

1998 - January 5/6 Birkbeck College, London

LONDON MEETING 1998

A scientific meeting will be held at Birkbeck College, London, on 5/6 January, 1998. The Local Secretary is Dr Anne Richards.

PROGRAMME

Monday 5 January

Room 303

9.00 A. Michael Burton, Vicki Bruce and Steve W. Kelly (University of Glasgow and University of Stirling)

Cross-domain repetition priming in person recognition

9.30 Vicki Bruce, Derek Carson, A. Michael Burton and Andrew W. Ellis University of Stirling, Abertay University, University of Glasgow and University of York

Effects of task repetition and visual similarity on repetition priming of visual objects.

10.00 Ann Dowker, Jessica Heron and Carolyn May (University of Oxford)

Individual differences in face recognition: Is there a continuum of face processing abilities in the general population?

10.30 Coffee

11.00 Donald Morrison and Vicki Bruce (University of Stirling)

Ignoring famous faces: An application of the negative priming paradigm.

11.30 Tim Valentine and Pamela Coxon (Goldsmiths' College and University of Durham).

The effects of the age of eyewitnesses on the accuracy and suggestibility of their testimony.

12.00 Melanie Vitkovitch and Claire Rutter (University of East London)

Inhibitory effects during sequential naming: Time course and termination.

12.30 Angus Gellatly, Geoff Cole and Anthony Blurton (University of Keele)

Do new equiluminant visual objects capture attention?

1.00 Lunch

2.00 Emer M. E. Forde and Glyn W. Humphreys (University of Birmingham)

Privileged links between vision and action

2.30 James N. MacGregor, Thomas C. Ormerod and Edward P. Chronicle (University of Victoria, Canada and Lancaster University).

Modelling human performance on the 9-dot problem.

3.00 Marius Usher (University of Kent. Introduced by Dr Toby J. Lloyd- Jones) Interference and response selection in active memory.

3.30 Tea

4.00 Nigel W. Bond (University of Western Sydney)

A rose by any other name is still a rose.

4.30 Chris Moulin and Tim Perfect (University of Bristol)

Metamemory in Alzheimers Disease: Contrasting metacognitive judgements for lists and single words.

Tuesday 6 January

START OF PARALLEL SESSION

Parallel Session A: Room 303

9.00 Simon P. Liversedge and Roger P. G. van Gompel (University of Nottingham and University of Glasgow. Introduced by D.C. Mitchell)

Processing cataphoric pronouns: Do gender and number information guide the resolution process?

9.30 Roger P. G. Van Gompel, Martin J. Pickering and Matthew J. Traxler (University of Glasgow and The Florida State University)

The source of processing difficulty in syntactic ambiguity resolution

10.00 Holly Brannigan and Martin Pickering (University of Glasgow)

Syntactic dimensions of verb representation: Evidence from syntactic priming in language production.

10.30 Coffee

11.00 Kate Mayall and Glyn W. Humphreys (University of Birmingham)

Inhibition of previously named objects: Evidence for the use of 'action tags'.

11.30 Deborah A. Hall and Glyn W. Humphreys (MRC Institute of Hearing Research and University of Birmingham)

Letter processing strategies in pure alexia.

12.00 Jane Hinton, Simon P. Liversedge and Geoffrey Underwood (University of Nottingham and University of Durham)

Modulation of neighbourhood effects of semantic information during lexical identification.

12.30 Nicholas J. Hargaden, Glyn W. Humphreys and Linda R. Wheeldon (University of Birmingham)

Evidence for lexical priming of phonological encoding in post-cue picture naming.

1.00 Lunch

Parallel Session B: Room 304

9.00 Annette Farrant, Jill Boucher and Mark Blades (University of Sheffield. Introduced Professor A. Mayes).

Metamemory in children with autism

9.30 Heather Jordan and Steven P. Tipper (University of North Wales, Bangor)

Object and location-based frames of reference in Inhibition of Return.

10.00 Rebecca B. O'Grady and Hermann J. MYller (Birkbeck College, University of London)

Object-based visual selection is subject to domain-based attentional limitations

10.30 Coffee

11.00 Martin A Conway (University of Bristol)

Executive control of inhibition: The case of directed forgetting.

11.30 R. E. O'Carroll and N. Grubb (University of Stirling and Royal Infirmary of Edinburgh. Introduced by Professor Vicki Bruce).

An analysis of memory impairment following hypoxic brain damage.

12.00 Theresa Johnstone and David R. Shanks (University College, London)

Evidence against implicit abstraction.

12.30 J. A. Gray (Institute of Psychiatry, London)

Possible implications of synaesthesia for the problem of consciousness

1.00 Lunch

Tuesday 6 January (afternoon)

Room 303

2.00 Steven Frisson and Martin J. Pickering (University of Glasgow and University of Antwerp)
On-line processing of metonymy.

2.30 Andrew Stewart, Martin Pickering and Anthony Sandford (University of Glasgow.).
The influence of implicit causality information on anaphor resolution.

3.00 Alan Garnham, Jane Oakhill, David Reynolds and Carolyn Wiltshire (University of Sussex)
Are implicit causality effects on reading real?

3.30 Tea

4.00 Mark Smith and Linda Wheeldon (University of Birmingham)
The scope of grammatical encoding in speech production.

4.30 Kate Cain, Jane Oakhill and Peter Bryant (University of Sussex and University of Oxford)
Factors that contribute to individual differences in children's comprehension skill.

ABSTRACTS

Cross-domain repetition priming in person recognition

A. Michael Burton¹, Vicki. Bruce² and Steve W. Kelly¹

1. University of Glasgow

2. University of Stirling

Three experiments are reported examining repetition priming of personal names. In each experiment, faces are used as prime stimuli and people's names as the test stimuli. Experiment 1 fails to demonstrate priming from faces to names when the same task, a familiar/unfamiliar judgement, is made in prime and test phases. Experiment 2 shows that priming is observed when the same semantic judgement (British/American) is made at prime and test phases. Experiment 3 shows that priming is observed when different semantic judgements (dead/alive, British/American) are made at prime and test phase. These results suggest that transfer-appropriate processing cannot provide the

sole account of repetition priming in person recognition. Instead, the results are interpreted in terms of a structural account of priming, embedded within an interactive activation and competition model of person recognition.

Effects of task repetition and visual similarity on repetition priming of visual objects.

Vicki Bruce¹, Derek Carson², A. Michael Burton³, Andrew W. Ellis⁴

1. University of Stirling
2. Abertay University
3. University of Glasgow
4. University of York

At a previous EPS meeting, we described how repetition priming of object recognition is affected by the nature of the task performed in the priming and test phases. When object recognition was tested using both vocal naming and semantic decision tasks, only the naming task was affected by whether the test phase repeated a same or different exemplar of the object. This is difficult for most object recognition models in which semantic categorisation is seen as an earlier stage than name retrieval, and hence potentially more likely to reveal effects of visual repetition. The new experiments described here explored the mechanisms responsible for the lack of visual sensitivity found in semantic decision tasks using objects, and results support the hypothesis that what is critical is whether the semantic categorical decisions can be based on pre-existing knowledge structures or must be computed "on-line". The results are discussed in comparison with findings from other domains of face and word recognition.

Individual differences in face recognition: Is there a continuum of face processing abilities in the general population?

Ann Dowker, Jessica Heron and Carolyn May

University of Oxford

Our studies examined the extent and nature of 'normal' individual differences in different components of face processing; the interrelationships between different face processing measures; and the relationships between these face processing measures and some psychometric test scores. In Study 1, 40 subjects were given tests of famous face recognition, unfamiliar face recognition, and unfamiliar face matching. They were also given all the Verbal and Performance subtests of the WAIS. There was considerable individual variation in all face processing tasks, and no

significant correlations between the different face processing tasks. Study 2 recruited subjects who rated themselves as particularly 'good' and 'poor' at face recognition, and gave them similar tests, plus lip-reading and expression recognition tests. The self-rated 'good' group (13 subjects) and 'poor' group (10 subjects) did differ significantly on measures of familiar and unfamiliar face recognition. There were some significant correlations between different face processing measures; but striking discrepancies within individual subjects: e.g. one performed extremely poorly on all face recognition tests but well on lip-reading; another performed well on famous face recognition, but almost at chance on lip-reading and expression identification. There were few significant correlations with psychometric tests, though in both studies Comprehension correlated negatively with some face processing measures.

Ignoring famous faces: An application of the negative priming paradigm

Donald Morrison and Vicki Bruce

University of Stirling

Since the mid 1980s, positive and negative priming techniques have been used to investigate the topics of face/person recognition and visual selective attention, respectively. The present research for the first time employed the negative priming paradigm to explore the processing of ignored familiar faces. Familiar faces were found to mediate negative priming, and this effect crossed stimulus domains e.g., the decision that the name 'Sean Connery' is that of an actor took longer when his face was ignored on the previous trial. Furthermore, when distractor faces were removed from probe displays, this negative priming disappeared and positive priming was observed. These findings are challenging for current models of person recognition.

The effects of the age of eyewitnesses on the accuracy and suggestibility of their testimony.

Tim Valentine¹ and Pamela Coxon²

1. Goldsmiths College, University of London

2. University of Durham.

Previous studies have compared the performance of young adult eyewitnesses with that of children or elderly witnesses, but few studies have allowed direct comparison of the performance of all three age groups. The accuracy and suggestibility of accounts of a video recording of a kidnapping was investigated using an experimental eyewitness paradigm. Subjects were drawn from three age groups; children (aged 7 - 9 years); young adults (aged 16 - 18 years) and elderly subjects (aged 60 - 85 years). Subjects' accuracy in answering non-misleading questions and their susceptibility to misleading information was measured. Both the elderly and child subjects gave fewer correct answers and more

incorrect answers to non-misleading questions than did young adults. The elderly subjects gave fewer correct responses but also fewer incorrect responses to non-misleading questions than did child subjects. Children were more suggestible than either elderly or young adults. No significant difference was found in the suggestibility of elderly and young adults. Contrary to the trace strength hypothesis no relationship was found between accuracy of recall and suggestibility.

Inhibitory effects during sequential object naming: time course and termination.

Melanie Vitkovitch and Claire Rutter

University of East London

Previous work has established that when a series of semantically related objects is named under speeded instructions, errors can reflect the names of previously named objects. However, while errors reflect previously named objects at lags of about 3 or more, errors do not relate to the immediately preceding trial. This has been interpreted as a brief, inhibitory effect (Vitkovitch, Kirby & Tyrrell, 1996). Two experiments are reported here which examine whether the inferred inhibition reduces over time. In Experiment 1, the interval between response and next stimulus is manipulated (RSI). When RSI = 8 seconds, errors begin to emerge at earlier lags as compared to RSI = 4 seconds, indicating that inhibition has reduced over time. In Experiment 2, the RSI's between the related objects were 8 and 16 seconds, and an unrelated intervening item appeared between each related object. Under the 16 second RSI condition, errors relating to the immediately preceding trial (Lag 1 errors) were most frequent relative to other lags. This was not the case for the 8 second RSI condition. This suggests that inhibition has dissipated after 16 seconds. Initial comparisons of conditions involving the unrelated intervening item with conditions with only related items suggest that an intervening item can also have an effect on inhibition. The results are discussed with respect to other inhibitory effects in the literature.

Do new equiluminant visual objects capture attention?

Angus Gellatly, Geoff Cole and Anthony Blurton

University of Keele

A number of studies have demonstrated that, under most circumstances, the abrupt onset of a new visual object captures attention. Yantis and Hillstrom (1994) claimed that capture is not due to a luminance-change detection system but to a mechanism which detects the appearance of new perceptual objects, such as when a previously camouflaged animal breaks cover. We identify two potential shortcomings in the experiments

reported by Yantis and Hillstrom, which could account for their findings without the need to postulate any such high level mechanism. Four experiments will be reported which are designed to test whether abrupt onsets do capture attention when luminance change and prior allocation of attention are ruled out as possible explanations.

Yantis, S. & Hillstrom A.P. (1994) Stimulus-driven attentional capture: Evidence from equiluminant visual objects. *Journal of Experimental Psychology: Human Perception and Performance*, 20, 95-107.

Privileged links between vision and action

Emer M. E. Forde and Glyn W. Humphreys

University of Birmingham

ABSTRACT TO COME.

Modelling human performance on the 9-dot problem.

James N. MacGregor¹, Thomas C. Ormerod² and Edward P. Chronicle²

1. University of Victoria, Canada

2. Lancaster University

Traditionally, the 9-dot problem has been regarded as difficult to solve because participants become fixated on figural properties, and require insight for successful solution. More recent cognitive accounts argue that difficulty arises because participants either (a) fail to consider appropriate solution hypotheses (Weisberg & Alba, 1981) or (b) impose a solution-defying constraint (Lung & Dominowski, 1983). This paper presents a criterion-based serial optimisation model which makes no assumptions about previous knowledge and imposes minimal constraints on legal moves. In three experiments the model accurately predicts the probability of participants finding a solution across a range of problem variants. A fourth experiment examines performance on two variants that, according to the model, should be equally difficult, but which potentially differ in figural cues. Performance was better on the version where there was greater correspondence between the figural properties of the problem and those of the solution. We conclude that while the model provides a good account of many aspects of performance, figural factors remain which may influence solutions. It appears that a full account of performance on "insight" problems such as the 9-dot problem

may have to take account of the perceptual properties of the problem array.

Lung, C., & Dominowski, R. L. (1983) Effects of strategy instructions and practice on nine-dot problem solving. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 6, 804-811.

Weisberg, R. W., & Alba, J. W. (1981) An examination of the alleged role of "fixation" in the solution of several "insight" problems *Journal of Experimental Psychology: General*, 110, 169-192.

Interference and response selection in active memory

Marius Usher (Introduced by Dr Toby J Lloyd-Jones)

University of Kent

This paper investigates the capacity limitations of short-term memory (STM): passive decay and interference. A computational model of STM based on principles characteristic to the prefrontal cortex will be briefly presented, showing interference based limitations. It is proposed that in STM tasks, subjects can rely either on a purely phonological, rehearsal-based mechanism that is decay limited or on a separate, "central", mechanism that is interference but not decay limited. To check these predictions, two groups of subjects have been tested on immediate memory with the same word-list material, but with tasks that encouraged either phonological rehearsal (serial recall) or non-rehearsal (cued recall) strategies. It was found that word-length effects (typically reflecting time based limitations) occur in the first type of tasks only, while in the second type of tasks, performance is limited mainly by interference. It is proposed that the central mechanism for STM is mediated by self-sustained activation of attractor-network representations in the prefrontal cortex, and it is shown that such a model can also explain selection deficits recently reported in "dynamic aphasia" (Robinson, Blair & Cipolotti, 1997; Brain, in press).

A rose by any other name is still a rose.

Nigel W. Bond

University of Western Sydney

Despite recent interest, the question of whether humans employ verbal labels to remember odours is still unanswered. Subjects were exposed to two recognition tasks, one employing odours and the other famous faces. Half the subjects began with the odour task. They were presented with

12 target odours and allowed one sniff of each. Group O3 were presented with an odour every 3 seconds, Group O12 every 12 seconds, and Group O36 every 36 seconds. Half of the subjects were required to count backwards out loud, whereas the other subjects were simply required to say 'the' at their own pace. Some time later, subjects were presented with the 12 target odours intermingled with 12 new distracter odours. They were allowed unlimited time to report whether an odour was a target or a distracter and to indicate their confidence in their judgement. Subjects were then presented with photographs of 12 famous faces. Group F3 were presented with one every 3 seconds, Group F12 every 12 seconds, and Group F36 every 36 seconds. Subsequently, subjects were presented with different photographs of the 12 famous people intermingled with 12 photographs of other famous people. Again, they were required to indicate which photograph was of a target and which was a distracter. At the end of the study, subjects were presented with all 24 odours and all 24 faces, one at a time, and asked to name them if they could and to indicate how familiar the odours and faces were to them. There was no difference in the ability of Groups O3, O12 and O36 to distinguish target from distracter odours. Further, articulatory suppression had no effect on performance. Regression analyses indicated that familiarity, not the ability to name an odour, was the best predictor of the ability to recognise a target. Interestingly, familiar distracter odours were more likely to produce false alarms, but this effect was reduced significantly by articulatory suppression. There were no differences between groups F3, F12 and F36 in the ability to recognise target faces overall. However, in Groups F12 and F36, articulatory suppression reduced recognition performance for familiar faces and for faces subjects could name. Regression analyses indicated that the ability to name a face was the best predictor of the ability to recognise a face as a target, not familiarity. These data suggest that subjects do not employ verbal labels in an odour recognition task, although they do appear to do so when attempting to recognise famous faces.

Metamemory in Alzheimers Disease: Contrasting metacognitive judgements for lists and single words.

Chris Moulin & Tim Perfect

University of Bristol

Baddeley (1986) proposed that there is an executive component to the memory difficulties in Alzheimers Disease (AD). Three related studies examine the executive functions of memory monitoring and control in AD patients, age matched controls and young adults. Contrary to expectations, the first study found that AD patients were as accurate as controls in judging the difficulty of individual items to be learned, and in dedicating study time across items. The second study required subjects to predict memory performance for lists of differing difficulty and semantic relatedness. The results showed that whilst controls showed discrimination across lists, AD patients did not. Finally, the third study used a recognition paradigm to overcome floor effects in AD patients memory performance. In this study, two successive trials examined learning of metacognitive accuracy for both items and lists. Whereas controls were more accurate in predicting item performance in the second trial, AD patients continued to rate words inappropriately. For the lists, all groups showed equivalent discrimination across trials. The results of

these studies suggest that there is no impairment in on-line metacognitive judgements in AD, but that there is impairment in judgements made after the event.

Baddeley, A.D. (1986) *Working Memory*. Oxford: OUP Processing cataphoric pronouns:

Do gender and number information guide the resolution process.

Simon P. Liversedge¹ and Roger P.G. van Gompel²

1. University of Nottingham

2. University of Glasgow

Few studies have been conducted to investigate cataphoric pronoun resolution (pronouns that refer forwards rather than backwards in text). One of the few was conducted by Cowart and Cairns (1987) who found that readers attempt to assign a cataphoric pronoun to the first noun-phrase in the main clause and that non-syntactic information does not guide resolution. We conducted two eye-tracking experiments to further investigate these findings. In Experiment 1 subjects read sentences such as 2 and 3. Our objective was to determine whether gender information guides cataphoric pronoun resolution. 2. When he was fed up, the boy visited the girl very often. 3. When she was fed up, the boy visited the girl very often. Reading times were longer for sentences like 3 than for sentences like 2. In Experiment 2 we used similar sentences containing a pronoun which either matched or mismatched the number of the first noun phrase in the main clause. Reading times were again longer when there was a mismatch than when there was a match. Taken together the results of our experiments suggest that subjects assign cataphoric pronouns to the first noun phrase in the main clause and that the resolution process is not guided by gender or number information.

Cowart, W. & Cairns, H. S. (1987) Evidence for an anaphoric mechanism within syntactic processing: Some reference relations defy semantic and pragmatic constraints. *Memory and Cognition*, 15, 318-331.

The source of processing difficulty in syntactic ambiguity resolution

Roger P.G. van Gompel¹ Martin J. Pickering¹ and Matthew J. Traxler²

1. University of Glasgow

2. Florida State University

Two eye-tracking experiments showed that processing difficulty in syntactic ambiguity resolution arises from a revision process, not from a competition process between possible syntactic analyses, as claimed by constraint-based theories. The experiments suggest that in biased syntactic structures, the processor nearly always adopts the same analysis initially. Only if this analysis is implausible, reanalysis ensues, resulting in processing difficulty. In structures that are balanced between two analyses, each analysis is adopted initially about half the time,

resulting in processing difficulty if the structure is disambiguated either way. For both biased and balanced structures, the ambiguous conditions were easy, because the processor was never forced to reanalyse. We argue that the results are problematic for both two-stage and constraint-based processing theories, and argue for the unrestricted race theory, which explains the data.

Syntactic dimensions of verb representation: evidence from syntactic priming in language production.

Holly Branigan and Martin Pickering

University of Glasgow

It is generally accepted that lexical representations must encode four dimensions of structure: a lexical entry's semantic content, its syntactic properties, its morphological composition, and its phonological content (e.g. Levelt 1989). The phonological, morphological and semantic dimensions of lexical representation have been well-studied; in contrast, little research has examined how syntactic information is represented in the mental lexicon. We report the results of a series of experiments which investigate how syntactic information is encoded in verb representations. The experiments employ a syntactic priming paradigm (Bock 1986, 1989; Bock & Loebell 1990; Bock, Loebell & Morey 1992; Branigan, Pickering, Liversedge, Urbach & Stewart 1995). Previous work has shown the existence of priming effects based upon verb subcategorisation frames in language production. For example, subjects complete a sentence fragment such as 'The teacher showed...' using a double object frame ('The teacher showed the pupil the book') more often after another double object structure ('The postman handed the woman the parcel') than after a semantically equivalent prepositional object structure ('The postman handed the parcel to the woman'). These effects can be straightforwardly accounted for within a model which conceptualises the mental lexicon as a network (e.g. Roelofs 1992), in which verbs and their associated subcategorisation frames are represented as nodes connected by weighted links. Residual activation following employment of a particular subcategorisation frame favours its subsequent use. Our experiments used a sentence completion task to examine whether subcategorization information is represented as a property of individual lexical entries, or whether it is instead shared across a set of entries with related properties. Subjects completed lists of sentence fragments which contained prime/target pairs, for example 'The magician gave the wand...'/ 'The blackmailer posted...'. Although priming effects occurred when the prime and target fragments contained different verbs, priming was significantly greater when the prime and target contained the same verb. This suggests that subcategorisation information is shared between different lexical entries, but to a limited degree. Subsequent experiments examined how grammatical information internal to the verb itself (e.g. tense and aspect information) is represented. In contrast to the first experiment, we found no reduction in the magnitude of priming when the aspect or tense of the prime verb differed from that of the target verb, suggesting that the verb nodes themselves are unspecified for grammatical features such as tense. We discuss the implications of our results for models of lexical representation.

Inhibition of previously named objects: Evidence for the use of "action tags"

Kate Mayall and Glyn W. Humphreys

University of Birmingham

The "post-cue naming paradigm" has previously been used to study later, name-retrieval stages of object naming (Humphreys, Lloyd-Jones & Fias, 1995). In this paradigm, two pictures (or words) are presented simultaneously for a limited duration, with just one being cued for naming. In the present set of experiments, we investigated the effects of priming on the post-cue naming task by presenting pairs of stimuli twice. When stimulus pairs were repeated in a second block, RTs to original distractors were speeded while RTs to original targets were unaffected, relative to RTs in block 1. When a picture categorisation or a word naming task was used, there was no difference in block 2 RTs between original targets and distractors. There was also no difference if pictures were categorised in block 1 and named in block 2. The effect on naming remained if the picture pair was repeated as soon as three trials later, but not if it was repeated immediately. Further, using a condition where no response was made following the first presentation of a pair, it was demonstrated that previous visual analysis of a picture produced facilitation, but previous naming produced inhibition. The results will be discussed in terms of the provision of "action tags" (Descepper & Treisman, 1996) in the mapping from semantics to phonology, for items on which naming has been undertaken.

Descepper, B. & Treisman, A. (1996) Visual memory for novel shapes: Implicit coding without attention *Journal of Experimental Psychology: Learning, Memory and Cognition*, 22, 27-47.

Humphreys, G. W., Lloyd-Jones, T. J. & Fias, W. (1995) Semantic interference effects on naming using a postcue procedure: Tapping the links between semantics and phonology with pictures and words *Journal of Experimental Psychology: Learning, Memory and Cognition*, 21, 961-980.

Letter processing strategies in pure alexia

Deborah A. Hall¹ and Glyn W. Humphreys²

1. MRC Institute of Hearing Research

2. University of Birmingham

We present five patients who all show the cardinal symptom of pure alexia (letter-by-letter reading) as their single word reading was slow and abnormally affected by word length. Such reading performance has been assumed to reflect reliance on a sequential letter processing strategy. In our group, performance on a range of letter and word processing tasks suggested that sequential letter processing was not obligatory and could be influenced by lexical factors. For example, the distribution of fast reading responses across word length showed that two patients were able to identify a small number of words directly (i.e. parallel letter processing), particularly those with high imageability ratings. We further investigated the speed of visual processing in three matching tasks which manipulated letter case, letter font, and picture identity. Each task required patients to match items with respect to their physical or nominal identity under conditions of simultaneous versus sequential presentation. Reaction times were significantly affected by the nature of the stimulus and performance varied qualitatively across the five

patients. We suggest that letter-by-letter reading does not result from a single impairment, but that the disorder can reflect a common strategy adopted as a result of different types of visual and/or pre-lexical processing deficits.

Modulation of neighbourhood effects by semantic information during lexical identification

Jane Hinton¹, Simon P. Liversedge² and Geoffrey Underwood¹

1. University of Nottingham

2. University of Durham

We report three lexical decision experiments that investigated the mechanisms underlying lexical processing. In Experiment 1, slower responses were made to target words following ambiguous partial primes (consistent with many words) than unambiguous partial primes (consistent with only the target word). This was termed the ambiguity effect. We explained these results in terms of an interactive activation framework in which other linguistic codes could also influence word identification. In Experiments 2 and 3 we investigated the combined effect of orthographic and semantic information upon lexical identification. In IA terms, if semantic and orthographic information both directly influence a common mechanism underlying identification, there should be an interactive effect of these types of information. We preceded partial primes with semantically related primes and observed a reduced ambiguity effect, probably due to the semantic prime activating the target and inhibiting its orthographic competitors. Furthermore, when the partial primes were preceded by semantic primes related to the target's highest frequency neighbour, the ambiguity effect was increased, suggesting that activating the neighbour increases the amount of inhibition exerted upon the target word. These results are consistent with an activation account of lexical processing in which multiple codes may jointly influence the ease of word identification.

Evidence for lexical priming of phonological encoding in post-cue picture naming

Nicholas J. Hargaden, Glyn W. Humphreys and Linda R. Wheeldon

University of Birmingham

Evidence for processes involved in building the sound forms of words for production of speech (phonological encoding) is mixed. In a series of experiments we observed a facilitatory effect on response times of shared phonological information between picture targets and word primes in a post-cue naming task. The effect appeared regardless of the position of the shared information (i.e. word-initial and rhyme pairs), suggesting a lexical locus rather than an effect on sub-lexical phonological encoding. The effect disappeared at a long (1500 msec) post-stimuli delay, but was reinstated when subjects were asked to sub-vocalise a nonsense string, ruling out late articulatory processes. In addition, phonological

priming did not occur when subjects were encouraged to use a non-lexical route to production, when written word pairs were used. The results are interpreted in terms of priming facilitating the initial retrieval of word-forms, rather than phonological encoding itself.

Metamemory in children with autism

Annette Farrant, Jill Boucher and Mark Blades

University of Sheffield. Introduced by Professor A. Mayes

Five experiments will be reported comparing metamemory abilities in children with autism, age and language-matched mentally retarded children, and language-matched young normal controls. The mean language age of the participants in Experiment 1 was approximately 6-years, in Experiments 2, 3 and 4 approximately 8- years, and in Experiment 5 approximately 9-years. All the children were given one or more false belief tests. Experiment 1 assessed the children's understanding that a task variable (list length) and a person variable (age) will affect their own and others' performances on an immediate auditory-verbal recall task. Experiment 2 assessed the ability to utilise category cues in a picture recall task. Experiments 3 and 4 assessed the ability to verbalise strategies used in a memory span test, and in one retrospective and two prospective memory situations. Experiment 5 assessed the children's knowledge and understanding of another person's memory. On the basis of available evidence and theory we predicted that the children with autism would be impaired on all the metamemory tasks, and that impairment would be associated with failure on tests of false belief. Our predictions were not supported. The children with autism were not impaired on any of the metamemory tasks, although they were less likely than controls to make spontaneous use of memory strategies involving, other people. Unexpectedly few of the children failed the false belief tasks. These results will be discussed in relation to current theories concerning, primary psychological deficits underlying autism, in particular the 'theory of mind' theory of autism, and the central executive dysfunction theory.

Object- and location-based frames of reference in Inhibition of Return

Heather Jordan and Steven P. Tipper

University of Wales, Bangor

The spatial priming paradigm has been used to explore the role of attention in sampling the visual scene. Precueing a location with a sudden on set stimulus which does not predict the appearance of a subsequent target (exogenous cueing) results in facilitation of target detection when the stimulus onset asynchrony (SOA) is less than 300 ms. At longer SOAs participants are slower to detect a target in a cued location (the Inhibition of Return or IOR effect). It has been found that IOR can also be observed operating in an object-based frame of reference, when previously cued objects move to a new location. Data will be presented which demonstrates that: 1. both object- and location-based IOR can be

investigated in static displays. 2. the traditional spatial cueing paradigm confounds location- and object-based frames of reference. 3. the study of IOR is useful in observing the separate characteristics of both location- and object-based frames of reference.

Object-based visual selection is subject to domain-based attentional limitations

Rebecca B. O'Grady and Hermann J. Muller

Birkbeck College, London

Four experiments, adapting the object-judgement paradigm developed by Duncan (1984), examined the relationship between object-based mechanisms of visual attention. The experiments demonstrated a cross-domain cost, in terms of accuracy, when observers made dual colour-form judgements to one or two overlapping objects presented briefly, relative to within-domain, dual colour and dual form, judgements. This domain-based selection effect was additive to an object-based effect, a cost of making dual judgements to separate objects, as reported by Duncan (1984). The pattern of object and domain-based effects points to a capacity limitation in how multidimensional features are bound into a coherent object representation, consistent with the dimension-weighting account of MYller, Heller and Ziegler (1995) according to which there is a limit to the total selection weight available to be allocated to the object's dimensions.

Duncan, J (1984). Selective attention and the organization of visual information. *Journal of Experimental Psychology: General*, 114, 501-517.

Muller, H. J., Heller, D., and Ziegler, J. (1995). Visual search for singleton feature targets within and across feature discriminations. *Perception & Psychophysics*, 57, (1), 1-17.

Executive control of inhibition: The case of directed forgetting

Martin A. Conway

University of Bristol

In the lists directed forgetting procedure an individual is presented with a list of words to remember and in the forget (F) condition the list contains a mid-list cue to forget all preceding items (List 1) whereas in the remember condition (R) the mid-list cue requires retention of all preceding items. In both conditions items following the mid-list cue (List 2) are to-be-remembered. At test participants are required to remember all items. The standard finding using free recall is that performance on List 1 items in the F condition is reliably lower than performance on List 1 items in the R condition and List 2 items in the F condition. Also often observed is less proactive interference in the F compared to the R condition. These findings are taken to show inhibition of previously acquired items. In a series of experiments using this directed forgetting procedure we found: a) children up to the age of 12 years do not show the effect, b) adults when given a demanding

secondary task on List 2 items show a disruption of inhibition, c) frontal lobe patients do not show the effect but other neurologically impaired patients do, and d) normal elderly although recalling at levels lower than that of children and frontal lobe patients nevertheless showed a reliable the directed forgetting effect. It is concluded from this pattern of findings that directed forgetting is mediated by executive control processes situated in the frontal lobes.

An analysis of memory impairment following hypoxic brain damage.

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The hippocampus is thought to be particularly sensitive to the effects of hypoxia. Aggleton has recently proposed that specific hippocampal damage results in detrimental effects on recall, with recognition unaffected. In the present study, thirty- five survivors of out-of-hospital cardiac arrest were compared with 35 age and sex matched control subjects discharged after myocardial infarction without cardiac arrest. Cardiac arrest subjects demonstrated marked memory impairment, presumably as a consequence of hypoxic brain damage. Moderate or severe impairment was found in 37% of cardiac arrest subjects and in no control subjects. The severity of memory impairment correlated significantly with indices of cardiac arrest duration. Data will be presented which test Aggleton hypothesis regarding the sparing of recognition memory following hippocampal damage

Evidence against implicit abstraction.

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Two experiments investigated whether subjects who memorise representative strings from a grammar, without knowing that those strings were generated from a set of rules, can abstract the rules of the grammar during the training process. A Match group memorised strings generated from a biconditional grammar, while an Edit group hypothesis tested in order to actively identify the rules of the grammar. Both groups processed the same training strings and classified the same novel test strings. The similarity of test strings to training items was manipulated independently of their conformity to the rules of the grammar (grammaticality). In Experiment 1 similarity was manipulated at the level of whole letter strings, whereas in Experiment 2 similarity was manipulated at the level of fragments of two (bigrams) or three (trigrams) letters. In Experiment 1, neither group showed a whole item similarity effect. The Match group showed no effect of grammaticality, while the Edit group

learners demonstrated near-perfect performance. In Experiment 2 the Edit group learners showed the same pattern of performance, but the Match group showed a similarity effect at the level of bigrams and trigrams. The Match group findings support non-abstractionist fragment-based accounts of implicit learning.

Possible implications of synaesthesia for the problem of consciousness.

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The links between (a) the occurrence of conscious experiences, (b) brain activity and (c) the information processing mediated by such brain activity remain mysterious (Gray, 1995). Different groups of theorists assume either that (a) is linked primarily to (c), so that e.g. computers could replace brains as the physical medium of information processing while preserving conscious experience; or that (a) is linked relatively directly to (b). These contrasting positions are adopted without empirical justification and often without clear articulation. As a first attempt to bring this contrast into the laboratory, we have commenced a study of brain activation (using functional magnetic resonance imaging, fMRI) comparing word-colour synaesthetes (Baron-Cohen & Harrison, 1997) with normal controls on a series of paired associate tasks. The paper will present the arguments on which the study, and its possible implications for consciousness are based, along with some preliminary fMRI results.

Gray, J. A. (1995). The contents of consciousness: a neuropsychological conjecture. *Behavioural & Brain Sciences*, 13, 617-680. Baron-Cohen, S. & Harrison, J. E. (eds.) (1997). *Synaesthesia: classic and contemporary readings*. Oxford: Blackwell

On-line processing of metonymy

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Two eye-tracking experiments investigated the processing of metonymic expressions. In Experiment 1, participants read sentences in which places were used metonymically to refer to institutions, and whose literal interpretation was implausible (e.g., talked to the school). Initial reading times showed that such expressions were processed similarly to expressions with literal interpretations (e.g., walked to the school), and were much easier to process than expressions that had no straightforward metonymic interpretation (e.g., talked to the bridge). Experiment 2 contained sentences in which places metonymically referred to events (e.g., during Vietnam). These were contrasted with literal uses of place names (e.g., around Vietnam), and places that had no conventional metonymic event usage (e.g., during Finland). Participants experienced difficulty with these latter expressions, though the effects were delayed in comparison with Experiment 1. We argue that readers can rapidly adopt metonymic interpretations, and suggest that the processor automatically searches for both literal and metonymic interpretations of

expressions

The influence of implicit causality information on anaphor resolution.

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Implicit causality is generally viewed as a property which imputes causality of an event to one participant (see examples 1-4). Previous research suggests that implicit causality affects anaphor resolution (eg Garvey, Caramazza and Yates 1975, Garnham, Oakhill and Cruttenden 1992). However, these studies have failed to distinguish between implicit causality and other potentially confounding factors (e.g. plausibility), and using the probe task have produced inconsistent results regarding the time course (Garnham, Traxler, Oakhill and Gernsbacher 1996, McDonald and MacWhinney 1995). We report three self-paced reading studies which examined how implicit causality influences reference resolution. All three studies employed sentences like (1- 4), each followed by a question: 1) Mary congratulated Lucy because she / had won the championship. 2) Mary congratulated Lucy because Lucy / had won the championship. 3) Mary congratulated Lucy because she / was very impressed. 4) Mary congratulated Lucy because Mary / was very impressed. All four sentences are rated equally plausible. However, in (1) and (2), the second fragment is consistent with the implicit causality bias of the verb 'congratulated', whereas in (3) and (4), it is inconsistent. In all three studies, subjects read the second fragment faster if it was consistent with the verb bias. This suggests strongly that implicit causality does play an important role in pronominal resolution. In the Pronoun conditions ((1) and (3)), implicit causality interacted with order of mention: reference to the second-mentioned character was influenced by verb bias, but reference to the first-mentioned character was always easy. This pattern was found even when the pronoun could be unambiguously resolved by gender. However, in the Name conditions ((2) and (4)), implicit causality did not interact with order of mention. Reference to either character was only easy when consistent with implicit causality. Given that the effects were found for the fragment following the anaphor, the results are consistent with implicit causality information exerting its influence at the integrative stage of discourse model construction rather than acting as a predictive mechanism. We explain the results in terms of structural and non-structural focus dimensions of the discourse model.

Are implicit causality effects on reading real?

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Some verbs, such as "blame" and "confess", implicitly impute causality to one or other of the participants in the actions they describe. For example, "blame" imputes causality to the person blamed (typically the direct object of "blame"), whereas "confess" imputes causality to the confessor (typically the subject of "confess"). A subsequent explicit cause, described for example in a "because" clause, may be the same as or different from the implicit cause (referred to as congruency or incongruency between the implicit and explicit causes). Many previous studies have shown that readers have more difficulty processing such "because" clauses when the explicit and implicit causes differ than when they are the same (e.g., Caramazza et al., 1977; Garnham et al., 1992). However, when they follow the same main clause (e.g. "John blamed Bill") congruent and incongruent "because" clauses differ in other respects (for example, in the words they contain). We constructed a new set of materials in which identical "because" clauses were congruent or incongruent with different main clauses. In a series of three experiments, reading time differences between congruent and incongruent occurrences of the "because" clauses failed to emerge. However, congruity did have other effects, for example on question answering times and judgements of how well the "because" clause continued on from the main clause.

Caramazza, A., Grober, E., Garvey, C., & Yates, J. (1977). Comprehension of anaphoric pronouns. *Journal of Verbal Learning and Verbal Behavior*, 16, 601-609.

Garnham, A., Oakhill, J. V., & Cruttenden, H. (1992). The role of implicit causality and gender cue in the interpretation of pronouns. *Language and Cognitive Processes*, 7, 231-255.

The scope of grammatical encoding in speech production

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Three experiments investigate the scope of grammatical encoding during sentence production. Subjects produced sentences to describe an array of three moving pictures (e.g., the dog goes up and the hand and the kite go down). In Experiment 1, two clause sentences were produced which were matched for total grammatical complexity but which differed in the complexity of their initial clause. Production latencies were longer for sentences with a complex initial clause (e.g, the dog and the hand go up) than for sentences with a simple initial clause (e.g, the dog goes up) suggesting that only the initial clause of the sentence was grammatically encoded prior to articulation. In Experiment 2, the pictures to be named were previewed for two seconds prior to movement onset allowing subjects to retrieve the picture names before they initiated grammatical encoding. Reaction times measured from movement onset showed no effect of initial clause complexity. In Experiment 3, single clause sentences were produced and latencies were a function of initial phrase complexity. These findings support incremental models of grammatical

encoding (Kempen and Hoenkamp, 1987) in which lexical items are first retrieved for the initial phrase of the sentence to be produced (Levelt and Maassen, 1981; Meyer, 1996).

Kempen, G. & Hoenkamp, E. (1987) An incremental procedural grammar for sentence formulation *Cognitive Science*, 11, 201-258.

Levelt, W. J. M. & Maassen, B. (1981) Lexical search and order of mention in sentence production In W. Klein & W. J. M. Levelt (Eds.) *Crossing the boundaries in, linguistics* Dordrecht: Reidel.

Meyer, A. S. (1996) Lexical access in phrase and sentence production: Results from picture-word interference experiments *Journal of memory and Language*, 35, 124- 161.

Factors that contribute to individual differences in children's comprehension skill.

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In this talk, we consider the difficulties of children who have problems with reading comprehension, even when they are competent at single-word recognition. Our earlier work has shown that good and poor comprehenders differ in a number of areas, and in this talk we discuss the relative contribution of several theoretically relevant skills and abilities to the prediction of reading comprehension. We present data from the first two stages of a longitudinal study, when the children were 7 to 9 years old. Multiple regression analyses demonstrated a dissociation between the skills and abilities that predict single-word reading and those that predict text comprehension. In addition, performance on the comprehension subskills at time one were good predictors of comprehension a year later, whereas performance on word-level tasks did not predict unique variance in comprehension skill, but did predict reading accuracy. We hypothesised that at least part of the reason for poor comprehenders' difficulties could be traced to their less efficient working memories, which limit the extent to which information from different parts of a text can be successfully compared and integrated. Multiple regression analyses suggest that, although working memory does contribute significantly to the prediction of comprehension skill, the tests of comprehension subskills also contribute uniquely to the prediction. The implications of these findings for our understanding of children's problems in text comprehension will be discussed.