

EPS

Experimental
Psychology
Society

**ESSEX
MEETING**

7-8 APRIL 2005

A scientific meeting will be held at the main Lecture Theatre Block, University of Essex on 7 - 8 April, 2005. The local organiser is Dr Debi Roberson.

Thirty-third Bartlett Lecture

Professor M Coltheart (Macquarie University, Sydney, Australia)
From Cognitive Neuropsychology to Cognitive Neuropsychiatry

The Bartlett Lecture will take place at 6.00pm, Thursday 7th April in Lecture Theatre 6, University of Essex.

Symposia:

Thursday 7th April 2pm – 5pm

Dual Route Theory and Reading Development
Organisers: Professor J Masterson and Dr M Stuart

Friday 8th April 10am – 12.30pm

Current Issues in Cognitive Neuropsychiatry
Organisers: Dr M Brysbaert and Dr K Rastle

Presentations

Sessions will be held in lecture theatres 5 and 8. Both theatres have OHPs and data projectors for PowerPoint presentations. Presenters are encouraged to email their presentations ahead of time, or bring them on CD rom or USB, but may provide their own laptops (and connector leads if Mac users). The on-site computers run PowerPoint under Windows NT/2000. Any queries about facilities in the theatres should be sent to Dr Debi Roberson, (robedd@essex.ac.uk or ring +44 (0)1206-873710).

Coffee will be served in lecture theatre 6.

Receptions and Conference Dinner

The Department of Psychology welcomes EPS delegates to a drinks reception from 7pm on Thursday evening, 7 April in the Psychology Department. The conference dinner will be at 8.15pm at Le Talbooth, Stratford Road, Dedham, Tel: 01206 323150. A booking form for the dinner is enclosed.

START OF PARALLEL SESSIONS
Session A**Lecture Theatre 8**

- 9.00 **Kathleen Rastle, Samantha McCormick*, and Matthew H Davis***
(University of London)
Morpho-orthographic segmentation in early visual word recognition
- 9.30 **Veronika Coltheart and Robyn A Langdon*** (Macquarie University,
Sydney, Australia)
Repetition blindness and effects of lexicality, orthographic similarity and
homophony on report after rapid serial visual presentation
- 10.00 **Sarah J White*** (University of Durham) (Introduced by S P Liversedge,
University of Durham)
The influence of word frequency and orthographic familiarity on eye
movements during reading
- 10.30 COFFEE
- 11.00 **Colin J Davis* and Stephen J Lupker*** (Macquarie Centre for
Cognitive Science, Sydney, University of Bristol and University of
Western Ontario) (Introduced by M Brysbaert, University of London)
Lexical selection entails lexical inhibition: Evidence from the masked
priming paradigm
- 11.30 **J S Bowers, C J Davis*, S L Mattys, and M F Damian** (University of
Bristol)
Automatic semantic activation of embedded words in written and spoken
supersets: Is there a “hat” in “that”?
- 12.00 **Paul Skarratt* and Michal Lavidor** (University of Hull)
Testing the split fovea theory: A transcranial magnetic stimulation
(TMS) study of word length effects
- 12.30 **Anna Woollams*, Matthew A Lambon Ralph, John R Hodges, and
Karalyn Patterson** (MRC Cognition and Brain Sciences Unit,
Cambridge and University of Manchester)
SD²: On the association between semantic dementia and surface dyslexia
- 1-2 LUNCH

START OF PARALLEL SESSIONSSession B**Lecture Theatre 5**

- 9.00 **E L Hill, C M Bird*, S White*, P Angell*, and U Frith** (University of London and University of Oxford)
Executive processes in high functioning autism: Patterns of performance in a multiple case series
- 9.30 **Antje S Meyer and Markus Damian** (University of Birmingham and Bristol University)
Conditions for the activation of the names of distracter objects in the picture-picture interference paradigm
- 10.00 **Linda Mortensen*, Antje S Meyer, and Glyn W Humphreys** (University of Birmingham)
The effects of ageing on the time course of object naming
- 10.30 COFFEE
- 11.00 **D Roberson, J Davidoff, I R L Davies, and L R Shapiro*** (University of Essex, University of London, University of Surrey, and University of Warwick)
Further evidence that colour categories are culturally relative
- 11.30 **Sebastian J Crutch* and Elizabeth K Warrington** (University College, London and Imperial College, London)
Different principles of organisation for abstract and concrete conceptual knowledge
- 12.00 **Claudia Uller*** (University of Essex) (Introduced by Debi Roberson, University of Essex)
A precursory system for the non-verbal representation of number
- 12.30 **C Philip Beaman** (University of Reading)
Conceptual insights arising from using someone else's toothbrush
- 1- 2 LUNCH

Session A**Lecture Theatre 8****Symposium:** Dual route theory and reading development

Organisers: Professor J Masterson and Dr M Stuart

- 2.00 **Elaine Funnell** (University of London)
Introduction: What phenomena must a good theory of reading development be able to account for?
- 2.30 **Morag Stuart** (University of London)
The trajectory of normal reading development
- 3.00 **Anne Castles* and Timothy Bates*** (University of Melbourne, Australia and Macquarie University, Sydney, Australia)
Variability in developmental reading disorders
- 3.30 TEA
- 4.00 **Taeko N Wydell and Jackie Masterson** (Brunel University and University of Essex)
Reading in non-alphabetic scripts
- 4.30 **Nikki J Pitchford* and Elaine Funnell** (University of Nottingham and University of London)
Reading with the right hemisphere: Evidence from developmental deep dyslexia
- 5.00 **Timothy Bates*, Anne Castles*, Michelle Luciano*, Margaret J Wright*, Max Coltheart, and Nicolas G Martin*** (Macquarie University, Sydney, Australia, University of Melbourne, Australia, and Queensland Institute of Medical Research, Brisbane, Australia)
What do genes tell us about reading?

End of Symposium

- 5.30 Business Meeting (Lecture Theatre 5)
- 6.00 **Thirty-third Bartlett Lecture – Professor M Coltheart** (Macquarie University, Sydney, Australia)
From Cognitive Neuropsychology to Cognitive Neuropsychiatry (Lecture Theatre 6)
- 7.00 Drinks Reception (Psychology Department)
- 8.15 CONFERENCE DINNER, LE TALBOOTH

Session B**Lecture Theatre 5**

- 2.00 **Ifat Yasin* and Christopher J Plack*** (University of Oxford and University of Essex) (Introduced by Arnold Wilkins, University of Essex)
The limit of human high-frequency hearing
- 2.30 **Maïke Heining*, Andrew W Young, Michael J Brammer*, Jeffrey A Gray†, and Mary L Phillips** (Institute of Psychiatry, London, University of York, and King's College London)
Disgust is processed by the insular cortex independent of sensory modality of stimulus presentation
- 3.00 **Mike Burton, Juergen Kaufmann*, and Stefan Schweinberger** (University of Glasgow)
Common processes for learning and priming in face recognition
- 3.30 TEA
- 4.00 **Lydia Tan* and Geoff Ward** (University of Essex)
Rehearsal and output order in immediate serial recall (ISR)
- 4.30 **Angela Boldini*, Riccardo Russo, and Steve Avons** (University of Essex)
Reversing the picture superiority effect: A speed-accuracy trade-off study of recognition memory
- 5.00 **Chris Berry*, David Shanks, and Rik Henson** (University College London and MRC Cognition and Brain Sciences Unit, Cambridge)
Unconscious memory: A failure to replicate key evidence
- 5.30 Business Meeting (Lecture Theatre 5)
- 6.00 **Thirty-third Bartlett Lecture – Professor M Coltheart** (Macquarie University, Sydney, Australia)
From Cognitive Neuropsychology to Cognitive Neuropsychiatry (Lecture Theatre 6)
- 7.00 Drinks Reception (Psychology Department)
- 8.15 CONFERENCE DINNER, LE TALBOOTH

Session A**Lecture Theatre 8**

- 9.30 **EPS/BAAS Undergraduate Prize**
Rebecca Jones* (Birkbeck College, University of London)
An attentional blink for fearful faces: Emotional processing does require attention
- Symposium:** Current issues in cognitive neuropsychiatry
Organisers Dr M Brysbaert and Dr K Rastle
- 10.00 **Sarah-Jayne Blakemore** (University College London)
Recognition of action in schizophrenia
- 10.30 **Vaughan Bell*** (University of Cardiff)
Delusions: A Cognitive/emotional approach
- 11.00 COFFEE
- 11.30 **A S David, L Bach*, N Medford* and K D Morgan*** (Institute of
Psychiatry and GKT School of Medicine, London)
Towards a cognitive neuropsychiatry of insight
- 12.00 **Richard Bentall*** (University of Manchester)
Some limitations of the neuropsychiatric research programme
- 12.30 **Marc Brysbaert, chair** (Royal Holloway, University of London)
Discussion

End of Symposium

END OF MEETING

Session B

Lecture Theatre 5

- 10.00 **Jason Tipples** (University of Hull)
Voluntary control and orienting to counterpredictive eye gaze and arrow cues
- 10.30 **Caterina Cinel and Glyn Humphreys** (University of Essex and University of Birmingham)
On the relations between implicit and explicit spatial binding: Evidence from Balint's syndrome
- 11.00 COFFEE
- 11.30 **David Soto*, Dietmar Heinke*, Glyn W Humphreys, and Manuel Blanco*** (University of Birmingham and University of Santiago de Compostela, Spain)
Early, involuntary top-down guidance of attention from working memory
- 12.00 **Geoff G Cole, Robert Kentridge*, and Charles Heywood*** (University of Durham)
New objects capture attention, colour changes do not
- 12.30 **Karina J Linnell and Glyn W Humphreys** (Goldsmiths College, University of London and University of Birmingham)
Grasping an object part involves selecting the whole object

END OF PARALLEL SESSIONS

END OF MEETING

Morpho-orthographic segmentation in early visual word recognition

Kathleen Rastle, Samantha McCormick, and Matthew H Davis
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Accumulated behavioural evidence suggests that words comprising more than one morpheme (e.g., “darker”) are represented in a ‘decomposed’ manner (e.g., “dark” + “-er”) in visual word recognition. This decomposition has typically been described as a high-level lexical phenomenon, which occurs only in cases in which complex words are semantically related to their stems (e.g., “darker”, but not “corner”, would be decomposed). In this paper, we provide evidence for a different characterization of morphological decomposition. We present the results of several experiments using masked stem priming of visual lexical decision, which demonstrate that there is a distinct form of morphological decomposition operating early in visual word recognition, at which all letter strings comprising more than one orthographic morpheme are segmented (e.g., both “darker” and “corner” would be decomposed into the morphemes “dark”, “corn”, and “-er”). We establish that this form of decomposition is (a) insensitive to the semantic characteristics of stimuli; (b) insensitive to the lexical status of stimuli; and (c) robust to common orthographic alterations found in complex words (e.g., “dancer”, “metallic”, adorable”). Further thoughts regarding the nature of the morpho-orthographic segmentation algorithm are discussed.

Repetition blindness and effects of lexicality, orthographic similarity and homophony on report after rapid serial visual presentation

Veronika Coltheart and Robyn A Langdon
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Report of both words from a sequence presented at rates of 8-10 per second is reduced if one of the words is a repetition of an earlier one. This is repetition blindness. A reduced report deficit occurs even when the pair of words is orthographically or phonologically similar rather than identical. However, if the items are pronounceable nonwords or pseudohomophones rather than words, repetition improves rather than impairs recall. We report experiments in which the critical pair of items were similar words, nonwords, homophones or pseudohomophones. The pattern of effects differs when the critical items are merely similar rather than identical. The results are considered in relation to accounts of repetition blindness and we discuss the relationships among repetition blindness and phenomena termed 'orthographic repetition blindness' and 'phonological repetition blindness'.

The influence of word frequency and orthographic familiarity on eye movements during reading

Sarah J White
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The variables of word frequency and orthographic familiarity were independently manipulated in an eye movement reading study. The critical words were frequent and orthographically familiar (e.g. *town*), infrequent and orthographically familiar (e.g. *cove*) or infrequent and orthographically unfamiliar (e.g. *quay*). Orthographic familiarity was defined by the total token n-gram frequencies for each word. For each item, critical words from each of the three conditions were embedded in the same sentential frame up to and including the word after the critical word. For the orthographically familiar words, there were longer reading times on the low frequency, compared to high frequency, critical words. Single fixation durations were longer on the infrequent orthographically unfamiliar words than the infrequent orthographically familiar words. Therefore, both word frequency and orthographic familiarity influence reading times. For saccades launched from the previous word, the orthographically familiar critical words were more likely to be skipped when they were frequent compared to when they were infrequent. For the infrequent words, orthographic familiarity had no influence on word skipping probability. Therefore, only word frequency (not orthographic familiarity) influences the probability of word skipping. The results will be discussed in relation to models of eye movement control in reading.

Lexical selection entails lexical inhibition: Evidence from the masked priming paradigm

Colin J Davis^{1,2} and Stephen J Lupker³
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According to many models of lexical processing, the representation that best matches the input stimulus is selected via a competitive process in which activated lexical units inhibit their competitors. A number of predictions of one of these models, McClelland and Rumelhart's (1981) interactive-activation model, were tested in three experiments using the masked priming technique in the lexical decision task. Experiment 1 showed a strong effect of prime lexicality: Lexical decisions on target words were facilitated by orthographically related nonword primes (relative to unrelated nonword primes), but were inhibited by orthographically related word primes (relative to unrelated word primes). The inhibitory effect of word primes was replicated in Experiment 2, which also involved a manipulation of neighbourhood size. Inhibitory priming was only minimally affected by target word neighbourhood size, but there was a trend toward greater inhibition when high-N nonword foils were used than when low-N nonword foils

were used. In Experiment 3, it was demonstrated that the inhibition effect is greater when the prime and target share a neighbour. Simulations show that the original IA model cannot accommodate these results, but a modified IA model provides a good fit to the data.

Automatic semantic activation of embedded words in written and spoken supersets: Is there a “hat” in “that”?

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Recently, Bowers, Davis, and Hanley (2005) reported evidence that embedded words within written supersets (e.g., hat in that) are activated to the level of semantics. Participants categorized targets semantically when their subsets required a different response (e.g., Does hatch refer to a piece of clothing?; hat requires a YES and hatch a NO response) or the same response (e.g., Does hatch refer to a human body part?). Responses were slower in the incongruent condition, suggesting that subsets were processed to the level of meaning. Furthermore, this congruence effect was obtained when subsets were embedded in initial, middle, and final positions. Today we report studies that assess whether embedded words are activated to the level of meaning in spoken words. The first experiment employs the same procedure and words as above. Preliminary evidence suggests that only initial embedded words are semantically activated. A second study will rely on the picture-word interference paradigm in which picture naming is slowed by the concurrent presentation of a semantically related word. Participants will name pictures (e.g., shirt) while unrelated spoken words are presented. The key question is whether naming is slowed when the spoken words contain embedded words semantically related to the picture (e.g., that).

Testing the split fovea theory: A transcranial magnetic stimulation (TMS) study of word length effects

Paul Skarratt and Michal Lavidor
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The number of letters in a word has been shown to affect lexical decision performance in the left, but not the right visual field. This word length effect has been understood to reflect the relative efficiency of the right and left cerebral hemispheres at processing words, respectively. However, one current debate concerns whether initial processing of centrally presented words is split between the cerebral hemispheres. To investigate the split and bilateral accounts of foveal processing, we presented 5- and 8-letter words at fixation, with a small left or right field bias (Experiment 1). In accordance with the predictions of the split-fovea theory, our results showed word length effects only

for words with a left-field bias. In addition, we found that repetitive TMS over that left occipital cortex created a word length effect for right-biased words, whereas right occipital TMS accentuated the word length effect already shown for left-biased words. Together, these results support the split fovea account of word recognition. We then used single-pulse TMS to investigate the temporal aspects of these effects (Experiment 2).

SD² : On the association between semantic dementia and surface dyslexia

Anna Woollams¹, Matthew A Lambon Ralph², John R Hodges¹, and Karalyn Patterson¹

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Some current connectionist models of reading assume that, in reading aloud, interaction between semantic and phonological representations occurs for all words but is particularly important for the correct pronunciation of low-frequency exception words (e.g. Plaut et al., 1996). It is therefore an explicit prediction of such models that Semantic Dementia [SD-1], a general impairment of semantic knowledge, should be accompanied by Surface Dyslexia [SD-2], a selective deficit in lower-frequency exception word reading, with a significant relationship between the severity of SD-1 and SD-2. We evaluated these claims with reference to 105 observations of cross-sectional and longitudinal reading data from 48 cases of SD-1. Overall, success in reading low-frequency exception words was closely related to the level of semantic deficit, with the latter variable accounting for nearly half of the variance in the former. In three cases, patients with early semantic deficits were initially unimpaired at reading; all three, however, subsequently progressed into an SD-2 reading pattern. These results provide a striking demonstration of SD², i.e. a predictable association between SD-1 and SD-2, as anticipated by these connectionist models of reading aloud.

Plaut, D. C., McClelland, J.L., Seidenberg, M.S., & Patterson, K.E. (1996). Understanding normal and impaired word reading: Computational principles in quasi-regular domains. *Psychological Review*, 103(1), 56-115.

Executive processes in high functioning autism: Patterns of performance in a multiple case series

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Mixed evidence exists for executive dysfunction in autism spectrum disorders (ASD). This may be because of the nature of the tasks used, the heterogeneity of

participants, and difficulties with recruiting appropriate control groups. A comprehensive battery of “executive” tests was administered to 23 individuals with high-functioning ASD and 23 well-matched controls. Performance was analyzed both between groups and on an individual basis to identify outliers in both the ASD and control groups. There were no differences between the groups on all “classical” tests of executive function, with the exception of the Trail Making Test (Part B). However, differences were found on newer tests of executive function. Specifically, deficits in planning, abstract problem-solving and especially multitasking. On the tests that discriminated the groups, ca. half the ASD individuals were identified as significantly impaired (i.e. below the 5th percentile of the control mean). This study provides evidence for significant executive dysfunction in at least a subgroup of able individuals with ASD. Greatest dysfunction appeared in response initiation and intentionality at the highest level - the ability to engage and disengage actions in the service of overarching goals. These deficits are best observed through using more recent, “ecologically valid” tests of executive dysfunction.

Conditions for the activation of the names of distracter objects in the picture-picture interference paradigm

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Morsella and Miozzo (2002) showed participants pairs of superimposed line drawings of objects (one red, one green) and asked them to name the green object and to ignore the red one. The mean target naming latency was shorter when the names of the two objects were similar (as in “bell/bed”) than when they were dissimilar. This finding is of great theoretical importance as it suggests that, contrary to the claims of serial stage models of lexical access, the names of objects that are not selected for naming can become activated. In a series of experiments using exactly the same materials as Morsella and Miozzo and new materials we failed to find any evidence for activation of the phonological forms or the semantic representations of the distracter objects. That is, the naming latencies for targets accompanied by objects with phonologically similar, semantically similar (“chair/bed”) or unrelated names did not differ significantly from each other. We then altered the experimental design such that each target also served as a distracter on a different trial and vice versa. This change led to a significant phonological effect but not to a semantic effect (see also Damian & Bowers, 2003). Thus, our results indicate that the names of distracter objects can become activated, provided that, on other trials, the distracters are targets for naming. Subsequent analyses and an additional experiment suggest that the phonological facilitation in the last series of experiments did not arise because of between-trial activation or inhibition of targets or distracters but rather because the participants were less likely to attend exclusively to the targets than they had been when the distracters were not targets for naming.

Morsella, E., & Miozzo, M. (2002). Evidence for a cascade model of lexical access in speech production. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 28, 555-563.

Damian, M. F., & Bowers, J. S. (2003). Locus of semantic interference in picture-word interference tasks. *Psychonomic Bulletin & Review*, 10, 111-117.

The effects of ageing on the time course of object naming

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In naming one object, young speakers fully identify the object before planning its name. Similarly, in naming two objects, they look at the first object until they have planned its name and only then shift their gaze to the second object. We investigated whether elderly speakers use the same sequential naming strategy. Participants named objects in isolation and in triplets, while hearing distractor words. The objects were visually intact or degraded and the word was phonologically related or unrelated to the target object, which was named first in the triplet (“flute, kite, ear”). Both young and elderly speakers showed additive effects of degradation and relatedness on speech latencies and target gaze durations, suggesting that speech planning and speech-to-gaze coordination are unaffected by ageing. However, elderly speakers showed slowed processing of the second object. When the target object was named second (“kite, flute, ear”), the relatedness effect disappeared in both groups of speakers, but the age-related slowing in processing of the second object was maintained. The implications for understanding the effects of ageing on identification and naming of multiple objects are discussed.

Further evidence that colour categories are culturally relative

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In the domain of colour, the question of whether language affects our categorization of perceptual continua continues to excite debate. Recent research (Roberson, Davies, & Davidoff, 2000; Roberson et al., 2004) found substantial evidence of cognitive colour differences between different language communities, but concerns remained as to how representative might be a tiny, extremely remote community. The present study replicates and extends previous findings using additional paradigms among

a larger community in a different visual environment. Adult semi-nomadic tribesmen in Southern Africa carried out similarity judgments, short-term memory and long-term learning tasks. They showed different cognitive organization of colour to both English and another language with five colour terms. Moreover, Categorical Perception effects were found to differ even between languages with broadly similar colour categories. The results provide further evidence of the tight relationship between language and cognition.

Roberson, D., Davidoff, J., Davies, I.R.L. & Shapiro, L. R. (2004) The Development of Color Categories in Two languages: A longitudinal study. *Journal of Experimental Psychology: General*, 133, 554-571

Roberson, D., Davies I. & Davidoff, J. (2000) Colour categories are not universal: Replications and new evidence from a Stone-age culture. *Journal of Experimental Psychology: General* , 129, 369-398>

Different principles of organisation for abstract and concrete conceptual knowledge

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Although a vast research literature exists examining the structure of the semantic system as it pertains to our knowledge of concrete items, the organisation of conceptual knowledge relating to abstract words has remained almost entirely unexplored. We describe a series of experiments conducted with a patient with semantic refractory access dysphasia in which abstract and concrete word comprehension are compared and contrasted. Semantically associated abstract words were found to interfere reliably with one another significantly more than semantically synonymous abstract words, whilst concrete words showed the reverse pattern. We report the first evidence that abstract and concrete word meanings are based in representational systems which have qualitatively different properties. More specifically, we show that abstract concepts, but not concrete concepts, are represented in an associative neural network. Our results challenge the generality of many existing models of human conceptual knowledge which derive their structure from experimental findings in the concrete domain alone.

A precursory system for the non-verbal representation of number

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How do humans represent number? Traditional studies on the psychology of number have focused on the psychophysics of number or the construction of mathematics

through culture. Recent evidence from human infant and animal research sheds light onto this question, and suggests that there are two systems for non-verbal number representation. One is an indexing system for small numbers (up to 3 or 4). The other, a symbolic system for large numbers. Pre-linguistic infants and non-human primates spontaneously represent numbers up to 3 or 4. Experiments with a species of amphibian suggest that a precursory system for small number may have been in existence for several millions of years. In this paper, I develop the idea that the indexing system for non-linguistic number is a mechanism which may have evolved to maximize survival by eating, mating and avoiding death.

Conceptual insights arising from using someone else's toothbrush

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Famously, Watkins (1984) declared, “models are like toothbrushes, everyone has one, and no-one wants to use someone else's”. However, using “someone else's toothbrush” can sometimes be an informative experience. This paper examines how the feature model (Neath, 2000) can be applied to a number of novel situations and *a priori* predictions derived from running simulations. Two simulation studies are described. The first study examines a simulation prediction of the relationship between absolute and proportion scores of serial order memory as a function of list length and the presence of irrelevant speech. The second simulation study runs a series of “computational experiments” (Cooper, Yule & Fox, 2003) to look at the model's predictions of how individual differences in span and in susceptibility to irrelevant speech effects are related. The simulation studies reveal both strengths and weaknesses of the model and the second series in particular demonstrates how counterintuitive predictions can be derived, and their source identified, by means of computational experimentation.

Cooper, R., Yule, P., & Fox, J. (2003). Cue selection and category learning: A systematic comparison of three theories. *Cognitive Science Quarterly*, 3, 143-182.

Neath, I. (2000). Modeling the effects of irrelevant speech on memory. *Psychonomic Bulletin & Review*, 7, 403-423.

Watkins, M. J. (1984). Models as toothbrushes. *Behavioral and Brain Sciences*, 7, 86.

Symposium: Dual route theory and reading development

Organisers: Professor J Masterson and Dr M Stuart

Introduction: What phenomena must a good theory of reading development be able to account for?

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Two cognitive models of reading – the triangle model (Plaut et al, 1996), and the dual route model (Coltheart et al, 2001) - are commonly applied to reading development. This paper will consider the strengths and weaknesses of each model with respect to novel data from assessments and simulations of the development of word and nonword reading.

Coltheart, M., Rastle, K., Perry, C., Langdon, R. and Zeigler, J. (2001). DRC: A dual route cascaded model of visual word recognition and reading aloud. *Psychological Review*, 108, 204-256.

Plaut, D.C., McClelland, J.L, Seidenberg, M.S., and Patterson, K. (1996). Understanding normal and impaired reading: Computational principles in quasi-regular domains. *Psychological Review*, 103, 56-115.

The trajectory of normal reading development

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In this paper, I argue that a model of the processes involved in skilled reading can provide a useful framework for thinking about reading development, because it shows us what it is that the child must develop in order to become a skilled reader. I show how the most recent version of the DRC model is now sufficiently interactive, with both lexical and nonlexical feedback systems and shared components across the two systems, to extend its usefulness from merely providing an insight into what must be developed to providing also an explanation of how this development might come about. This explanatory power depends to some extent not just on a description of what might be happening within the rudimentary lexical and nonlexical routes to word recognition that the child is developing, but also on an assumption that children notice and reflect upon their experiences of patterns of print and sound in the words that they read.

Variability in developmental reading disorders

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An important contribution of the dual route model has been to generate predictions about the patterns of reading deficit that might be observed in the developmental dyslexic population. In line with these predictions, children with *developmental surface dyslexia* show selectively poor irregular word reading for their age in the presence of normal nonword reading, while those with *developmental phonological dyslexia* display poor nonword reading in the presence of normal word reading. Together, the two map seamlessly onto a dual route model, with surface dyslexia reflecting an impairment in acquiring or retaining word-specific lexical representations, and phonological dyslexia reflecting a difficulty in learning or applying nonlexical rules. However, Harm and Seidenberg (1999) and others have attempted to simulate surface and phonological dyslexia within distributed-representation connectionist models, which do not contain separate lexical and nonlexical routes. In this talk, I will discuss evidence for and against these competing accounts of surface and phonological dyslexia, with the aim of demonstrating that these patterns of reading disorder remain best accounted for within a dual route architecture.

Harm, M.W., & Seidenberg, M.S. (1999). Phonology, reading acquisition, and dyslexia, insights from connectionist models. *Psychological Review*, 106, 491-528.

Reading in non-alphabetic scripts

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Cognitive models of reading developed for explaining skilled reading processes in English have also been applied to account for skilled reading processes in Japanese. An attempt is made to explain reading development in Japanese particularly using Coltheart et al's DRC model, based on the data obtained from the adult Japanese normal and impaired readers (i.e., acquired dyslexics). In addition, we address the evidence analogous to that obtained for English children for pronunciation consistency effects in reading in Chinese children, and evidence suggesting that pre-reading phonological awareness predicts reading achievement in Chinese.

Reading with the right hemisphere: Evidence from developmental deep dyslexia

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We present a case study of developmental deep dyslexia that shows clear evidence of right hemisphere activation during single word reading, as originally proposed by Coltheart (1980; 1983). PIP is a young woman with Ehlers-Danlos Syndrome, a genetic disorder affecting connective tissue growth. She has no structural brain abnormalities (as evidenced by MRI) and above average intelligence (VIQ = 106, PIQ = 117), yet reads at the level of a 6-year-old. In oral reading PIP shows characteristics of deep dyslexia: she fails to read aloud nonwords, she shows significant effects of imageability in word reading and lexical decision, and when misreading she makes semantic errors (e.g., reading ‘gender’ as “sex”). In contrast to adult acquired cases, PIP reads some function words accurately. Functional neuro-imaging (fMRI) shows PIP activates similar left hemisphere areas as controls during all reading tasks. However, she shows significantly increased activation of the right hemisphere inferior premotor cortex when reading words of high imageability and nonwords to which she makes highly imageable lexicalisations (e.g., reading ‘roin’ as “lion”). We suggest PIP’s reading profile can be explained within a DRC framework in which sublexical processes have failed to develop and instead additional verbal right hemisphere processes are employed to support lexical access.

Coltheart, M. (1980). Deep dyslexia: a right hemisphere hypothesis. In M. Coltheart, K. E. Patterson & J. C. Marshall (Eds.), *Deep Dyslexia*. London: Routledge & Kegan Paul.

Coltheart, M. (1983). The right hemisphere and disorders of reading. In A. W. Young (Ed.), *Functions of the Right Hemisphere*. London: Academic Press.

What do genes tell us about reading?

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Research is presented using the genetic independence of psychological processes to test competing cognitive models of reading. A model in which distinct genes exist for lexical and nonlexical processing is compared to simpler single-route models and it is

demonstrated that reading must rely on at least two genetically-distinct reading systems. Semantic knowledge and working memory processes are suggested to entail further distinct sources of genetics variance. Multivariate linkage analysis is presented as a tool for distinguishing genes which are specific for particular components of reading, and linkage data in our sample is used to demonstrate this.

End of Symposium

The limit of human high-frequency hearing

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The sensitivity of the human auditory system to sounds of very-high frequency rapidly decreases for sounds above about 15 kHz (the breakpoint-frequency of the hearing-threshold curve). It has been suggested that this decreasing sensitivity of the human auditory system to high-frequency sounds reflects the attenuation characteristics of the highest neural frequency channel, tuned close to the breakpoint-frequency. Using psychophysical techniques to measure tuning curves, we show that, on the contrary, the human auditory system is sharply tuned to sounds as high as 17 kHz, above the breakpoint-frequency of the hearing-threshold curve. The findings suggest that the decreased sensitivity is a consequence of the transmission characteristics of the middle ear, in combination with a reduction in the efficiency of the transduction mechanism at high frequencies.

Disgust is processed by the insular cortex independent of sensory modality of stimulus presentation

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Disgust is an emotion crucial to avoidance of ingestion of harmful substances and is therefore closely linked to odours and tastes. It is unclear whether the previously demonstrated anterior insula response to visual expressions of disgust reflects its involvement in the response to the emotion of disgust per se, or a less specific relation of

expressions of disgust to the processing of tastes and smells. We used neuroimaging to determine the extent to which these regions respond to odours per se or, specifically, to disgust, and to what extent these areas overlap with previously published results of facial expressions of disgust. Results showed left anterior insula activation in response to all odours, with right anterior insula activation only in response to disgusting odours. A significant increase in the right anterior insula was found when comparing activation in response to disgusting odours with activation in response to pleasant odours. Activation in response to facial expressions of disgust and disgusting odours overlapped in the insula. These findings indicate not only that right anterior insula is involved in the perception of olfactory disgust, but also that it is a key component of the neural circuitry underlying disgust perception per se.

Common processes for learning and priming in face recognition

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Despite a large literature on face recognition, rather little is known about the ways in which faces become familiar. Some computational models suggest that processes involved in learning might reveal themselves in long-term repetition priming. Here we explore learning and priming in a single large-scale experiment incorporating behavioural (RT) and psychophysiological (ERP) measures. Subjects performed an old/new task on famous or unfamiliar faces which had been encountered once, twice or not at all during the experiment. For familiar faces, irrespective of the number of repetitions, priming effects were found in the form of a reduced N400 at centro-parietal sites. For unfamiliar faces, a topographically similar effect was found, but only for faces that had been repeated for the second time. Additional repetition effects were observed between 600ms and 1000ms at prefrontal, frontal and occipital electrode sites, which were only slightly modified by familiarity. These findings provide the first evidence that face learning and repetition priming are associated with similar brain processes, and might originate from the same computational process.

Rehearsal and output order in immediate serial recall (ISR)

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Two experiments examined rehearsal and output order in ISR. In Experiment 1, 40 participants saw sequences of six words for spoken recall under fast, medium and slow presentation rates. Twenty participants engaged in overt rehearsal during list presentation; twenty remained silent. As the presentation rate increased, so the number of rehearsals and the recall accuracy decreased. Participants tended to rehearse earlier items in forwards serial order, and recall accuracy increased with the recency of rehearsal. However, recall was often poorer than rehearsal: the maximum sequence of words

recalled was on average shorter than the maximum sequence of words rehearsed. In Experiment 2, three groups of 16 participants were presented with sequences of eight words for written recall. The serial output group was pre-cued to respond in strict forwards order. The free output group was pre-cued to respond in any order they wished. In the post-cued group the output order was only specified immediately prior to recall. Recall decreased with output order. There was little or no difference between the pre-cued and post-cued groups: with free output there was reduced primacy and increased recency compared with serial output. We conclude that ISR is more sensitive to recency than is often claimed.

Reversing the picture superiority effect: A speed-accuracy trade-off study of recognition memory

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Speed-accuracy trade-off methods have been used to contrast single- and dual-process accounts of recognition memory. In these procedures subjects are presented with individual test items, and are required to make recognition decisions under various time constraints. In two experiments we presented words and pictures to be intentionally learned, while test stimuli were always visually presented words. At test we manipulated the interval between the presentation of each test stimulus and a response signal, thus controlling the amount of time available to retrieve target information. The standard picture superiority effect was significant at long response deadline conditions (i.e. ≥ 2000 ms). Conversely, a significant reverse picture superiority effect emerged at short response-signal deadlines (i.e. ≤ 200 ms). The results are congruent with views suggesting that both fast familiarity and slower recollection processes contribute to recognition memory.

Unconscious memory: A failure to replicate key evidence.

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Merikle and Reingold (1991) reported priming for words in the absence of recognition memory in matched indirect (implicit) and direct (explicit) memory tests. Their striking result provides powerful and widely-cited support for unconscious memory processes in normal subjects. Using the same paradigm, we report a series of experiments failing to replicate this key result. In an encoding phase, participants viewed pairs of words and named the cued member on each trial. In a subsequent test phase, new and previously uncued words were presented at test against a background mask. Participants decided whether each word was old or new (direct task) or whether the contrast between the word and the background was high or low (indirect task).

For uncued words, unlike Merikle and Reingold (1991), we consistently found that the magnitude of priming does not exceed recognition memory. Indeed, no reliable priming was obtained for uncued words whereas recognition was reliably above chance. The same pattern of results was found when a perceptual identification task was used as the indirect task. These results question the existence of implicit memory and are, instead, compatible with the view that performance on implicit and explicit memory tasks is mediated by a single conscious process.

Merikle, P. M., & Reingold, E. M. (1991). Comparing direct (explicit) and indirect (implicit) measures to study unconscious memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17, 224-233.

EPS/BAAS Undergraduate Prize

An attentional blink for fearful faces: Emotional processing does require attention

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Opinions are divided regarding the extent to which emotional faces can be detected without the aid of selective attention. Some studies have shown that emotional faces, particularly those expressing negative emotions, are able to capture attention more easily than neutral faces, but more recent research has found no advantage for emotional faces. The experiment presented here used the attentional blink paradigm to investigate whether fearful faces could be detected during the so-called attentional blink interval, the period of reduced attentional capacity which has been shown to occur immediately after the presentation of the first of two target stimuli during rapid serial visual presentation (RSVP). Accuracy at detecting the presence of a fearful face from among a series of neutral faces in this dual task condition was compared with accuracy in a baseline condition which did not require participants to perform the task relating to the first target stimulus. Fearful faces could appear at one of six different time intervals after the first target. Results showed that face detection accuracy was impaired in the dual task condition compared to the single task condition, but only at early time lags. This attentional blink effect indicates that fearful faces were not detected pre-attentively. The explanation proposed to account for these results and those from other research investigating the role of attention in emotional processing is that when attention is fully engaged by a difficult competing task, emotional stimuli are not able to capture attention. However, when there is superfluous attentional capacity, emotional stimuli receive preferential processing in comparison to neutral stimuli. According to this account, emotional processing does require attention.

Symposium: Current issues in cognitive neuropsychiatry
Organisers M Brysbaert and Dr K Rastle

Recognition of action in schizophrenia

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Our research investigates the proposal that the sensory consequences of movement are predicted by forward models of the motor system. It has been proposed that the sensory prediction can be compared with the actual sensory feedback from movement and the results of this comparison can be used to determine the source of the sensation. This predictive system enables the consequences of self-produced events to be cancelled relative to external events and allows us to distinguish self- and externally produced events. It has been proposed that an impairment of this predictive mechanism could give rise to certain symptoms experienced in schizophrenia. If self-produced sensations are interpreted as being generated by an external source, then thoughts might be interpreted as external voices (auditory hallucinations) and self-produced movements might be interpreted as externally generated (delusions of control). In this talk, I will describe studies that investigate forward models of motor control, and their possible involvement in delusions of control.

Delusions: A cognitive/emotional approach

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Data from a number of sources will be adduced to support the idea that delusions in general involve a combination of both abnormal beliefs, sometimes predicated upon anomalous experience, and distress at the content of the belief. Results from a new test, the Cardiff Anomalous Perception Scale, applied to patients with psychotic delusions, pagans and others will be presented showing that bizarre beliefs plus distress at holding them seem to be required to produce psychiatric illness. Merely holding odd ideas is a necessary but not sufficient condition for delusions to manifest themselves as illness. A more specific interaction between the absence of a normal emotional response to familiar faces and some subsequent attribution process in the Capgras delusion will be explored. Here psychophysiological evidence of such absence, again, is necessary but, clearly, is not enough to produce the delusion that someone close to the patient is an imposter. Finally, the ramifications of these and other examples of the cognitive/emotional requirements in delusions for our understanding of "normal" beliefs will be tentatively raised.

Towards a cognitive neuropsychiatry of insight

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Insight is a multidimensional phenomenon which may be defined as comprising the following elements: the awareness that one has a mental disorder, the ability of relabel subjective psychological phenomena as abnormal and appreciation of the need for treatment. Anosognosia is a relatively extreme form of lack of insight seen in neurological cases. However, the phenomenon may occur to various extents throughout the range of neurological and psychiatric conditions. Within schizophrenia research, systematic review and meta-analysis demonstrates that there is a clear though relatively weak association between poor insight and cognitive impairment particularly measures of executive function. Relabelling – involving a kind of self-reflection and appraisal - seems to be particularly dependent on some forms of higher cognitive function. However, this cannot explain entirely lack of insight since awareness of disorder and the need for treatment in another person is often preserved in the face of lack of awareness of one's predicament. This suggests that poor insight might have a normative basis in processes of self-deception and image enhancement. Some preliminary work to explore this will be presented as well as a preliminary cognitive model.

Some limitations of the neuropsychiatric research programme

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Abstract: Most of the research work subsumed under the term 'cognitive psychiatry' has involved the search for cognitive and neuropsychological abnormalities that might be responsible for specific psychopathological phenomena such as delusions and hallucinations. While this approach has led to important advances in our understanding of these phenomena, it has some limitations, which I will illustrate with examples from my own research. First, cognitive neuropsychiatric research has typically focused on cognitive deficits, and ignored the role of emotional processes in psychotic experiences. However, cognitive deficits, while affecting social functioning and negative symptoms, appear to play little or no role in the positive symptoms of psychotic patients, which are influenced by negative emotional states and self-esteem problems. Many of the cognitive abnormalities observed in patients with positive symptoms in fact reflect content-specific cognitive biases rather than deficits (for example, selective attention to threat-related information, attributional biases). Second, many of the processes underlying positive symptoms are probably unstable over time, reflecting the dynamic interactions between the relevant cognitive processes. For example, my own research has highlighted shifts in patients' delusional systems (e.g. from 'poor me' paranoia in which persecution is seen as unjustified, to 'bad me' paranoia in which persecution is believed to be justified) which are associated with changes in attributional processes and self-esteem.

Finally, cognitive neuropsychiatric research has also ignored the aetiology of positive symptoms, especially the role of environmental influences in conferring risk. Although it might be assumed that observed cognitive abnormalities reflect brain dysfunction, there is evidence that adverse family relationships and exposure to trauma increase the risk of delusions and hallucinations respectively.

Discussion

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End of Symposium

Voluntary control and orienting to counterpredictive eye gaze and arrow cues

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Is orienting to eye gaze more strongly involuntary than orienting to arrow cues? In the current study, a correlational approach was applied to investigate the relationship between involuntary and voluntary orienting to eye gaze and arrow cues. In contrast to recent findings (Friesen, Ristic, & Kingstone, 2004), arrow cues triggered involuntary orienting. Furthermore, indices of involuntary and voluntary orienting were associated (correlated) rather than dissociated, at both long (1200 ms) and short (105 ms) intervals between the onset of the cue and the target onset. Finally, in agreement with neuropsychological findings (Vecera & Rizzo, 2004), involuntary orienting to eye gaze was correlated with self-reported attentional control. The findings highlight the value of considering individual differences when investigating orienting to symbolic cues.

Friesen, C. K., Ristic, J. & Kingstone, A. (2004). Attentional effects of counterpredictive gaze and arrow cues. *Journal of Experimental Psychology: Human Perception and Performance*, 30, 319-329.

Vecera, S. P., & Rizzo, M. (2004). What are you looking at? Impaired 'social attention' following frontal-lobe damage. *Neuropsychologia*, 42, 1647-1665.

On the relations between implicit and explicit spatial binding: Evidence from Balint's syndrome

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We report two experiments examining whether factors that affect binding in explicit report tasks also affect implicit binding in GK, a patient with Balint's syndrome. We show that there can be implicit binding of visual features even when the patient was at chance at explicitly discriminating the relations between the features. In Experiment 1 we found evidence for implicit binding of shape and colour, even when GK could not explicitly identify the shape and colour that went together. In addition, both GK's implicit binding and his explicit report of colour and shape were affected by the spatial distance between stimuli. In Experiment 2, we examined the binding of shape elements. The results indicate that the patient is sensitive to the spatial relations between different shapes, even when the explicit judgments of these relations were at chance. Effects of grouping were found on both implicit and explicit binding of the spatial relations between shapes. We interpret the qualitative similarities between implicit and explicit binding to indicate that they reflect a single process in which binding relations, initially established pre-attentively, are later consolidated by attention. This later process, of attentional consolidation, is disrupted in Balint's syndrome.

Early, involuntary top-down guidance of attention from working memory

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Four experiments explored the interrelations between working memory, attention and eye movements. Participants had to identify a tilted line amongst vertical distracters. Each line was surrounded by a colored shape which could be pre-cued by another item held in memory, that could match at least one attribute of the stimuli in the array. Relative to the neutral baseline, in which none of the stimuli matched the properties of the memory item, search was more efficient when the target fell within the stimulus cued by the memory item and was slowed when the memory item matched the stimulus surrounding a distractor. This memory cueing affected the fastest behavioural reaction times and also the first saccade made in search. Similar effects emerged even when the memory cue never contained the target, but not when it was presented but did not have to be held in memory. There was no evidence that the effects of memory guidance were modulated by priming effects between consecutive trials. The results suggest that there can be early, involuntary, top-down directing of attention to a stimulus matching the contents of working memory.

New objects capture attention, colour changes do not

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During the past 2 decades evidence has accumulated suggesting that the appearance of a new object is particularly effective in capturing attention. This is based partly on visual search studies in which targets associated with abrupt onset are detected more efficiently than targets associated with other types of visual event (e.g., motion). However, the notion that object-onset has a ‘special status’ in visual attention has been challenged. One of the issues is how to equate abrupt onset and other visual transients with respect to low-level sensory factors. In a variant of the precuing paradigm, we compared the effectiveness with which a colour cue would attract attention when the cue either resulted in the formation of ‘new’ objects or changed the colour of already present ‘old’ objects. Critically, the cues in both new and old object conditions were matched in cone-contrast space such that their effects on the retinal cones and parvocellular pathway were identical. Any differences in signals conveyed via the luminance based magnocellular pathway were also eliminated with dynamic random luminance masking. Results showed that whereas a colour cue that resulted in the appearance of new objects accrued attention a colour cue that resulted in old objects changing colour did not. We argue that the onset of a new object is a particularly effective attentional cue.

Grasping an object part involves selecting the whole object

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Cueing attention to a target in one part of an object can facilitate discrimination of an attentional probe in another part of the same object (Duncan, 1984). We replicate this object-based effect, and show that it is preserved when a grasping movement is made to the cued part of the object; in the latter case, probe discrimination is better when the probe falls (i) at a location displaced from the cued location, but still inside the grasped object than (ii) at a location equidistant from the cued location, but outside the grasped object. We conclude that grasping a part of a multi-part object involves attention to the whole object. We contrast these results with prior data we obtained where a pointing response was required (Linnell et al., in press), and we discuss the ways in which different actions may influence attention and perceptual coding.

Duncan, J. (1984). Selective attention and the organization of visual information.

Journal of Experimental Psychology: General, 113, 501-517.

Linnell, K.J., Humphreys, G.W., McIntyre, D., Laitinen, S. & Wing, A.M. (in press).

Action modulates object-based selection. *Vision Research*.

END OF MEETING

ESSEX INFORMATION

College Accommodation

Accommodation has been reserved for the nights of 6th and 7th April in Wivenhoe House Hotel, on campus. All rooms at Wivenhoe House are doubles and en-suite. The rate for single occupancy is £49.50, that for double occupancy is £44.00 per person. A limited number of standard rooms on campus (not en-suite) will also be available at a cost of £25.00 per night. Links to alternative accommodation are shown below and should be booked directly with the hotel or guesthouse. Reservations for University accommodation and/or the conference dinner can be made on the enclosed booking form, which should be returned to Dr Debi Roberson before **18 March**, 2005.

Cheques must be made payable to “University of Essex” and sent to “Dr Debi Roberson, EPS Meeting, Department of Psychology, University of Essex, Wivenhoe Park, Colchester. CO4 3SQ”, (Tel: 01206 873710).

Hotels and guesthouses close to campus

Alternative accommodation can be found at:

- <http://www.4hotels.co.uk/uk/colchester.html>
- <http://privatewww.essex.ac.uk/~kbrooke/recommended/hotels.htm>

Early booking is strongly recommended if you wish to use alternative accommodation.

Messages

Messages for those attending the meeting can be left at Psychology Reception, tel: 01206 873802.

Travel

For information on directions and maps, you are invited to consult:

- <http://www.essex.ac.uk/about/find.html>

By Air

The most convenient airport is likely to be Stanstead. For information telephone +44(0) 870 000 0303 or see website <http://www.baa.co.uk/main/airports/stansted/>

By Rail

A frequent direct service operates between London Liverpool Street and Colchester. For information contact National Rail enquiries; tel: 08457 484950, or <http://www.rail.co.uk/>

By Coach

First Eastern Coachlink run an hourly coach service between the University and Stansted Airport. Further details are available from the following website: <http://www2.essex.ac.uk/postoffice/> .

Coach services from Luton, Heathrow, Gatwick and Stansted Airports to Colchester are operated by National Express. For more information visit their website at www.nationalexpress.com . From Colchester Bus Station, the bus numbers 61, 74, 74B, 76, 77, 78, 78A and 78X will take you to the University campus.

For all further information on local bus timetables and other public transport, call traveline on: + 44 870 608 2608 or visit their website at: www.traveline.org.uk .

By Car

The University is close to the A12. For directions and maps see <http://www.essex.ac.uk/about/find.html#road>

Parking

For those staying at Wivenhoe House, there is guest parking available at the hotel. Parking elsewhere on Essex University campus is in pay and display car parks. Parking permits (at £3 per day) can be obtained through the department, but details must be sent to Dr. Debi Roberson before the 18th of March.

Local Taxis

There is a taxi rank at Colchester Rail Station (the journey to the University normally takes about ten minutes outside rush hour). There is also a taxi rank on Colchester High Street near the Red Lion Hotel. A taxi to the University from the station costs about £6.20.

Micraline Taxis (telephone 01206 766666) is a Colchester-based company which has a contract with the University

Bus

University to city: The main University bus stop is at the Valley Road junction, near Square One.

The University is served by the following Firstgroup buses:

From Colchester Rail Station: 78 and 78A to Valley Road.

From Colchester Bus Station: 74, 76, 77, 78 and 78A.

As services can at times be irregular and not always direct to the campus, 45 minutes should be allowed when travelling from the rail station to the University.

Eating and Drinking

Campus

There are a number of outlets on campus offering a range of meals from sandwiches to hot meals between 8am and midnight. For details see: <http://www2.essex.ac.uk/catering/>

Pubs in Essex

The Rose and Crown in Wivenhoe is a relaxed riverside pub. It offers an excellent range of beers and wine. Also in Wivenhoe, the *Black Boy* serves good fish and chips. Close to the University in Colchester, the *Rose and Crown* in Crown Street has a cosy atmosphere and oak beams. In the centre of town the *Castle*, in the high street has a nice atmosphere and good beer, as does the *Kings Arms* and the *Hospital Tavern*, both in Crouch Street. Large, lively and popular with students are the *Hole in the Wall* on Balkerne Hill and the *Playhouse* on St. John's Street. Further afield: *The Shepherd & Dog* in Langham is highly recommended. See: <http://www.bestpubs.co.uk/pubalist.asp?a=1195> for a comprehensive list.

Restaurants in Essex

Close to the University in Wivenhoe, the **Bakehouse** serves excellent European food and fish. The centre of Colchester has a range of good restaurants. **The Lemon Tree**, the **North Hill Exchange Brasserie** and the **Warehouse Brasserie** serve modern English and European food. On **North Hill** there is: **Ask** (serving pizza and pasta), **Monty's** serving good Indian food, two **Thai** restaurants and a **Tapas** bar. **Orientation** serves Chinese/Pacific rim food. Further afield, the **Crown** in **Stoke by Nayland** and **Milsoms**, in Dedham serve very good British food and game.

See also <http://www.topmenus.co.uk/essex/colchester/restaurants.htm> for a comprehensive list of restaurants.

Places of Interest

First Time Visitors to Essex – Colchester is Britain's oldest town. Information about the town and surrounding area can be found at: <http://www.colchesterguide.co.uk/>

Colchester Castle represents the largest Norman Keep in Europe and was constructed over the massive vaults of the ruined Temple of Claudius,. Details can be found at <http://www.theheritagetrail.co.uk/castles/colchester%20castle.htm>. Out of town, there is **Flatford Mill**, where Constable painted 'The Haywain', and **Layr Marney Tower**, as well as the nature reserve at Fingringhoe.

Conference Dinner

This will be held at Le Talbooth. The cost will be £36, for four courses including wine and transport to and from the university. Postgraduates may attend the dinner for a subsidised cost of £18.00. In this instance the booking form must be accompanied by a statement from an EPS member confirming Postgraduate status. Please book, and indicate any dietary requirements, on the enclosed form which should be returned to “ Dr Debi Roberson, EPS Meeting, Department of Psychology, University of Essex, Wivenhoe Park, Colchester. CO4 3SQ” before **18 March**, 2005.

NOTES