-ignored auditory items undergo inhibition, and are considered in terms of inhibitory and non-inhibitory accounts.

Anderson, M. C., Bjork, R. A., & Bjork, E. L. (1994). Remembering can cause forgetting: Retrieval dynamics in long-term memory. Journal of Experimental Psychology: Learning, Memory, and Cognition, 20, 1063-1087.

Marsh, J. E., Hughes, R. W., & Jones, D. M. (2008). Auditory distraction in semantic memory: A process-based approach. Journal of Memory and Language, 58, 682-700.

Interaction of colour, shape, and motion in dynamic object recognition

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To recognize objects, observers do not only rely on shape. Previous research has shown that surface properties such as colour or dynamic features such as motion are also used for object recognition. How do colour, shape, and motion features interact during recognition? In this study, participants learned four novel objects, each defined by a distinct combination of colour, shape, and non-rigid motion (such as bending, twisting, and stretching). Twelve participants focused their attention on motion and identified objects on that feature during learning, and 12 identified objects on the basis of shape. At test, participants identified the learned objects when neither, one or both of the unattended features changed. When participants identified objects by motion, we found increased reaction times when either shape only or both unattended features were changed relative to when no features changed. We found a similar pattern of results when participants identified objects on the basis of shape, although this group was generally faster than the motion group. For both groups, there was no significant effect of changing colour. Overall, the results indicate that both unattended shape and non-rigid motion, but not colour, impair recognition performance suggesting interactions between attended and unattended features.

Covert detection of facial familiarity and attractiveness

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It has been suggested that participants, without a deficit in face recognition, give higher skin conductance responses (SCR) to familiar faces than to unfamiliar faces (Ellis et al. 1999). Stone et al. (2001), in investigating possible confounds between emotional valence and familiarity, found no difference in SCR levels between familiar and unfamiliar faces. However, higher SCRs were recorded for subliminally presented faces rated as good (positive) compared to those considered evil (negative), suggesting that the increase in SCR's associated with familiar faces may be due to positive valence rather than familiarity. In the experiment presented here we manipulated familiarity and attractiveness and tested whether participants distinguished between faces for these variables when presented too fast to allow conscious recognition. Three sets of faces were presented: (1) Famous attractive (FA); Unfamiliar attractive (UFA); Unfamiliar less attractive (UFLA). SCRs were the same for each category of faces whether presented subliminally or supraliminally, and were the same for attractive faces whether FA or UFA. However, SCRs differed between the attractive and less attractive (UFLA) faces,

suggesting that higher SCRs to famous faces are not necessarily due to covert recognition, but may be a response to the positive affective valence of the stimuli.

Ellis H. D., Quayle A., & Young A.W. (1999) "The emotional impact of faces (but not names): Face specific changes in skin conductance responses to familiar and unfamiliar people" Current Psychology 18 88-94

Stone A. & Valentine T. (2004) "Better the devil you know? Non-conscious processing of identity and affect of famous faces" Psychological Bulletin and Review 11 469-474

Reconsidering duration estimates as measures of perceived time rate

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Numerous studies have used the judgment of duration as a measure of the rate at which time passes (e.g., Chaston & Kingstone, 2004). The research reported here shows that while passage of time judgments (POTJs), that is, ratings of how quickly or slowly time seems to pass, are influenced by some of the same factors as duration judgments, significant correlations between duration judgments and POTJs did not usually occur in three experiments. The first indicated that POTJs were affected by changes in information-processing load, while retrospective duration judgments were not. The second showed that duration estimates varied between presented film clips, with prospective estimates being far higher than retrospective ones, but that there were no significant differences in POTJs. The third study showed that presence or absence of knowledge of event duration did not affect POTJs. Overall, time being judged as passing quickly did not correspond with a shorter duration judgment, so interpreting a short estimate of duration to mean that the passage of time was experienced as fast (as is usually assumed) appears to be fallacious.

Chaston, A., & Kingstone, A. (2004). Time estimation: The effect of cortically mediated attention. Brain and Cognition, 55, 286-289.

Proactive interference is not a unitary phenomenon: implications for working memory theory

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Proactive interference (PI) is typically explained as a function of cognitive components believed to mediate its effects on memory. Although two sources of PI have been delineated -item-non-specific PI (continued presentation of same category items) and item-specific PI (continued repetition of the same items)- a unique contribution of each source to memory has not been envisaged. Both forms of PI were investigated in a recognition memory task that matched item-specific and non-specific conditions on the amount of storage and processing required. Experiment 1 revealed a lack of covariance between the two PI effects. Experiment 2 isolated distinct causes of the influence of each from of PI on working memory performance. In addition, each effect was dissociated from forward and backward digit span. When rehearsal was made more difficult with the

addition of secondary tasks, there was some evidence that span scores covaried with PI, independently of each PI source. The data suggest that PI effects are not reliant on the functioning of domain general cognitive mechanisms; specific mechanisms that are dependent on the source of PI mediate its influence in working memory.

Language representation and processing in fluent bilinguals: electrophysiological support for the revised hierarchical model of bilingual memory

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The purpose of this investigation was to test the assumption of asymmetric mapping of words to concepts in bilingual memory proposed in the Revised Hierarchical Model (RHM, Kroll & Stuart, 1994). Twenty six Spanish-English bilinguals were presented with pairs of words, one in English and one in Spanish, and asked to indicate whether or not the words had the same meaning. In half the trials the Spanish word preceded the English word (forward translation), and in the other half the English word preceded the Spanish word (backward translation). In each condition, half of the words had the same meaning. Event-related potentials (ERPs) were used to examine lexical-semantic activation during word translation. In support of the RHM, a direction dependent translation asymmetry was observed in the magnitude of the N400 repetition effect. Specifically, the N400 effect was larger during backward translation than during forward translation, due to a larger reduction in N400 amplitude when an L2 word was preceded by its L1 translation equivalent. This difference extended beyond the typical N400 time window and remained evident at 500-1000 post stimulus. Results are discussed in terms of the differential speed of lexical and conceptual access during forward and backward translation.

Deficits in cross-race face recognition: No evidence for encoding-based effects

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The cross-race effect (CRE) in face recognition is typically observed in tasks which tap into long-term memory processes. Several studies, however, have found evidence that the effect emerges early in the process of learning, retention, and retrieval (Lindsay, Jack, & Christian, 1991; Walker & Hewstone, 2006). In seven experiments, with over 300 participants, we found that the recognition deficit associated with the CRE does not likely reflect deficits in immediate encoding. In Experiment 1, with a study-to-test retention interval of 4 minutes, participants were better able to recognize White faces, relative to Asian faces. Experiment 1 also validated the use of computer-generated faces used in subsequent experiments. In Experiments 2 through 6, performance was virtually identical to Asian and White faces in a match-to-sample, immediate recognition task. In Experiment 7, decreasing the target-foil similarity and disrupting the retention interval with trivia questions elicited a reemergence of the CRE in recognition accuracy. The recognition deficit in the CRE apparently emerges from retention or retrieval deficits, not differences in immediate perceptual processing.

Comparing haptic and visual size constancy in old/new object recognition

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Recent alternative accounts of short-term memory (e.g., Gupta & MacWhinney, 1997; Jones, Hughes & Macken, 2006; Martin & Saffran, 1997; Schweppe & Rummer, 2006)have proposed that the verbal short-term retention of information is better explained by recourse to language processing and production than to any bespoke short-term memory system (e.g., Neath, 2000; Salamé & Baddeley, 1982). In support of these views, we report two experiments in which the syntactical order of item pairs within a six-item list mediated serial recall performance. Specifically, adjective-noun lists, in which the order of item pairs (1 and 2, 3 and 4, 5 and 6) was congruent with syntax in the English language, were significantly better recalled than noun-adjective lists (Experiment 1a) even when the same list items were reversed (i.e., adjective-nouns changed to noun-adjectives and vice versa; Experiment 1b). Results are discussed in the light of a recent perceptual-gestural account of verbal short-term memory in which the retention of items in short-term memory preys upon the knowledge and mechanisms used in speech production (e.g., Hughes & Jones, 2005; Jones, Hughes, & Macken, 2006; Woodward, Macken, & Jones, 2008).

Gupta, P., & MacWhinney, B. (1997). Vocabulary acquisition and verbal short-term memory: Computational and neural bases. Brain and Language, 59 , 267-333

Hughes, R. W., & Jones, D. M. (2005). The impact of order incongruence between a task-irrelevant auditory sequence and a task-relevant visual sequence. Journal of Experimental Psychology: Human Perception and Performance, 31, 316-327.

Jones, D. M., Hughes, R. W. & Macken, W. J. (2006). Perceptual organization masquerading as phonological storage: Further support for a perceptual-gestual view of short-term memory. Journal of Memory and Language, 54, 265-281.

Martin, N. and Saffran, E.M. (1997). Language and auditory-verbal short-term memory impairments: Evidence for common underlying processes. Cognitive Neuropsychology, 14 (5), 641-682.

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Salame, P., & Baddeley, A. D. (1982). Disruption of short-term memory by unattended speech: Implications for the structure of working memory. Journal of Verbal Learning and Verbal Behavior, 21, 150-164.

Schweppe, J. & Rummer, R. (2006). Shared representations in language processing and verbal short-term memory: The case of grammatical gender. Journal of Memory and Language, 56(3), 336-356.

Woodward, A., Macken, W. J., Jones, D. M. (2008). Linguistic familiarity in short-term memory: A role for (co)articulatory fluency? Journal of Memory and Language, 58(1), 48-65.

Surface connectivity effects in three-dimensional object recognition.

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Recent evidence suggests that 3D object shape can be represented in terms of non-volumetric shape primitives that correspond to object surfaces (e.g., Leek et al., 2005; in press). Here we extended this work to examine the role of spatial configuration of surfaces in the representation of 3D objects using a whole-part matching paradigm. In Experiment 1, we used a set of 14 3D surface-rendered novel objects. Part stimuli contained either three, four or five surfaces from equal number of VCs. Thus, information about spatial configuration of volumes was held constant, while the number and configuration of surfaces was manipulated. Matching efficiency increased as a function of the number of surfaces shown in the part stimuli. In Experiment 2 part stimuli contained equal number surfaces, from either two, three or four VCs. Thus, the number of surfaces was constant, whilst the number and configuration of VCs was manipulated. Participants were more efficient in matching parts to wholes in the four VC condition compared to the two VC condition. The findings are relevant to current debates on the nature of shape primitives used to represent 3D object shape and provide new constraints on theoretical models of 3D object representation in visual recognition.

Leek, E.C., Reppa, I., & Arguin, M. (2005). The structure of three-dimensional object representations in human vision: Evidence from whole-part matching. Journal of Experimental Psychology: Human Perception & Performance, 31 (4), 668-684.

Leek, E.C., Reppa, I., Rodriguez, E., & Arguin, M. (in press). Surface but not volumetric part structure mediates three-dimensional shape representations: Evidence from part-whole priming. Quarterly Journal of Experimental Psychology.

Linear separability in object perception

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Learning to categorise a set of objects in a certain way can affect perception in a way that is compatible with the categorisation. Nevertheless, what is currently unknown is whether and how learning non-linearly separable (NLS) categories, where the objects do not share common features, affects perception. The current study examined the hypothesis that learning an NLS category structure would lead participants to perceive the categorized stimuli in a linearly separable (LS) way. Participants were taught to categorise a set of arrow-like objects either in LS or a NLS way and subsequently provided similarity ratings for all the categorized stimuli. Whilst NLS categories were more difficult to learn compared to the LS ones, there were also significant differences in learning rates between the two LS conditions. Similarity ratings of the categorised stimuli were modulated by difficulty of categorisation: intuitive LS classifications led to greater amount of restructuring in psychological space compared to difficult LS classifications. Furthermore, the categorized stimuli were perceived so that in two and three dimensions the learned category structure was still NLS, but it was clearly LS in four dimensions. Thus, learning an NLS category structure resulted in the creation of dimensions that

enabled an LS perception of the corresponding stimuli.

Priming local syntactic structures in speech production: An online study

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In two syntactic priming experiments, we examined whether the production of the target sentence (e.g. "The duck and the cup move apart") was facilitated by the prior production of a sentence with an identically structured subject noun phrase, compared to a subject noun phrase with a different structure. Both types of primes differed from the target sentence in their overall structure (e.g., (related: "The spoon and the pen move above the table"; unrelated: "The spoon moves above the pen"). The participants produced the targets as descriptions of moving objects. We found that the effects of the prime sentences depended on whether they were read aloud or produced as descriptions of pictures. Namely, read primes yielded significant facilitation, which demonstrates that speakers can reuse syntactic frames for individual phrases even when the overall structures of successive utterances are different. By contrast, related primes that were descriptions of pictures yielded significant inhibition. A third experiment suggested that this effect probably arose during the mapping from the conceptual to the syntactic structure.

Role of perceptual salience in the isolation effect

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Most healthy individuals demonstrate a leftward visuospatial attentional bias when making judgements of linear extent: a phenomenon termed 'pseudoneglect'. Little is known about the pre-existing (normal) neural circuitry specifically associated with pseudoneglect. The aim of this study was to determine which cortical regions and connecting sub-cortical pathways are associated with this phenomenon, as assessed by functional magnetic resonance imaging (fMRI) and diffusion tensor magnetic resonance imaging (DT-MRI). METHOD: 8 right-handed females aged 19-23, who demonstrated pseudoneglect when making judgements about pre-transected horizontal lines, were scanned using fMRI and DT-MRI to identify neural correlates associated with this behaviour. ANALYSIS: Within a General Linear Model, a voxel-wise analysis was conducted. A leftward bias implicated right parietal and frontal cortical regions and the superior fronto-occipital pathway. These results are supported by pathological performance which has been associated with damage to right parietal regions and the superior fronto-occipital fasciculus. Understanding the neural circuits involved in left attentional bias in healthy individuals will provide a framework from which researchers and clinicians can meaningfully interpret pathological performance, particularly that observed in patients with visuospatial neglect.

Accommodation

Accommodation has been reserved for the nights of 9-11 July at Mulberry Court (on Mulberry Street, L7 7EZ), for £44.50 for three nights or £33.20 for two nights (9-10). Mulberry Court is self-catering accommodation in the heart of the University campus. These rooms are not en suite, but they are inexpensive and located just a few minutes from the conference venue (see map on the back of the programme). They are also not far from the railway station and the city centre (about a 15 minutes walk). Reservations for accommodation and/or the conference dinner can be made with the enclosed booking form, which should be returned to Dr Rebecca Lawson by 18th June 2008. Cheques must be made payable to "University of Liverpool" and sent to Dr Rebecca Lawson, School of Psychology, Eleanor Rathbone Building, University of Liverpool, Liverpool, L69 7ZA.

As an alternative to Mulberry Court, there are many hotels and guest houses in Liverpool. On the "Visit Liverpool" website (http://www.visitliverpool.com/) you can search for accommodation and book online, or contact the Booking Service on 0844 870 0123. When searching for accommodation, select "Liverpool City Centre" as the area.

Hotels particularly close to the conference venue include the Hope Street Hotel (www.hopestreethotel.co.uk), the Blackburne Arms Hotel (0871 811 4814), the Feathers (www.feathers.uk.com) and, slightly further away, the Britannia Adelphi (www.britanniahotels.com). Nearer the city centre is the Liverpool Central Travelodge at 25 Haymarket, L1 6JN (www.travelodge.co.uk 0871 9846156) which is a cheaper alternative. There is also a hostel close to the University, the Embassie Hostel (www.embassie.com) with dorm rooms only at £15 to £17.50 per night. A couple of km away from the University, you can find accommodation near the Albert Dock (World Heritage Site). For instance at the Dolby Hotel (0845 45 66 399) or the Crowne Plaza (http://www.ichotelsgroup.com/h/d/cp/1/en/home). We have marked Mulberry Court and some of the hotels on the map provided.

Travel

The University of Liverpool website has information on directions and maps (http://www.liv.ac.uk/about/visiting/index.htm). The conference will take place in the School of Psychology which is in the Eleanor Rathbone Building, at the south end of the campus, between Bedford Street and Myrtle Street.

By Rail Liverpool Lime Street is the nearest mainline railway station and it has excellent long-distance rail connections. As an example, it takes 2h and 20 min from London Euston to Liverpool. The station is about 20 minutes walking or 10 minutes in a taxi to the conference (see map). It is best to ask taxi drivers to take you to Myrtle Street rather than the University since the campus is quite extensive.

By Coach National Express (http://www.nationalexpress.com/destinations) operate regular daily services from Liverpool to all over the UK and most airports. See their website for full details. For information on local buses and other public transport, call Traveline on + 44 (0) 871 200 22 33 or visit their website at http://www.traveline.org.uk

By Ferry Mersey Ferries operates services between Pier Head, Birkenhead and Wallasey (www.merseyferries.co.uk). You can also sail between Liverpool and Dublin, Belfast and the Isle of Man.

By Plane For those coming from abroad, there are flights from a number of cities to Liverpool John Lennon Airport with Easyjet and Ryanair. There are good bus and train services running from the airport to the city centre.

By Car From the M62: at the end of the motorway continue straight ahead onto Edge Lane (A5080 then A5047) and follow signs for Liverpool City Centre and Liverpool University. You will be charged to park on campus and you must use the visitor's car parks so please bear this in mind when planning your journey.

Eating and Drinking

Breakfast and lunch There are many sandwich shops and cafes near the Eleanor Rathbone Building. On Myrtle Street (just across the road) are Kimos (Lebanese) and the Tea Gather (Chinese), and the Eureka (Greek) which is in Myrtle Parade. Many more places (e.g., Blackburne House, Everyman) are within a five minutes walk.

Lunch and dinner An advantage of the location of the conference near the city centre is the range of restaurants (varying in style and price) within walking distance. For instance, along Hope Street you will find: London Carriage Works, Ego, No. 60, the Everyman Bistro, Side Door and others. In Hardman Street you will find: Valparaiso, Bistro Jacques and others.

Conference Dinner The conference dinner will be held in the University's private dining room at Number 5 (which is at No. 5 Abercromby Square), on Thursday 10th July at 7.30pm. This is 150m from the conference venue in the Eleanor Rathbone Building. The cost will be £25 for three courses including wine and coffee. Please book and indicate any dietary requirements on the enclosed form which should be returned together with a cheque for £25 (made out to "University of Liverpool" to Dr Rebecca Lawson, School of Psychology, University of Liverpool, Bedford Street South, L69 7ZA) by 18th June 2008.

Places of interest and events during the conference

Liverpool is a unique, multicultural city with much to offer - in addition it is hosting the European Capital of Culture in 2008. We are not going to try to give a detailed list here of tourist attractions. The Tourist Information Office website is a useful place for information on what's on in Liverpool (http://www.visitliverpool.com/).

The Anglican and Catholic Cathedrals are both on Hope Street, close to the conference venue. The National Trust looks after a range of historical properties in the city, including photographer E. Chambré Hardman's home and studio on Rodney Street; and Mendips and 20 Forthlin Road, the childhood homes of John Lennon and Paul McCartney respectively; as well as the Tudor Speke Hall, near Liverpool Airport. In the city centre, 150m from Lime Street train station, are St. George's Hall, the Walker Art Gallery, (http://www.liverpoolmuseums.org.uk/walker), the Picton Library and the World Museum, see http://www.liverpoolmuseums.org.uk/wml/visit/wmlmap.asp. At the waterfront, Liverpool's Albert Dock is home to the Merseyside Maritime Museum and Customs and Excise Museum, and it also houses the northern branch of the Tate gallery (http://www.tate.org.uk/liverpool/). An alternative way to tour the city centre is with the Yellow Duck, an amphibious sightseeing tour that runs from the Albert Dock (www.theyellowduckmarine.co.uk).

Galleries, museums and sculpture (with opening times)

Close to the University campus:

Victoria Gallery and Museum, Mount Pleasant, L3 5TX (10.00 – 5.00). The University's new gallery opening in June

59 Rodney Street (National Trust), L1 9ER (11.00 – 4.15). The Georgian house where photographer E. Chambré Hardman lived and worked for over 40 years. (Book timed tickets in advance if possible.)

Williamson Tunnels, Chatham Place, L7 3HD (10.00 – 6.00).

Near to Liverpool Lime Street train station:

Walker Art Gallery, William Brown Street, L3 8EL (10.00 – 5.00). Permanent collection, plus Art in the Age of Steam, and Ben Johnson's Liverpool Cityscape

World Museum, William Brown Street, L3 8EN (10.00 – 5.00).

St George's Hall, William Brown Street, L1 1JJ (10.00 – 5.00). Opposite Lime Street train station and by the Walker Art Gallery.

Near to Albert Docks, on the Mersey waterfront:

Tate Liverpool, Albert Dock, L3 4BB (10.00 – 5.50). Permanent collection, plus Gustav Klimt: Painting, design and modern life in Vienna 1900

Maritime and Slavery Museum, Albert Dock, L3 4AQ (10.00 – 5.00).

Ferry 'cross the Mersey from the Pier Head (L3 1DP) from which you get the best view of the Three Graces on Liverpool's waterfront. (10.00 – 6.45)

Elsewhere in Liverpool:

FACT, Wood Street, L1 4DQ (11.00 – 6.00). Pipilotti Rust's sculptural video

The Bluecoat, School Lane, L1 3BX (10.30 – 5.00). Arabic Cities: Art and architecture in the Middle East (opens 10th July)

Antony Gormley's Another Place. Crosby Beach (take the Northern Line local train from Central Station to Hall Road Station) - sculpture on the beach.

Richard Wilson's Turning the Place Over. Cross Keys House, Moorfields

Go Superlambananas, 100 versions of the sculpture by Taro Chiezo. The original is on the corner of Tithebarn Street and Vauxhall Street at the time of writing.

Selected performances

Tuesday 8th July

Once Upon a Time at the Adelphi - 7.30 Playhouse Theatre, Williamson Square A new musical by Phil Willmott (0151 709 4776)

Counting Crows - 8.00 Echo Arena, Waterfront (0844 8000 400)

Wednesday 9th July

All About Eve - 7.30 Philharmonic Hall, Hope Street. Restored version of Joseph Mankiewicz 1950 film with Bette Davis, Anne Baxter and George Sanders shown on the world's only working Walturdaw Screen which rises from the stage together with the Phil's resident organist Dave Nicholas.

Once Upon a Time at the Adelphi - (see Tuesday)

Crowded House - 8.00 Echo Arena, Waterfront (0844 8000 400)

Thursday 10th July

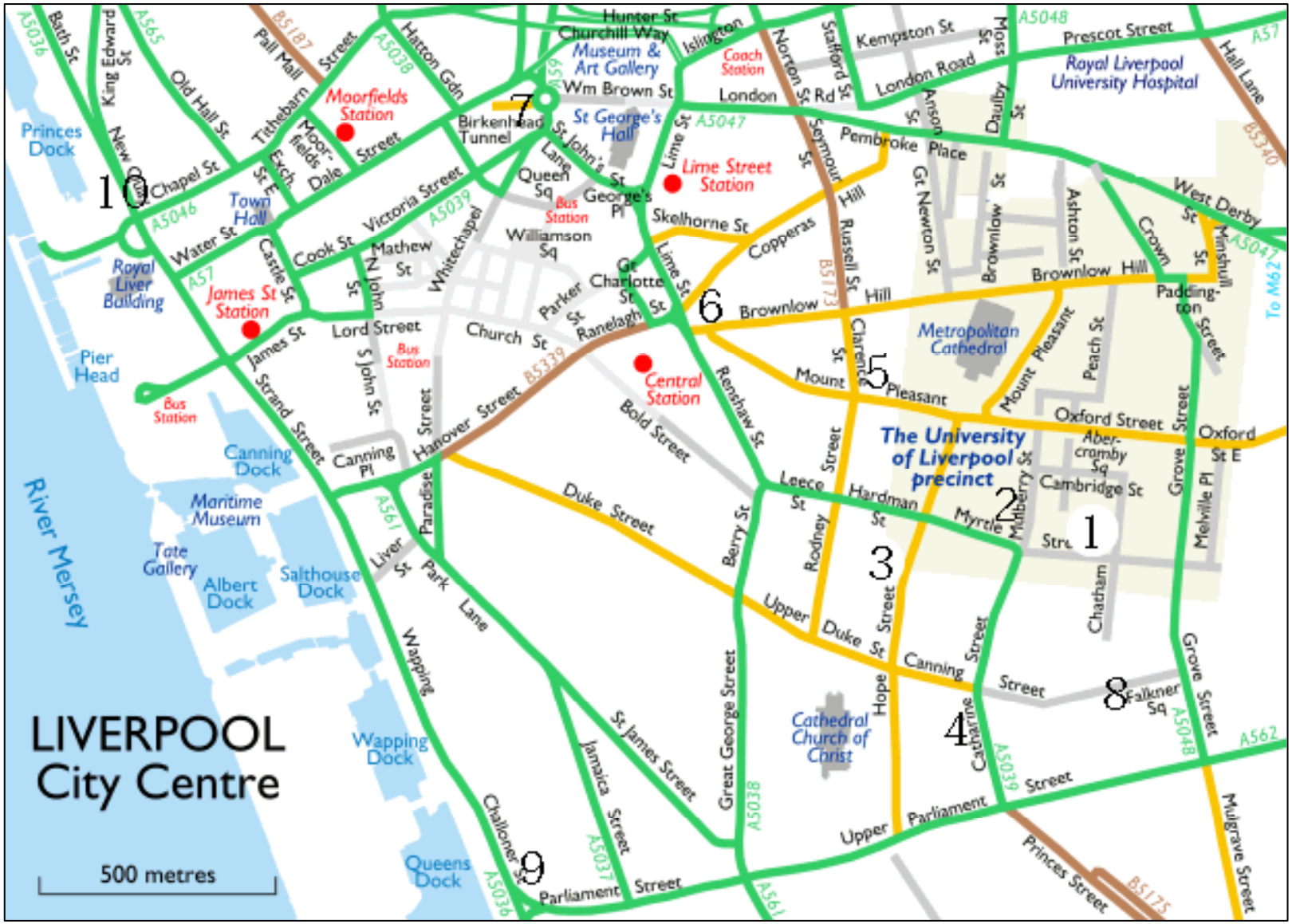
White Nights Return - 7.30 Philharmonic Hall, Hope Street (0151 709 3789) Vasily Petrenko conducts the Royal Liverpool Philharmonic Orchestra in a concert of popular Russian music including Tchaikovsky's Symphony no. 5.

Once Upon a Time at the Adelphi - (see Tuesday)

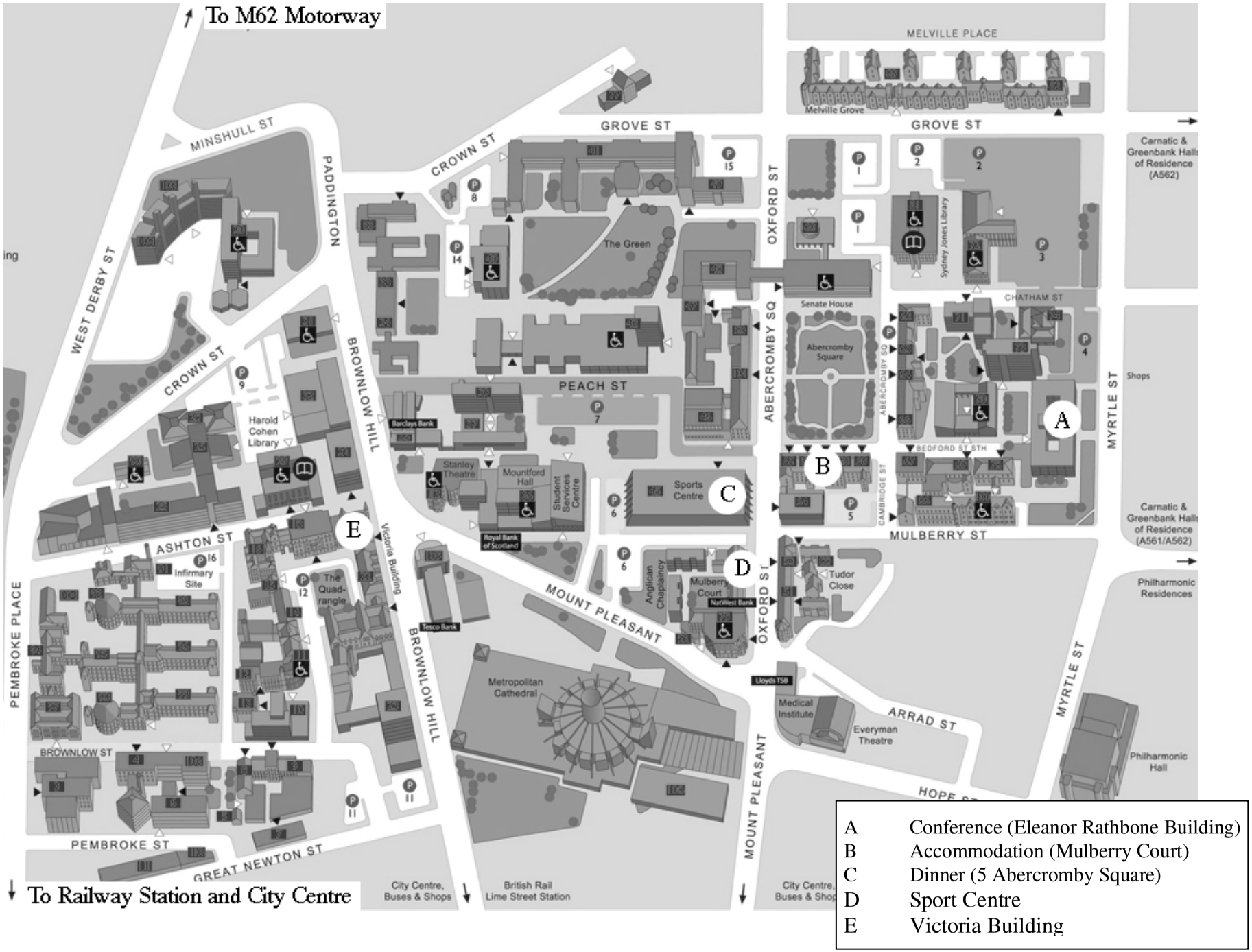
Friday 11th July

Once Upon a Time at the Adelphi - (see Tuesday)

Deacon Blue - 8.00 Echo Arena, Waterfront (0844 8000 400)



1. Conference
2. Mulberry Court
3. Hope Street Hotel (www.hopestreethotel.co.uk)
4. Blackburne Arms Hotel (0871 811 4814)
5. Feathers (www.feathers.uk.com)
6. Britannia Adelphi (www.britanniahotels.com).
7. Travelodge (www.travelodge.co.uk)
8. Embassie Hostel (www.embassie.com)
9. Dolby Hotel (0845 45 66 399)
10. Crowne Plaza


To M62 Motorway
MELVILLE PLACE
Melville Grove
GROVE ST
MINSHULL ST
CROWN ST
PADDINGTON
WEST DERBY ST
The Green
OXFORD ST
Senate House
Abercromby Square
ABERCROMBY SQ
CHATHAM ST
Sydney Jones Library
Carnatic & Greenbank Halls of Residence (A562)
Shops
MYRTLE ST
PEACH ST
Barclays Bank
Harold Cohen Library
BROWNLOW HILL
Stanley Theatre
Mountford Hall
Student Services Centre
Sports Centre
C
A
B
BEDFORD ST STH
CAMBRIDGE ST
MULBERRY ST
Carnatic & Greenbank Halls of Residence (A561/A562)
Philharmonic Residences
ASHTON ST
Infirmary Site
The Quad-rangle
Victoria Building
E
Royal Bank of Scotland
Anglican Chaplaincy
Mulberry Court
NatWest Bank
D
Tudor Close
MOUNT PLEASANT
Tesco Bank
Metropolitan Cathedral
Lloyds TSB
Medical Institute
Everyman Theatre
ARRAD ST
Philharmonic Hall
PEMBROKE PLACE
BROWNLOW ST
PEMBROKE ST
GREAT NEWTON ST
To Railway Station and City Centre
City Centre, Buses & Shops
British Rail Lime Street Station
A Conference (Eleanor Rathbone Building)
B Accommodation (Mulberry Court)
C Dinner (5 Abercromby Square)
D Sport Centre
E Victoria Building