

2002 - 9/10/11 Joint Meeting with Belgian Psychological Society, Leuven, Belgium

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LEUVEN MEETING 2002

A joint scientific meeting with the Belgian Psychological Society held at the Department of Psychology, University of Leuven, Belgium, 9-11 April, 2002.

Tuesday 9 April 2002, 9:30 - 11:30

Symposium 1 - Spoken Word Recognition

Convenors: **James McQueen and Anne Cutler**, Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands; **Alain Content**, Free University Brussels, Belgium

Perceptual assimilation and lexical access.

Uli H. Frauenfelder, Pierre Halle, and Juan Segui, University of Geneva, Switzerland and CNRS, University of Paris V, France

Is the syllable an intermediate representation in French speech processing? Evidence from form priming in nonwords.

Nicolas Dumay, University of York, United Kingdom

French speakers' syllabification of trisyllabic pseudowords.

Alain Content, Free University Brussels, Belgium

Lexical activation in spoken-word recognition: Insight from the pause-detection paradigm.

Sven Mattys, University of Bristol, United Kingdom

Lexical re-tuning of phonetic categories during speech perception.

Dennis Norris, Anne Cutler and James M. McQueen, (MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom and Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands)

Tuesday 9 April 2002, 9:30 - 13:00

Invited Symposium 1 - Visual Perception of Objects, Scenes, and Actions Commonalities and Distinctions

Convenors: **Peter De Graef** and **Karl Verfaillie**, University of Leuven, Belgium

Diagnostic recognition: A new informational framework for object categorization

Philippe Schyns, University of Glasgow, UK

The understanding of goal-directed actions: Functional neuroanatomy

Julie Grèzes, Wellcome Department of Cognitive Neurology, London, UK

fMRI investigations of high-level vision in humans: people, places, and things

Nancy Kanwisher, Department of Brain and Cognitive Sciences at MIT, USA

Tuesday 9 April 2002, 14:00 - 16:00

Symposium 2 - Prospective memory

Convenor: **Géry d'Ydewalle**, University of Leuven, Belgium

A prospective study of prospective memory: Challenges due to procedural changes for an fMRI study

Wim De Bruycker, Géry d'Ydewalle and Els Brunfaut, University of Leuven, Belgium

Activation of performed and to-be-performed activities in healthy and impaired older adults

J E Freeman and J A Ellis, University of Reading, UK

Event-based prospective memory in 3- to 9-year old children: The effects of age, explanation and type of action

L Kvavilashvili, D J Messer and F E Kyle, University of Hertfordshire, UK, South Bank University, UK and Royal Holloway, University of London, UK

Complex prospective memory development in children

M Martin, M Kliegel and J A Ellis, University of Heidelberg, Germany and University of Reading, UK

Tuesday 9 April 2002 14:00 - 16:00

Symposium 3 - Evaluative Conditioning

Convenors: **Andy Field**, University of Sussex, UK and **Jan de Houwer**, University of Ghent, Belgium

Visual Evaluative Conditioning and Contingency Awareness: Past Controversies and Current Wisdom

Andy Field, COGS, University of Sussex, UK

Evaluative learning that results from an aversive conditioning procedure: an overview

Dirk Hermans, Geert Francken and Debora Vansteenwegen, University of Leuven, Belgium

Associative transfer of non-evaluative stimulus properties

Jan De Houwer, Tom Meersmans, Frank Baeyens and Paul Eelen, University of Ghent, Belgium and University of Leuven, Belgium

The allocation of attention to stimuli imbued with valence through evaluative learning

Eamon Fulcher, Department of Psychology, University College Worcester, UK

Tuesday 9 April 2002 14:00 - 16:00

Symposium 4 - Eye Movements and Visual Cognition

Convenor: **John Findlay**, University of Durham, UK

Executive contributions to eye movement control

Timothy L Hodgson, Imperial College of Science, Technology and Medicine, Charing Cross Hospital Campus, London, UK

Exogenous and endogenous saccades: Effect of dual-task interference from an action representation based view

Els Stuyven, Department of Experimental Psychology, Ghent University, Belgium

Does scene context and fixation position affect the processing of objects in scenes?

Lynn Gareze and John M Findlay, Department of Psychology, University of Durham, UK

The visual analog in transsaccadic object perception

Peter De Graef and Karl Verfaillie, Laboratory of Experimental Psychology, University of Leuven, Belgium

Eye Movements in Reading: Word Frequency, Word Predictability, and Low-level Factors all Affect Fixation Time

Keith Rayner, Department of Psychology, University of Massachusetts, USA

Tuesday 9 April 2002, 16:30 - 18:30,

Paper Sessions 1, 2, 3

Session 1: Contiguity and Structure in Learning

Beyond spatio-temporal contiguity: Natural and learned audio-visual pairings use different neural integration sites

Gilles Pourtois and Beatrice de Gelder, Tilburg University, The Netherlands and Université de Louvain, Belgium

Hierarchical coding of serially ordered spatial information: Evidence from analyses of time to generate the next step in the sequence

Carlo De Lillo, University of Leicester, UK

High-order information reprocessing during post-training paradoxical sleep

Philippe Peigneux, Steven Laureys, Axel Cleeremans and Pierre Maquet, Cyclotron Research Center, Université de Liège, Belgium, Cognitive Science Research Unit, Université Libre de Bruxelles, Belgium

Session 2: Word and Text Comprehension

Comprehension complexity and corpus frequencies in noun phrase conjunction

Timothy Desmet and Edward Gibson, Department of Experimental Psychology, Ghent University, Belgium and Brain and Cognitive Sciences, Massachusetts Institute of Technology, USA

Cognitive aging effects on integration processes during text comprehension

Laurence Demanet, Marie-Anne Schelstraete, Michel Hupet and Guy Denhière, Unit Cognition and Development, U.C.L., Belgium and C.N.R.S. Université d'Aix-Marseille, France

Deficits in regular past tense processing: Delayed activation of semantic representations

Catherine E. Longworth, William D. Marslen-Wilson and Lorraine K Tyler, Centre for Speech and Language, Department of Experimental Psychology, University of Cambridge, UK and MRC Cognition and Brain Sciences Unit, Cambridge, UK

Effects of ambiguity: Further evidence from semantic categorization

Jennifer Rodd, Centre for Speech and Language, Department of Experimental Psychology, University of Cambridge

Session 3: Visual Attention and Awareness

Irrelevant attention shifts produce a Simon effect

Wim Notebaert and Eric Soetens, Vrije Universiteit Brussel, Belgium

Illusory perceptions of space and time preserve cross-saccadic perceptual continuity

Kielan Yarrow, Patrick Haggard, Ron Heal, Peter Brown and John C Rothwell,

Sobell Department of Motor Neuroscience and Movement Disorders, Institute of Neurology, University College London, UK

Visible persistence, informational persistence, and visual short-term memory in change detection tasks

Filip Germeys and Caroline Van Eccelpoel, Laboratory of Experimental Psychology, University of Leuven, Belgium

Probing the prerequisites of experimental 'blindness'

Michael Niedeggen, Guido Hesselmann, Arash Sahraie and Maarten Milders,

Experimental Psychology II, Duesseldorf, Germany and Department of Psychology, Aberdeen, UK

Business Meeting, EPS

19.00 Reception

Wednesday 10 April 2002, 9:00 - 11:00

Symposium 5 - Age of Acquisition and Written Language Processing: the Influence of Language and Orthography

Convenor: **Ilhan Raman**, Middlesex University, UK

Effects of age of acquisition in semantic categorisation tasks

Marc Brysbaert, Mandy Ghyselinck and Gert Storms, Royal Holloway, University of London, UK, Universiteit Gent, Belgium and Katholieke Universiteit Leuven, Belgium

Effects of age of acquisition and word frequency on object naming, word naming and lexical decision in Spanish and English

Andrew W Ellis, Cristina Izura and Fernando Cuetos, University of York, UK and University of Oviedo, Spain

On the AoA effects and Orthographic Transparency: Evidence from Turkish

Ilhan Raman, Middlesex University, UK

Age of acquisition effects on spelling in surface dysgraphia

Brendan Weekes, Robert Davies, Ben Parris and Gail Robinson, University of Sussex, UK and National Hospital for Neurology and Neurosurgery, UK

Wednesday 10 April 2002, 9:00 - 12:30

Invited Symposium - Interaction of Implicit and Explicit Learning

Convened by **Eric Soetens**, Vrije Universiteit Brussel, Belgium

How to survive without the implicit/explicit distinction

David Shanks, University College, London, UK

Verbal report of incidentally experienced environmental regularity: The route from implicit

learning to verbal expression of what has been learned

Peter Frensch, Humboldt University, Berlin, Germany

The interaction of implicit and explicit sequence learning

Daniel B. Willingham, University of Virginia, USA

Wednesday 10 April 2002 14:30 - 16:30, Sessions 4, 5, 6

Session 4: Reading Faces

The "who said what" paradigm revisited: Insights from multidimensional scaling

Christophe Labiouse, University of Liege, Belgium and Belgian NFSR Research Fellow

Putting names to faces: No theory seems to work.

Mike Burton, Rob Jenkins and Allan McNeill, University of Glasgow, UK

Reading the mind from eye gaze

Andrew J Calder, Andrew D Lawrence, Jill Keane, Sophie Scott, Adrian M. Owen,

Ingrid Christoffels and Andrew W Young, MRC Cognition and Brain Sciences Unit,

University of Cambridge, UK, University College London, UK, University of Amsterdam,

The Netherlands and University of York, UK

The mentalistic significance of the mouth: A comparison of deaf and hearing children's use of mouth and eye information in schematic face reading.

L Jackson, R Campbell and H Ellis, University of Reading, UK, Human

Communications Science, University College London, UK and Cardiff University, UK

Session 5: Thinking and Reasoning

Does everyone "take-the-best"? Empirical tests of a 'fast and frugal' decision heuristic.

Ben R Newell, David R Shanks and Nicola J Weston, University College London, UK

Insensitivity to prior causal knowledge in inference

F J López, A Caño, P L Cobos, J Almaraz and D R Shanks, University of Málaga, Spain and University College London, UK)

Utilising threat: Anticipated regret in deontic reasoning

Nick Perham and Mike Oaksford, Cardiff University, UK

Dissociating memory processes underlying misinformation effects in young children.

Robyn Holliday, University of Kent at Canterbury, UK

Session 6: Tracing Processing through Fixations and Saccades

Fixation positions on words in English sentences.

Sarah J White and Simon P Liversedge, University of Durham, UK

Searching for information: Eye movements while attempting to verify statements about pictorial scenes

Geoffrey Underwood, Lorraine Bell and Kate Roberts, University of Nottingham, UK

Bottom-up and top-down control in visual search

Wieske van Zoest and Mieke Donk, Vrije Universiteit Amsterdam, The Netherlands

Saccadic responses indicate parallel set activation during task-switching

Charlotte Golding, Tim Hodgson and Chris Kennard, Imperial College, London, UK

Wednesday 10 April 2002 17:00 - 18:30, Sessions 7, 8, 9

Session 7: Modeling Semantic Structure

Verbal fluency from common and ad hoc categories: evidence from dementia

Arlene J Astell and Romola S Bucks, University of St. Andrews, UK and University of Southampton, UK

Conceptual structure in the normal system: Domain differences in the time course of activation of correlated and non-correlated semantic information.

Billi Randall, Helen Moss and Lorraine K Tyler, Centre for Speech and Language, Department of Experimental Psychology, University of Cambridge, UK

On the use of scaling and clustering in the study of semantic disruptions in patients with Alzheimer's disease

Gert Storms, Trinette Dirikx, Jos Saerens, Sonja Verstraeten and Peter P De Deyn, Department of Psychology, University of Leuven, Belgium, Memory Clinic, General Hospital Middelheim, Antwerp, Belgium and Laboratory of Neurochemistry and Behavior, Born Bunge Foundation, University of Antwerp, Belgium

Session 8: Phonology in Speech and Reading

In pursuit of the Syllabary: this Snark is a Boojum!

Stephen Monsell, Arie van der Lugt and Patricia Jessiman, University of Exeter, UK

The role of the rime. A cross-linguistic comparison of rime effects in reading English and Dutch

Dominiek Sandra, James Booth, Heike Martensen, Astrid Geudens and Charles Perfetti, University of Antwerp, Centre for Psycholinguistics, Belgium, Northwestern University, USA and University of Pittsburgh, USA

Lexical Bias in Spoonerisms: a 'related beply' to Baars, Motley, and MacKay (1975)

Robert J Hartsuiker, Martin Corley and Heike Martensen, University of Edinburgh, UK and University of Antwerp, Belgium

Session 9: Object Discrimination

Context-dependent asymmetries in stimulus comparisons by monkeys

Hans Op de Beeck, Johan Wagemans and Rufin Vogels, Laboratory of Neuro- en Psychofysiologie, University of Leuven, Belgium and Laboratory of Experimental Psychology, University of Leuven, Belgium

Advantage of low visual acuity of the retina in 2-month-olds infants: a statistical categorization model

Martial Mermillod, Robert M French, Paul C Quinn and Denis Mareschal, University of Liège, Belgium, Washington & Jefferson College, USA and Birkbeck College, UK

Interactions between view changes and shape changes in picture-picture matching

Rebecca Lawson, Heinrich H Bülthoff and Sarah Dumbell, University of Liverpool, UK and Max Planck Institut, Tübingen, Germany

Wednesday April 10, 2002, 18:30 - 19:30

9th EPS Prize Lecture

The Role of the Prefrontal Cortex in Actions and Habits

Simon Killcross, Cardiff University, United Kingdom

20.00 - Conference Dinner

Thursday 11 April 2002, 9:00 - 11:00

Symposium 6 - Memory and Attention in Timing

Convenor: **John Wearden**, Manchester University, UK

Operating the timing system: from automatic to controlled processes

John Wearden, Manchester University, UK

From behavioural data to underlying temporal processes: methodological considerations

André Ferrara, University of Liège, Belgium

Temporal interval production and short-term memory

David T Field and John A Groeger, University of Surrey, UK

'Shooting stars': a review and development of the multiplicative transform K^* in explanations of temporal reference memory in SET

Luke Jones, University of Manchester, UK

The effect of knowledge of results on time estimation: Is there mediation by the reference memory?

André Vandierendonck and Vicky Franssen, Ghent University, Belgium

Thursday 11 April 2002, 9:00 - 10:00, Sessions 10, 11

Session 10: Codes in Memory

Semantic coding in the recall of picture and word lists shown at RSVP and STM rates

Veronika Coltheart, Stephen Mondy and Robyn Langdon, Macquarie University, Sydney, Australia

Interactions between long- and short-term phonological memory: Evidence from an implicit phonological learning paradigm

Steve Majerus, Martial Van der Linden, Thierry Meulemans and Ludivine Mulder, Research Fellow-FNRS, Neuropsychology Unit, University of Liège, Belgium, Cognitive Psychopathology Unit, University of Geneva, Switzerland and Neuropsychology Unit University of Liège, Belgium

Session 11: Shape, Space, and Language

The cultural relativity of shape categories: Goodness had nothing to do with it.

Debi Roberson, Jules Davidoff and Laura Shapiro, University of Essex, UK and Goldsmiths College, University of London, UK

Spatial discourse: Processing, memorizing, and using navigational instructions

Michel Denis, Groupe Cognition Humaine, LIMSI-CNRS, Université de Paris-Sud, Orsay, France

Thursday 11 April 2002, 10:00 - 12:30

Invited Symposium - The Relationship Between the Lexical and Semantic Systems in Word Processing

Convened by **Marc Brysbaert**, Royal Holloway, University of London, UK

Meaningful models of word recognition

Lorraine K. Tyler, University of Cambridge, UK

The relationship between the lexical and semantic systems in word and object processing

Max Coltheart, Macquarie University, Australia

Thursday 11 April 2002, 13:30 - 15:30

Symposium 7 - Category-specificity in Mind and Brain

Convenor: **Glyn W Humphreys**, University of Birmingham, UK

Domain Differences in Semantic Dementia: Implications for Theories of Category-Specific Deficits

Timothy T Rogers, Matthew A Lambon-Ralph, David C Plaut, John R Hodges and Karalyn Patterson, (MRC- Cognition and Brain Sciences Unit, Cambridge, UK)

A case of impaired conceptual knowledge for fruit and vegetables

Dana Samson and Agnesa Pillon, (Université Catholique de Louvain, Belgium)

Semantic category dissociation in Alzheimer's disease : a longitudinal study.

V Cornil and A Pillon, (Université Catholique de Louvain, Belgium)

The diversity of category-specific deficits for living things.

Glyn W Humphreys, (Behavioural Brain Sciences, School of Psychology, University of Birmingham, UK)

Category-specific representations for numbers and animals, commonly activated in two different semantic tasks

Marc Thioux, Xavier Seron and Mauro Pesenti, (Université Catholique de Louvain, Belgium)

Thursday 11 April 2002 13:30 - 15:30

Symposium 8 - The Perception of Biological Motion

Convenors: **Karl Verfaillie and Jan Vanrie**, Laboratory of Experimental Psychology, University of Leuven, Belgium

Recognising the Style of Human Movement

Frank E Pollick, University of Glasgow, UK

Is biological motion perception modular?

Winand H Dittrich, University of Hertfordshire, UK

Interfering with biological motion

Ian M Thornton, Max Planck Institute for Biological Cybernetics, Tübingen, Germany

The role of limb movements in the perception of orientation of meaningless point-light actions

Jan Vanrie and Karl Verfaillie, Laboratory of Experimental Psychology, K.U. Leuven, Belgium

Thursday 11 April 2002, 15:30 - 16:30, Sessions 12, 13

Session 12: Social Attitudes & Beliefs

A recurrent connectionist model of attitude formation

Frank Van Overwalle, Vrije Universiteit Brussel, Belgium

Openness to Experience and Boundaries in the mind

Alain Van Hiel and Ivan Mervielde, Ghent University, Belgium

Session 13: Development of Concepts & Percepts

Cognitive factors and concept learning: A developmental approach.

Sabine Gelaes and Jean-Pierre Thibaut, Université de Liège, Belgium

Perception of partial collision events in infancy

Peter Dejonckheere, Ad Smitsman and Leni Verhofstadt-Denève, Ghent University, Belgium and University of Nijmegen, The Netherlands

Thursday 11 April 2002, 13:30 - 16:30, Session 14

Session 14: Strategy, Working Memory Capacity, and Inhibitory Control

What makes an insight problem? An investigation into the role of strategy-goal congruency.

Edward P Chronicle, James N MacGregor and Thomas C Ormerod, Lancaster University, UK and School of Public Administration, University of Victoria, Canada

Strategy use in relation to mathematical ability: Developmental delay or deficit?

Joke Torbeyns, Lieven Verschaffel and Pol Ghesquière, K.U. Leuven Research Assistant FWO - Vlaanderen, Belgium and K.U. Leuven, Belgium

The role of working memory in the carry operation of mental arithmetic

Stijn De Rammelaere and Ineke Imbo, Department of Experimental Psychology, Ghent University, Belgium

Working memory capacity in causal reasoning: blocking background knowledge

Wim De Neys, Walter Schaeken, and Géry d'Ydewalle, KU Leuven, Belgium

How to know what to inhibit: Action-effects are used in response-suppression

Bernie Caessens, Karen Mortier and André Vandierendonck, Department of Experimental Psychology, Ghent University, Belgium and Cognitive Psychology Section, Vrije Universiteit Amsterdam, The Netherlands

Aging effects in inhibitory control over no-longer relevant information during a garden-path sentence task

Valentine Charlot and Pierre Feyereisen, Unit Cognition and Development, UCL, Belgium

ABSTRACTS AND POSTERS

Tuesday 9 April 2002, 9:30 - 11:30,

Symposium 1 - Spoken Word Recognition

Convenors

James McQueen and Anne Cutler, Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

Alain Content, Free University Brussels, Belgium

Perceptual assimilation and lexical access.

Uli H. Frauenfelder¹, Pierre Hallé², and Juan Segui²

1. University of Geneva, Switzerland

2. CNRS, University of Paris V, France

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Our previous work has shown that /dl/ and /tl/, illegal word-initially, are perceptually assimilated to /gl/ and /kl/, respectively. We investigated the effect of this phenomenon on word recognition. Nonwords derived from /gl, kl/ base words by a velar-to-dental change (e.g., *dlaïeul* derived from "*glaïeul*") were generally perceived as words. These nonwords, used as primes in a cross-modal form-priming task, produced almost as much priming as did the base words. Legal nonwords such as *droseille*, derived from words by this same change produced much less priming. Such differential effects on word recognition suggest that the goodness of fit determining lexical activation depends not solely upon the phonetic features shared by the input and lexical forms, but also upon possible perceptual assimilation. The findings are a challenge for models proposing direct lexical access from phonetic features and support the existence of intermediary stages of perceptual integration into sublexical units.

Is the syllable an intermediate representation in French speech processing?

Evidence from form priming in nonwords.

Nicolas Dumay

University of York, United Kingdom

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The nature of the representations mediating access to the auditory input lexicon in French was investigated using intramodal phonological priming. More specifically, we examined to what extent final overlap facilitation relies on syllable overlap, by varying orthogonally the amount of shared acoustic-phonetic information and the syllabic correspondence between nonwords. Targets of CVC.CVC structure (*goltibe*) were preceded by primes with a syllabic overlap of three phonemes (.CVC; *purtibe*) or a supra-syllabic overlap of four phonemes (C.CVC; *pultibe*). Conversely, CV.CCVC targets (*pincluide*) were preceded by primes with a syllabic overlap of four phonemes (.CCVC; *vicluide*) or an infra-syllabic overlap of three phonemes (._CVC; *vifluide*). Two target-shadowing experiments were performed, with Experiment 2 including foils (e.g. *modrugue-padrouve*). Foils had no influence on RT results. Overall, the pattern of shadowing latencies indicated that final overlap facilitation is primarily determined by the amount of acoustic-phonetic overlap, with smaller (but reliable) priming effects for the three-phoneme overlap conditions (including the infrasyllabic one) than for the four-phoneme conditions. Priming was also found on error rates which were equally less numerous in the related conditions than in controls, with again no influence of the syllabic structure. Implications of these data for theories of pre-lexical processing in spoken word recognition will be discussed.

French speakers' syllabification of trisyllabic pseudowords.

Alain Content

Free University Brussels, Belgium

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Previous investigations of French speakers' intuitions about syllabification have shown striking asymmetries between syllable onsets and offsets in disyllabic words. Decisions about onsets were found to be highly consistent. In contrast, syllable endings decisions showed a large variability and were influenced by consonant sonority and spelling (Content, Kearns & Frauenfelder, 2001). This asymmetry led us to propose the SOSH hypothesis, according to which syllable onsets constitute privileged segmentation and alignment points for lexical mapping. In this talk, I will present a new set of syllabification data using trisyllabic pseudowords, which confirms the previous findings and allows us to eliminate alternative/artefactual explanations of the onset/offset asymmetry.

Content, A., Kearns, R.K. & Frauenfelder, U.H. (2001). Boundaries versus onsets in syllabic segmentation. *Journal of Memory and Language*, 45, 177-199.

Lexical activation in spoken-word recognition: Insight from the pause-detection paradigm.

Sven Mattys

University of Bristol, United Kingdom

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This study explores the sensitivity of a new paradigm--Pause Detection (PD)--to lexical activity during speech processing. In PD experiments, listeners speed-detect 150-ms pauses [p] artificially inserted in speech sequences. Pauses inserted in multisyllabic spoken sequences were detected more slowly after words (e.g., camper[p]ton.dee.lo) than after nonwords (e.g., goomper[p]ton.dee.lo), but the effect gradually decreased with longer stimuli. Lexical inhibition was also found to depend on the uniqueness point of the stimuli: Late-unique stimuli caused pause detection to be delayed. Finally, pauses were detected more slowly after high-activity than low-activity nonwords (based on the size of their initial cohort). It is argued that PD latencies can be used as an on-line gauge of lexical activity during speech processing. PD also offers a number of features that complement those of existing paradigms: (a) it reflects the total amount of activity in the lexicon as opposed to that of hand-picked tokens, i.e., it is a better analogy for global activity in computational modeling, (b) because the task is acoustic in nature, linguistic effects might provide an insight into the automaticity and modularity of speech processing, and (c) PD protocols can easily be transferred from speech to non-speech and from one language to another.

Lexical re-tuning of phonetic categories during speech perception.

Dennis Norris¹, Anne Cutler² and James M. McQueen²

1. MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom

2. Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

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A series of experiments show that listeners use lexical knowledge in learning how to interpret ambiguous speech sounds. Dutch listeners were asked to make lexical decisions to a list of spoken Dutch words and nonwords. In some words, the final

fricative had been replaced by an ambiguous sound, midway between [f] and [s]. One group of listeners heard ambiguous [f]-final words like [kara?] (based on *karaf*, carafe) and unambiguous [s]-final words (e.g., *karkas*, carcass). Another group heard the reverse (ambiguous [karka?], unambiguous *karaf*). Since neither [karas] nor [karkaf] are Dutch words, lexical information indicated how the final fricatives ought to have been interpreted. After the lexical decision phase, listeners categorised a range of ambiguous [f]-[s] sounds. Those who had heard [?] in [f]-final words were more likely to categorise the ambiguous fricatives as [f] than the listeners who had heard [?] in [s]-final words. Control conditions showed that this effect requires exposure to [?] in lexical contexts in the lexical decision phase. These findings demonstrate that lexical information can be used to train categorisation of the speech signal. This use of lexical information is qualitatively different from the feedback built into interactive models of speech perception.

Tuesday 9 April 2002, 9:30 - 13:00

Invited Symposium

Visual Perception of Objects, Scenes, and Actions: Commonalities and Distinctions

Convened by **Peter De Graef** and **Karl Verfaillie**

University of Leuven, Belgium

Diagnostic recognition: A new informational framework for object categorization

Philippe Schyns

University of Glasgow, UK

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Nowadays, discoveries about the formation of face, object or scene categories, the attention to information in different recognition tasks, and the mechanisms of recognition do not really inform research on the processes of low-level vision. Conversely, models of face, object and scene recognition and categorization are not always firmly grounded on the established principles of early vision. Higher-level cognition and perception are simply drifting apart.

Using examples from face, object and scene recognition, I will present new methods and results that bridge the gap between object categorization, the selective attention to diagnostic information, and the perception of the stimulus. I will propose a new framework based on the selective use of diagnostic information to ground categorization firmly into perception.

The understanding of goal-directed actions: functional neuroanatomy

Julie Grèzes

Wellcome Department of Neurology, London, UK

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Our ability to generate and to recognise the actions performed by others is the bedrock of our social life. Neuroimaging techniques (PET and fMRI) have been used to specifically explore, in human, the nature of the links between perception and action, subserving the understanding of goal-directed actions. By 'understanding goal-directed

action', we imply the mechanisms by which the subject understands and generates the action that is appropriate for an object (through its visual perception), but also the mechanisms by which the subject reads goal-directed actions performed by others (through their visual perception).

Our results demonstrated that observation is a selective process that recruits specific neural networks depending both on the nature of the stimuli perceived and on the subject's purpose during the observation phase. They however also suggest that the perception of manipulable objects and of other's actions share some common neural mechanisms (subserved by the parietal and premotor cortex) with action generation, therefore providing neurophysiological evidence to a link between perception and action.

fMRI investigations of high-level vision in humans: people, places, and things

Nancy Kanwisher

Department of Brain and Cognitive Sciences at MIT, USA

E-mail: jgrezes@fil.ion.ucl.ac.uk

Work in my lab over the last 5 years has used fMRI to identify and characterize three regions of human extrastriate cortex that respond selectively to specific stimulus classes: the fusiform face area (FFA) for faces, the parahippocampal place area (PPA) for places, and the extra striate body area (EBA) for bodies. Another region of cortex called the lateral occipital cortex (LOC) apparently represents object shape in a category-independent fashion. I will review these findings, and then describe ongoing work in our lab that pursues a number of questions that arise from this work, such as: 1) What is the nature of the representations that are extracted in each of these areas?, 2) Does each category-selective region of cortex primarily provide information about the category it responds selectively to, or does it also provide information about "nonpreferred" stimuli?, 3) How does activity in each of these areas relate to behavioral performance? and 4) Does extrastriate cortex contain other category-specific cortical regions?

Tuesday 9 April 2002, 14:00 - 16:00

Symposium 2 - Prospective Memory

Convenor **Géry d'Ydewalle**, University of Leuven, Belgium

A prospective study of prospective memory: Challenges due to procedural changes for an fMRI study

Wim De Bruycker, Géry d'Ydewalle, & Els Brunfaut

University of Leuven, Belgium

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Prospective memory (PM) is memory for activities to be performed in the future. In order to carry out a fMRI study on PM, the standard PM task is to be modified in two important ways: The PM task is to be divided into separate blocks of 1 min duration, alternated with blocks with background task only; and the time interval between consecutive PM cues/critical moments is to be shortened to 30 s. Two experiments explored the importance of these procedural changes. In Experiment 1, performance in time-based and event-based PM blocks of different durations (1 vs. 4 min) was compared. Typicality

and perceptual distinctiveness of the cues in event-based PM blocks were also manipulated. Experiment 2 manipulated the time interval between consecutive cues in an event-based and a time-based PM task (30, 60, or 120 s). Discussion will focus on whether the procedural changes reduce PM tasks to simple vigilance and time-monitoring tasks.

Activation of performed and to-be-performed activities in healthy and impaired older adults

J. E. Freeman & J. A. Ellis

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Activities intended for enactment are more accessible in young adults than activities that are not to be enacted (Goschke & Kuhl, 1993). We investigated this intended enactment effect in healthy older adults and in individuals with low MMSE scores indicative of possible dementia. In a laboratory-based task, using recognition latencies as a measure of item activation, young and healthy older adults showed an equivalent advantage for to-be-performed activities over verbally encoded items not intended for enactment. These two groups also showed a benefit of overtly performing actions during encoding, highlighting possible links between subject-performed task (SPT) and intended enactment effects. Both of these effects were absent in the low MMSE group. Examining naturally-occurring intentions, both healthy and low scoring MMSE older adults showed impaired activation for everyday intentions as compared with young adults (cf. Maylor et al., 2000). The role of motoric information in the intended enactment effect and implications for understanding age-related declines in prospective remembering will be discussed.

Event-based prospective memory in 3- to 9-year old children: The effects of age, explanation and type of action

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In most of the studies on event-based prospective memory (PM) participants have to remember to insert an additional action into their on-going activity whenever they see a target event (e.g., press a key when seeing a word 'chair' while rating words for pleasantness). However, in everyday life, prospective remembering may often involve the substitution of one action for another or the inhibition of a habitual response (Ellis, 1996). In the present study, 3-, 5-, 7-, and 9-year old children (N=480) were naming the pictures as part of the game and had to either say something additional when they named a picture of a dog (insertion condition), say something else instead of a dog (substitution condition) or not say anything (inhibition condition). Half of the children received a plausible explanation as to why they had to carry out this task and the other half did not. The results revealed a clear age effect in PM performance with older children performing better than younger children but this effect explained only 2%

of variability when 3-year-olds were excluded from the analyses. There was also a main effect of explanation so that performance was significantly better in explanation than in no explanation condition especially in 5-, 7-, and 9-year olds. Finally, the PM performance was worst in the inhibition condition and the highest in the substitution condition. The methodological, theoretical and practical implications of these findings will be discussed.

Complex prospective memory development in children

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Despite its importance for the cognitive development and the everyday life of children, little is known about the developmental course of prospective memory in preschool and elementary school age. In this study with 115 children between 6 and 11 years, we used a computer-based procedure to measure age-related differences in prospective memory performance. In addition, we examined the predictive power of retrospective memory and planning performance on prospective memory performance. The results suggest an age-related increase of prospective memory performance from preschool age to the end of the elementary school years. In addition, prospective memory performance was related to retrospective memory and planning performance. The findings are discussed with respect to future studies of memory processes relevant in the everyday life of children.

Tuesday 9 April 2002, 14:00 - 16:00,

Symposium 3 Evaluative Conditioning

Convenors

Andy Field

University of Sussex, UK

Jan de Houwer

University of Ghent, Belgium

Visual Evaluative Conditioning and Contingency Awareness: Past Controversies and Current Wisdom

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The controversial claim that evaluative conditioning (EC) can occur without contingency awareness has set EC apart as a distinct form of associative learning (Baeyens et al., 1990). However, the claim remains controversial (see Shanks & Lovibond, 2002; Fulcher & Hammerl, 2001; Field, 2001; Field 2000). This talk reviews this controversy before discussing some recent developments that may help us understand the wealth of conflicting evidence for learning without contingency awareness.

Three experiments are described that systematically investigate the role of contingency awareness in evaluative conditioning (EC) in a picture-picture paradigm in which

conditioned stimuli (CSs) and unconditioned stimuli (UCSs) were counterbalanced across subjects to overcome previously discovered experimental artifacts (e.g. Field & Davey, 1999). Conditioned responses for individuals who had contingency awareness enhanced were compared against a control group and groups for whom awareness was impeded using verbal instruction, a distracter task, or backward masked UCS presentations. EC effects were obtained in aware individuals compared to control participants, but for unaware participants effects depended on the use of a distracter task. The results of the three experiments along with a structural equation model of conditioning effects across all of the data indicates that (1) associative EC effects can be obtained without contingency awareness; and (2) distraction has an independent effect on conditioning. These results shed some light onto the possible boundary conditions that could explain past inconsistencies in obtaining conditioning effects in the visual paradigm.

Evaluative learning that results from an aversive conditioning procedure: an overview

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The tradition of evaluative learning has mainly developed as a rather separate research domain within the field of learning psychology. Most evaluative conditioning studies have employed paradigms that were specifically developed to study the process of acquired evaluative change (e.g. picture-picture paradigm, taste-conditioning paradigm). One of the typical characteristics of these paradigms is that they are essentially all higher-order conditioning paradigms. The unconditioned stimuli (US) that are used in these studies (e.g. a bad taste, a picture of a gun, a pleasant odour) are not 'unconditionally' positive or negative, but have acquired their valence through previous learning experiences.

More recently, however, a series of studies aimed at investigating evaluative learning in the context of an aversive conditioning preparation, in which an electrocutaneous stimulus was employed as US (e.g. Francken et al., 2001; Hermans et al., in press a, b, c; Vansteenwegen et al., 1998; see also work by Lipp, Hamm, Öhman). This line of research has not only demonstrated that evaluative learning can be observed in a prototypical expectancy/preparatory conditioning preparation, but is interesting in at least three respects. First, these studies corroborate previous conclusions concerning the functional characteristics of evaluative learning. Second, because several of these studies have employed alternative measures of stimulus valence (e.g. startle response; affective priming), they provide interesting insights in these measures. Third, because of the particular nature of the aversive conditioning procedure, these studies also provide insight in the possible role of acquired stimulus valence in the treatment of anxiety disorders and possible associated return of fear.

Associative transfer of non-evaluative stimulus properties

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Evaluative conditioning refers to the transfer of stimulus valence from a US to a CS with which the US was repeatedly paired. We examined whether other, non-evaluative stimulus properties of the US can also transfer to the CS. In a series of studies, we failed to find conditioning of judgements of the brightness of pictures, the semantic category of words, the product category associated with drinks, the carbonation level of drinks, and the age of persons.

The allocation of attention to stimuli imbued with valence through evaluative learning

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Previous research has shown that individuals scoring highly on measures of anxiety or negative emotionality, selectively attend to threat-related material. One consequence of this attentional bias may be to increase the perception of potential threats in the environment. In an attempt to understand the origins and nature of attentional bias, we tested the possibility that this bias can be extended to newly acquired unpleasant material, via evaluative learning. We first paired novel pictures with words that cued either pleasant or unpleasant personal experiences, and then tested liking for these pictures, before proceeding to test the effects of this learning on attentional interference. Our results show that participants with high neuroticism scores were more distracted by the pictures paired with unpleasant cues than were those with low neuroticism scores. We therefore conclude that attentional bias effects that differ across high versus low neuroticism groups can be produced by new evaluative learning. Our results suggest that there might be a cyclic interaction between attentional bias and evaluation, such that a stimulus with an acquired negative evaluation tends to capture attentional resources more readily in high negative emotion-prone individuals; and that such attentional capture enforces the acquisition of negative evaluation. An interesting finding is the lack of a consistent association between evaluative learning and accuracy of episodic memory, and this supports the assumption that these latter outcomes reflect the operation of two independent systems. This provides a plausible explanation for the apparent paradox that vulnerable individuals can be distracted by emotional cues without being able to report on the origins of these effects.

Tuesday 9 April 2002, 14:00 - 16:00,

Symposium 4 - Eye Movements and Visual Cognition

Convenor

John Findlay

University of Durham, UK

Executive contributions to eye movement control

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This paper addresses the question of how humans perform in situations where task rules change dynamically from moment to moment. Using several tasks which involve the control eye movements based on changing task rules, we show that neurologically normal individuals experience an influence of earlier rules on the spatial and temporal properties of saccades. In most situations normals are able overcome this tendency in order to control behaviour based on the new rule. However, in situations where there are no external cues to indicate the correct task, patients with frontal lobe damage continue to make responses based on old rules. In contrast, when the correct rule is directly instructed, patient performance is found to be similar to controls. Rather than a deficit in top-down control, this pattern is more consistent with a deficit in the self-regulatory functions required to over-ride reinforced behaviour. We propose that frontal cerebral cortex monitors conflict between actual and optimum neural states and adaptively biases competitive neural interactions to meet high-level goals. In this way, our brains are able to implement the flexible control of behaviour required to meet the challenge of our ever-changing environment.

Exogenous and endogenous saccades: Effect of dual-task interference from an actionrepresentation based view

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In order to solve the binding problem in action planning, the action-concept model of Hommel assumes that the execution of an intentional task needs the construction of an action-concept (action plan), an integrated representation (binding) of stimulus, response and effect codes. When an action plan requires a code already integrated in another action-concept, performance is impaired because this code is temporarily less available. In our research, we used this idea in a study on saccadic eye movements. Using an ABBA design, participants were asked to plan a manual binary choice task, but postpone its execution until after the generation of a saccadic eye movement, on which compatibility effects were studied. In line with our hypothesis, overlap costs were observed only with endogenous, but not with exogenous saccades. However, it appeared that endogenous saccades triggered by a inherently spatial stimulus (an arrow), also lacked binding effects. These results were replicated with hand and foot responses combined, showing that the role of the spatial characteristics of stimuli in these overlap costs is more general. Further experiments, however, suggest that not the inherently spatial nature of the stimulus plays a role, but that the "endogenous" character of a compatible response on an arrow stimulus should be doubted.

Does scene context and fixation position affect the processing of objects in scenes?

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We examine whether scene context affects the visual recognition of objects

present within them. Past research reporting inconsistent object "pop out" has been criticised for not being replicable and having serious material and design flaws. However, Hollingworth and Henderson (2000) found new evidence for an inconsistent object advantage in a change blindness task. We report four experiments which further examine the issue, employing a forced choice recognition test following a brief presentation with fixation position controlled.

In Experiment 1, line drawings of both consistent and inconsistent objects in scenes were used. Performance for consistent objects decreased faster than that for inconsistent objects as distance from fixation increased and the difference was marginally significant. This suggests that inconsistent objects were more reliably detected in extrafoveal vision. To investigate the applicability of these findings to natural scenes, the same procedure was carried out using photographs of real-life scenes (Experiment 2). The results indicated no difference between the recognition of consistent and inconsistent objects.

To determine whether this discrepancy could be explained by the nature of the material, line drawings were created matching the photographs used in Experiment 2. Experiment 3 used the same procedure as the earlier ones and experiment 4 presented the original line drawings (from Experiment 1) shown upside down, to inhibit the processing of the scene as a semantic whole. In neither experiment was any advantage for inconsistent objects obtained. We conclude that demonstrations of 'inconsistent object advantage' are very fragile.

Hollingworth, A. and Henderson, J. M. (2000) Semantic informativeness mediates the detection of changes in natural scenes. *Visual Cognition*, **7**, 213-235.

The visual analog in transsaccadic object perception

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Numerous studies have investigated whether object information acquired on a given fixation is stored across saccades and integrated with object information from subsequent fixations. In other words, what are the contents of transsaccadic object memory? Studies using saccade-contingent and/or transient-masking techniques to camouflage object changes have recently suggested that transsaccadic object memory may be subserved by a visual analog. Specifically, the sparse and abstract object representation which is found to survive saccades may be the result of selective attentional processing of object features in a maskable, non-selective and spontaneously decaying scene snapshot taken during the presaccadic fixation. To examine this hypothesis, we had viewers saccade to an object in a scene, and intrasaccadically changed the display to a blank field with a location cue. Subsequently, the blank + cue display was replaced by a scene in which the object at the cued location had changed its in-depth orientation. Viewers were asked to identify the direction of the orientation change. We manipulated the spatial correspondence between the cue and the target of the preceding saccade, the onset delay of the cue, and the duration of the blanking period. In this manner, we attempted to determine to what extent a single fixation

automatically yields a high-capacity and detailed visual analog from which an attention-based transfer produces the selective and abstract transsaccadic object representation observed in studies of transsaccadic integration and change detection.

Eye Movements in Reading: Word Frequency, Word Predictability, and Low-level Factors all Affect Fixation Time

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In this talk, I will first describe the results of an experiment in which word frequency and word predictability varied for a target word. Basically, the results yielded effects of each variable and no interaction of the two variables. Then, I will discuss evidence for an 'inhibition of return' effect in reading: when readers make saccades back to a word that they just fixated, their fixations are longer than when the saccade is to a word that they did not just fixate. Together, the results indicate that both low-level factors and lexical factors influence fixation time.

Currently Leverhulme Visiting Professor, Department of Psychology, University of Durham, UK

Tuesday April 9, 2002, 16:30 - 18:30, Sessions 1, 2, 3

Session 1: Contiguity and Structure in Learning

Beyond spatio-temporal contiguity: Natural and learned audio-visual pairings use different neural integration sites

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Studies of inter-sensory integration of auditory and visual information tended to assume that temporal and spatial contiguity is the single most important factor determining intersensory integration. In the present study we asked whether the specific type of audio-visual pairing also plays a role. If so, spatio-temporal contiguity is not sufficient for integration and neuronal sites of audio-visual integration will reflect content-sensitivity. We studied whether Transcranial Magnetic Stimulation (TMS) disrupted audio-visual integration as reflected in the redundant target advantage. Single pulse TMS applied over the left posterior parietal cortex at 50, 100, 150 and 200 ms disrupted integration at 150 ms and later of audio-visual shape/tone pairs (Learned condition) but not of voice/face pairs (Natural condition). Our result indicates that besides spatial and temporal contiguity, content specificity is an important determinant of audio-visual integration.

Hierarchical coding of serially ordered spatial information: evidence from analyses of time to generate the next step in the sequence

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The results of two experiments are reported. In the first experiment participants were presented with a configuration of nine identical icons, spatially grouped in three clusters of three icons each, on a touch sensitive computer monitor. The icons flashed according to sequences segregated by spatial clusters and, after a short delay, the participants were required to reproduce the sequences by touching the screen. An analysis of the latencies for touches corresponding to different ordinal positions in the sequence revealed longer latencies at cluster boundaries. These results corroborate previous findings and are compatible with the hypothesis that a two-level hierarchical representation underpins the reproduction of the sequences.

The second experiment was carried out to rule out the possibility that results of experiment one could have been accounted for by the relative length of the pointing movements. As in experiment one, the participants observed first a sequence of flashing icons on the screen. Then, segments of the sequence were presented. The participants were required to produce a single pointing movement to the icon corresponding to the next ordinal step in the sequence, with their hand starting from a resting position located at a fixed distance from the screen. Longer latencies emerged again for pointing responses directed to icons at ordinal positions corresponding to cluster boundaries. Taken together, the results of these two experiments provide strong evidence for the emergence of a form of spatial chunking in tasks requiring the encoding of serially ordered information within spatially structured patterns.

High-order information reprocessing during post-training paradoxical sleep

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The brain areas needed for the practice of a serial reaction time (SRT) task are more active during subsequent REM sleep in subjects trained to the task than in non trained subjects [Maquet et al. (2000) *Nature Neuroscience*, 3(8), 831-836]. These experience-dependent cerebral reactivations during post-training REM sleep could reflect the reprocessing of recent memory traces. Here, 6 new subjects were trained to the same SRT task then scanned during the post-training night using PET. The only difference with the trained group in the Maquet et al. study was that the sequence of stimuli was at random. Therefore, both trained groups underwent similar visuo-motor basic learning, but only one trained group learned complex, high-order, rules underlying the sequence of stimuli during SRT practice. Hence, this group only could potentially reprocess high-order information during post-training sleep. We found that post-training REM sleep activity in the thalamus, occipital and premotor cortex increased more in subjects trained to a structured sequence (with rules) than in subjects trained to the random sequence. It suggests that experience-dependent cerebral reactivations during post-training REM sleep underlie the reprocessing of high-order information about the structure of the sequential material to be learned.

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Perceptual or motor learning with artificial and fixed sequence structures

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We investigate whether sequence learning in a serial reaction time (SRT) task is primarily perceptual or motor by varying the stimulus dimension on which the sequence structure is imposed. In a previous study, with fixed sequences, a two-choice task with symbolic S-R mapping was used. Learning only occurred in the condition where both dimensions were structured. There was no evidence for pure perceptual (location) or motor (colour) learning. In a subsequent study we replicated the experiment with an artificial grammar, using a four-choice task. To find out whether motor learning would occur, the structure was imposed on the relevant colour dimension, while location varied randomly. Unlike the first study, participants were able to learn the motor sequence. In the present study we investigated if the same results hold with a fixed sequence structure. Subjects again had to respond to colour, while ignoring the irrelevant location of the stimulus. The following three conditions were manipulated between-subjects: a repeating 32-element sequence was imposed either on the relevant colour dimension, on the irrelevant location dimension or on both stimulus dimensions. Results will be discussed in the course of the presentation.

Session 2: Word and Text Comprehension

Comprehension complexity and corpus frequencies in noun phrase conjunction

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A number of researchers have proposed that sentence comprehension is frequency driven, such that the ease of understanding a syntactic construction depends on its frequency of use (e.g., Mitchell, Cuetos, Corley, & Brysbaert, 1995). In apparent contradiction to such accounts, Gibson and Schütze (1999) showed that on-line disambiguation preferences do not always mirror corpus frequencies. When presented with the syntactic ambiguity involving the conjunction of a noun phrase to three possible attachment sites, participants were faster to read attachments to the first site than attachments to the second one, although the latter were shown to be more frequent in text corpora. In the present study, we investigated whether a particular feature in the items of Gibson and Schütze - disambiguation using the pronoun "one" - could account for the discrepancy they found. On the basis of an investigation of the Brown and Wall Street Journal text corpora and a self-paced word-by-word reading study, we conclude that there is no discrepancy between on-line preferences and corpus frequencies, and consequently there is no need to assume different processes underlying sentence comprehension and sentence production based on this syntactic ambiguity, as Gibson and Schütze had hypothesized.

Cognitive aging effects on integration processes during text comprehension

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In his model of text comprehension, Kintsch (1998) postulated integration processes allowing the incorporation of new information to already known information at different levels. On the first level, some parts of the already-built text representation are selected by the leading edge strategy (L.E.S.) and maintained in a limited capacity working memory buffer (Kintsch & van Dijk, 1975). This L.E.S. allows the readers to store in the buffer the most important and the most recent propositions of the current processing cycle. On the second level, the content of the buffer is supposed to be regularly updated and integrated in the long-term working memory (Ericsson & Kintsch, 1995) to progressively build a coherent text base. Finally, on a third level, some knowledge-based information stored in the long term memory- e.g. inferences- are recovered during the reading to ensure the comprehension. Many studies showed an age-related decline in text comprehension (Van der Linden & Hupet, 1994) that could be interpreted by integration problems (Hess, 1995). The purpose of the present research was to measure how aging could affect the three different levels of integration. Three groups of participants (young, old and very old) were compared in three different tasks: A Reading-Recognition-Comprehension Task to test the L.E.S. and the comprehension, a Verbal Reconstruction Task to assess integrative function of long term working memory and finally a Reading Task of sentence pairs varying in causal relatedness to study inferential processes. Results indicated that very old participants have difficulties to draw inferences and a reduced capacity to integrate information in long-term working memory.

Deficits in regular past tense processing: Delayed activation of semantic representations

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Double dissociations between the regular and irregular English past tense (Marslen-Wilson and Tyler, 1998, Tyler, de Mornay-Davies, Anokhina, Longworth, Randall and Marslen-Wilson, 2002) imply separable systems processing morphophonologically complex and fully listed words. An alternative account (Joanisse and Seidenberg, 1999) argues that these double dissociations reflect impairments of phonology or semantics, with regular past tense deficits reflecting impaired phonological and spared semantic processing. We tested whether activation of semantic representations from regular past tense forms is normal in patients with regular past tense deficits. Healthy volunteers show equal semantic facilitation from verb primes irrespective of verb regularity and tense (Longworth, et al., 2001). If non-fluent aphasics have a normal time course of semantic activation from the regular past tense they should show similar priming. 4 non-fluent patients were tested using an auditory semantic priming/lexical decision task. Prime-target pairs (e.g. "jumped LEAP") were selected by manipulating semantic relatedness, verb tense and regularity. Verb stems showed semantic priming

irrespective of regularity. There was no semantic priming for the regular past tense but normal priming for the irregular past tense. This suggests that patients with regular past tense deficits have an abnormal time course of semantic activation from the regular past tense.

Effects of ambiguity: Further evidence from semantic categorization

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Semantic ambiguity can be used as a tool to investigate how the meanings of words are represented. Rodd, Gaskell and Marslen-Wilson (in press) report slower lexical decisions for words with multiple unrelated meanings (e.g. bark) compared with unambiguous words (e.g. cage). In contrast, they report a benefit for words with multiple related word senses (e.g. twist). I present a connectionist model that simulates these apparently opposite effects, in which retrieving word meanings is characterised as activating distributed semantic representations. The ambiguity disadvantage arises because of interference between different meanings, while the sense benefit arises because of differences in the structure of the attractor basins. Words with few senses develop deep, narrow attractor basins, while words with many senses develop shallow, broad basins. The model suggests that the sense benefit arises in lexical decision because only general semantic information is retrieved. It predicts that the sense benefit should be reversed when detailed semantic information must be retrieved. This prediction is confirmed in two semantic categorisation experiments. These findings are consistent with the view that the meanings of words correspond to stable states within a high-dimensional semantic space, and that variation in the meanings of words shapes the landscape of this space.

Session 3: Visual Attention and Awareness

Irrelevant attention shifts produce a Simon effect

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In a Simon task subjects have to react to a non-spatial feature (e.g., colour) of the stimulus with a left or right response. Stimuli are presented to the left or right of the fixation cross. Reaction times (RTs) are faster when the irrelevant location of the stimulus corresponds with the response location. In the present study we conducted two experiments with auditory stimuli to further support the claim that the Simon effect is caused by an attention shift towards the stimulus location. In Experiment 1, subjects have to react to the pitch of a tone that is presented in the left or right ear, with a left or right response. Two response-stimulus intervals (RSI) are used in order to manipulate the attention shifts during the task. With a short RSI, there is no Simon effect for location repetitions because no attention shift towards the stimulus location is needed. In Experiment 2, subjects had to react to the colour of a centrally presented visual signal. At stimulus onset, an irrelevant tone is presented in the left or right ear. The data

demonstrate a Simon effect according to the irrelevant auditory signal. This demonstrates that even an irrelevant attention shift produces a Simon effect.

Illusory perceptions of space and time preserve cross-saccadic perceptual continuity

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When glancing at a clock with a silently ticking second hand, observers sometimes perceive the first second to take longer than subsequent seconds do; time appears to be stretched following a saccade (Brown and Rothwell, 1997). A matching methodology was employed to further explore this temporal illusion (chronostasis). Subjects saccaded to a digital counter, with the resulting electro/intra-red oculogram used to trigger counter onset. The duration of the first count was varied, with subsequent counts taking one second. Subjects made a forced choice response (first count less than/greater than subsequent counts), with either a modified binary search procedure or logistic regression analysis employed to provide a single matched estimate. A control condition yielded a matched estimate in the absence of a saccade.

Experiment 1 established chronostasis' dependency upon saccade size (22° , 55°). Results suggest that a backward matching mechanism is being employed, with stimulus onset being predated to saccade onset (minus a constant). Follow up experiments indicated that chronostasis is genuinely saccade dependent. It does not disappear when preceded by active orienting of attention in the direction of the upcoming saccade, suggesting that attention is not the crucial factor (experiment 2). No chronostasis was observed when the counter moved to the point of fixation with no saccade (experiment 3). Chronostasis is critically dependent upon the brain's assumption that the saccade target (the counter) remains constant across the saccade. When one aspect of this constancy (position) is noticeably violated, chronostasis disappears (experiment 4).

Brown, P., and Rothwell, J.C. (1997). Illusions of time. Society for Neuroscience abstracts: 27th annual meeting. 23 (2): 441.4: 1119. Yarrow, K., Haggard, P., Heal, R., Brown, P. & Rothwell, J.C. (2001). Illusory perceptions of space and time preserve cross-saccadic perceptual continuity. Nature, 414, 302-305.

Visible persistence, informational persistence, and visual short-term memory in change detection tasks

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Over the past ten years, research on 'change blindness', or the inability to detect changes to an object or scene, has grown steadily. Most of this work has focussed on the nature of our representations of the visual world. The striking inability to detect changes across blanks in the 'flicker' paradigm (an original and modified image are presented in alternation with a blank screen between them) and 'detection' paradigm (observers only receive one view of each image, separated by a blank) have mainly

been interpreted as evidence for the idea that observers never form a complete, detailed representation of a scene. Furthermore, focussed attention is required to perceive change. In the absence of focussed attention, the contents of visual memory are simply overwritten by subsequent stimuli, and so cannot be used to make comparisons (Rensink, O'Regan, & Clark, 1997). Attention seems to insulate against the overwriting process, by transferring the item from a volatile to a more durable memory store (i.e. visual short-term memory, VSTM). The present study investigated the role of iconic memory (both visible persistence and informational persistence), attention, and VSTM in change detection. Five experiments using a change detection paradigm with arrays of letters, objects, or meaningless stimuli are presented.

Rensink, A., O'Regan, J. K., and Clark, J. J. (1997). To see or not to see: The need for attention to perceive changes in scenes. *Psychological Science*, 8, 368-373.

Probing the prerequisites of experimental 'blindness'

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Using the technique of rapid serial visual presentation (RSVP), the conscious perception of coherently moving dots can be prevented. A brief transient 'motion blindness' is induced if subjects are asked to detect the presence of a local colour cue before switching attention to a global random-dot kinematogram. Essential for this effect is the presence of episodes of coherent motion (distractors) prior to the local colour cue. Using event-related brain potentials (ERPs) we examined which information processing stage is specifically affected by distractors. ERPs were separately analysed for three temporal distractor positions in the RSVP stream (early, medium, or late), and compared with two control conditions where the same motion stimuli were either relevant or irrelevant. A specific response was reflected in a frontal negativity at about 250 ms which increased with increasing number of motion distractors, and a centro-parietal positivity at about 350 ms which decrease with increased number of distractors. Early sensory processing, obtained in a posterior negativity at about 170 ms, remained unaffected. Our results suggest augmented activation in a frontal control system, triggered by distractors. This mechanism apparently prevents visual awareness, not by reducing the sensitivity in the visual cortex, but by gating to higher-order stimulus evaluation.

Wednesday 10 April 2002, 9:00 - 11:00,

Symposium 5 - Age of Acquisition and Written Language Processing: the Influence of Language and Orthography

Convenor

Ilhan Raman

Middlesex University, UK

Effects of age of acquisition in semantic categorisation tasks

Marc Brysbaert¹, Mandy Ghyselinck², and Gert Storms³

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 2. Universiteit Gent, Belgium
 3. Katholieke Universiteit Leuven, Belgium
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The effect of AoA in visual word recognition is now firmly established. Most researchers interpret it as originating from the lexicon. However, Brysbaert, van Wijnendaele, and De Deyne (2000) ventured that AoA could also be an important variable in the way the semantic system is organised. It is not inconceivable that the meaning of later acquired concepts is highly dependent on previously acquired concepts. Another possibility is that the conceptual core of a semantic category is formed by the first acquired instances of the category. We collected further evidence for the semantic hypothesis by carefully looking at the effect of AoA in categorisation tasks. Results show that AoA is a significant predictor of category verification times, with early-acquired words classified faster than later-acquired words.

Brysbaert, M., Van Wijnendaele, I., & De Deyne, S. (2000). Age-of-acquisition is a significant variable in semantic tasks. *Acta Psychologica*, 104, 215-226.

Effects of age of acquisition and word frequency on object naming, word naming and lexical decision in Spanish and English

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Ellis and Lambon-Ralph (2000) argued that effects of age of acquisition (AoA) should be stronger in tasks which involve arbitrary mappings between representations than in tasks which involve consistent mappings. This prediction is tested in experiments which involve picture naming and word naming for the same items in Spanish and English. AoA effects are stronger in object naming than word naming in both languages, but the expectation that AoA effects would be larger in English than Spanish word naming was not upheld. Possible reasons for this are discussed. Effects of word frequency on the two tasks and languages are also considered.

Ellis, A. W. & Lambon-Ralph, M. A. (2000). Age of acquisition effects in adult lexical processing reflect loss of plasticity in maturing systems: Insights from connectionist networks. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 26, 1103-1123.

On the AoA effects and Orthographic Transparency: Evidence from Turkish

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There has been a recent surge of interest in examining the effect of AoA on lexical processing tasks, such as word naming. Evidence from English (e.g. Morrison & Ellis, 1997) suggests that, all other things equal, words acquired earlier tend to be named faster and more accurately than words acquired later on in life. More recently similar

findings have emerged from orthographies other than English, namely, Dutch (Brysbaert, Van Wijnendaele, & DeDeyne, 2000), Spanish (Weekes, Saenz de Miera & Ioga, 2001) and Italian (Colombo, Brivio & Job, 2001). It is of importance to establish whether AoA could operate as a function of orthographic transparency by examining its effect on word naming in Turkish which has a more transparent orthography than those reported earlier. In a naming task adult skilled Turkish readers were required to name a total of 50 words that were matched on frequency, imageability, letter length, initial phoneme and number of syllables but were varied on AoA. The results indicate an effect for AoA despite the totally consistent, context independent nature of the Turkish writing system. This finding is discussed in view of current models of oral reading.

Brysbaert, M., Van Wijnendaele, I., & De Deyne, S. (2000). Age-of-acquisition is a significant variable in semantic tasks. *Acta Psychologica*, 104, 215-226.

Colombo, L., Brivio, C. & Job, R. (2001). On the interaction of age of acquisition and repetition. Paper presented to the ESCOP, Edinburgh meeting, 5-8 September.

Morrison, C.M. & Ellis, A.W. (2000). Real AoA effects in word naming and lexical decision. *British Journal of Psychology*, 91, 167-180.

Weekes, B., Saenz de Miera, A. & Ioga, J.M. (2001). Age of Acquisition effects on reading and picture naming in Spanish and English. Paper presented to the EPS, Manchester meeting, July 11-13.

Age of acquisition effects on spelling in surface dysgraphia

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One defining feature of surface dysgraphia is better spelling of words with predictable sound-to-spelling correspondences compared to words with unpredictable correspondences and a tendency to produce phonologically plausible errors (e.g. couch->COWTCH). These errors are often more marked for low frequency words than high frequency words although this interaction is not always found (Graham, Patterson & Hodges, 2000). One concern is whether frequency effects are the result of age of acquisition (AoA) effects given the high correlation between these two variables. We do not know whether AoA has an effect on spelling even though one dominant hypothesis predicts that AoA effects result from the activation of phonological representations. One way to explore this question is to test for AoA effects on spelling in surface dysgraphia since it is universally assumed that surface dysgraphic patients spell words via phonological representations (lexical or sublexical). We report MK a patient who suffered Herpes Simplex Viral Encephalitis (HSVE) resulting in surface dysgraphia that we characterise as a tendency to produce a legitimate alternative spelling of a monosyllable defined as a LASC error. MK can access lexical and sublexical phonological representations and we argue that he spells words using these representations citing data to show that he cannot access orthographic lexemes directly on written picture naming tasks. We report experiments designed 1) to test the effect of AoA on MK's spelling by controlling for word frequency as well as other

highly correlated variables using logistic regression and 2) to test the effects of AoA and predictability on spelling using a fully factorial design. The results show an effect of AoA but no effect of frequency and an interaction between AoA and predictability i.e. an effect of AoA on unpredictable word spelling but no effect on predictable word spelling performance. We discuss these data with reference to recent accounts of AoA locating the effect at the level of mappings between input and output representations (Ellis & Lambon-Ralph, 2000). We argue that the effect of AoA on spelling is not the result of lexeme activation per se but reflects instead the largely unpredictable mappings between sound and spelling that exist in the majority of English words. We offer an account of predictability effects on spelling focused on competition between rime level units and argue that these effects reflect the normal cognitive processes used in spelling dictation.

Ellis, A.W. & Lambon-Ralph, M.A. (2000). Age of acquisition effects in adult lexical processing reflects loss of plasticity in maturing systems: Insights from connectionist networks. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 26, 1103-1123.

Graham, N.L., Patterson, K., Hodges, J.R. (2000). The impact of semantic memory impairment on spelling: evidence from semantic dementia. *Neuropsychologia*, 38(2) 143-163.

Wednesday 10 April 2002, 9:00 - 12:30

Invited Symposium

Interaction of Implicit and Explicit Learning

Convenor

Eric Soetens

Vrije Universiteit Brussel, Belgium

How to survive without the implicit/explicit distinction

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Implicit learning has been defined in terms of a lack of awareness of the process and products of learning. Here I review evidence from a speeded target detection task, the serial reaction time (SRT) task, in which targets follow a structured sequence. Results obtained with this task have been taken to provide support for the existence of implicit learning and for its dissociation from explicit memory. This evidence suggests, for instance, (1) that response priming can be dissociated from explicit memory with the latter being indexed by the ability to recognize or generate the structured sequence, and (2) that amnesic individuals show normal priming combined with impaired recognition. I present results from several new experiments which suggest, in contrast, that a single learning/memory system is adequate to account for performance in both normal and amnesic individuals. This conjecture is supported by a formal model which is successful in describing the fine-detail of performance.

Another proposal is that the critical feature of implicit learning is that it proceeds without

making any demands on attentional resources. I review evidence from the SRT task for this proposal and present additional new results pertaining to it. These results show that secondary tasks impair sequence learning.

My overall conclusion is that as we approach the 50th anniversary of the study which initiated experimental research into the relationship between learning and awareness (Greenspoon, 1955), we are no closer to proving the existence of implicit learning.

Verbal report of incidentally experienced environmental regularity: the route from implicit learning to verbal expression of what has been learned

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In our research we focus on the mechanisms leading to participants' ability to verbally express an environmental regularity that was experienced in the context of an incidental (implicit) learning situation. At present, our working hypothesis is that the ability to verbally describe an incidentally experienced environmental regularity arises as a consequence of an intentional search for the regularity. We believe further that the intentional search for regularity can be triggered by various means, one of which being the perceived consequence of implicit learning (Unexpected-event Hypothesis).

The talk will be divided into two main parts. In the first part, I will discuss various theoretical ideas on how verbal report of an experienced environmental regularity comes about. In the second part, I describe some of our own empirical research that directly addresses the empirical question at hand and is consistent with the claim that verbal report of environmental regularity is the consequence of an intentional search for regularity.

The interaction of implicit and explicit sequence learning

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Over the last twenty years there has been a great deal of research directed at delineating separate systems of learning and memory. There has been less effort directed towards determining how these systems might interact. I have suggested that implicit and explicit memory operate in parallel, at least in motor skill learning. Explicit memory may guide ongoing motor behavior while implicit learning occurs in the background, based on the actual movements that are executed. I will present data from behavioral and from brain imaging paradigms in support of this idea. I will also present data relevant to the differences in representation of implicit and explicit representations for motor skill. Finally, I will discuss new data from implicit and explicit learning of probabilistic categories, which others have argued are mutually inhibitory.

Wednesday 10 April 2002, 14:30 - 16:30, Sessions 4, 5, 6

Session 4: Reading Faces

The "Who Said What" Paradigm Revisited: Insights from Multidimensional Scaling

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The original "Who Said What" paradigm was proposed by Taylor and colleagues (1978) and had provided an elegant tool to track issues related to social categorization. We propose some refinements to the original paradigm. A traditional element of the paradigm is that within-category differences are minimized and between-category differences are exaggerated. We show that this claim cannot be tested within the original framework. Therefore, instead of using real faces, we use morphed faces progressively modified by constant amounts between two face endpoints, and for which a priori baseline inter-similarities can be computed. In this way, we are able to test accentuation effects with the aid of multidimensional scaling. We use continua involving inter-ethnic faces. Evidence for social categorization and accentuation effects were found despite the absence of clear-cut categories, suggesting that people, even implicitly, exaggerate inter-categorical differences and reduce intra-categorical differences in order to cope with complex situations.

Putting names to faces: No theory seems to work.

Mike Burton, Rob Jenkins and Allan McNeill

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It is well-established that retrieval of a person's name is generally harder (slower and more error prone) than retrieval of personal facts. Some recent theories have proposed that the difference between names and personal facts lies in the links between token makers and lemmas (e.g. Hollis & Valentine, 2001; Brédart et al, 1995). In essence, personal facts are stored in some semantic/conceptual system which in turn links to lemmas, whereas names have no semantic representation, and link to lemmas directly from token markers. This gives rise to the prediction that names should be easier to articulate than facts, when subjects are presented with a face. In two experiments we show that this prediction is not upheld. In common with other tasks comparing name and fact retrieval, subjects are slower to articulate names than facts, even when they are heavily over-trained on a small number of items (Experiment 1) or when the same words are used as facts or names (Experiment 2).

Brédart S, Valentine T, Calder A, Gassi L (1995). An interactive activation model of face naming. *Quarterly Journal of Experimental Psychology*, 48A, 466-486. Hollis J & Valentine T (2001). Proper-name processing: Are proper names pure referencing expressions? *Journal of Experimental Psychology: Learning Memory and Cognition*, 27, 99-116.

Reading the mind from eye gaze

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Baron-Cohen (1997) has suggested that the interpretation of gaze plays an important role in a normal functioning theory of mind system. Consistent with this suggestion, functional imaging research has shown that both theory of mind (ToM) tasks and eyegaze processing engage a similar region of posterior superior temporal sulcus (STS). However, a second brain region associated with ToM, the medial prefrontal cortex, has not been identified by previous eyegaze studies. We discuss the methodological issues that may account for the absence of medial prefrontal activation in these experiments and present a PET study that controls for these factors. Our experiment included three conditions in which the proportions of faces gazing at, and away from, the participant, were as follows: 100% direct (0% averted), 50% direct–50% averted, and 100% horizontally averted (0% direct). Two control conditions were also included in which the faces' gaze were averted down, or their eyes were closed. Contrasts comparing the gaze conditions with each of the control conditions revealed medial frontal involvement. Parametric analyses showed a significant linear relationship between increasing proportions of horizontally averted gaze and increased rCBF in the medial prefrontal cortex. The opposite parametric analysis (increasing proportions of direct gaze) was associated with increased rCBF in a number of areas including the superior and medial temporal gyri. Our results are consistent with the proposal that the presentation of highly social stimulus, such as gaze, is in itself sufficient to engage the mechanisms involved in attributing mental states to others.

Baron-Cohen, S. (1997). *Mindblindness: An essay on autism and theory of mind*. Cambridge, Massachusetts: MIT press.

The mentalistic significance of the mouth: A comparison of deaf and hearing children's use of mouth and eye information in schematic face reading.

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In reading facial displays of emotion, deaf children may also attend more closely to mouth patterns than do hearing children (Jackson, 2000). We therefore hypothesised that a group of deaf children, predominantly from hearing families, may show idiosyncratic abilities in reading intention from schematic faces (The Charlie task - Baron-Cohen et al., 1995). After establishing that all these children were skilled at accurately indicating line of sight ('where is Charlie looking?'), some variants on the task were introduced. In Experiment 1, Charlie's line of sight was ambiguous, but the schematic mouth pattern indicated like ('smiley') or dislike ('sad') in relation to pictured objects of positive and negative valence. Both deaf and hearing children utilised mouth patterns to disambiguate eye gaze. Experiment 2 showed that deaf, but not hearing children, incorporated the schematic mouth pattern when inferring desire. This group of deaf children use the eyes to attribute mental states in a similar way to hearing children, despite indications that some deaf children have difficulty on ToM tasks dependent on

reading 'the language of the eyes' (Jackson, 2000). They additionally take account of mouth patterns in reading faces to a greater extent than hearing children. Under these conditions, hearing, not deaf children, are blind to the 'mentalistic significance of the mouth'.

Baron-Cohen, S., Campbell, R., Karmiloff-Smith, A., Grant, J. & Walker, J. (1995). Are children with autism blind to the mentalistic significance of the eyes? *British Journal of Developmental Psychology*, 13, 379-398. Jackson, A. L. (2000). Do deaf children understand the language of the eyes? Paper presented at EPS conference, April 2000. Nottingham, UK.

Session 5: Thinking and Reasoning

Does everyone "take-the-best"? Empirical tests of a 'fast and frugal' decision heuristic.

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The "Take-the-Best" (TTB) heuristic (e.g., G. Gigerenzer & D. G. Goldstein, 1996) states that when making a choice between two alternatives, people will base their choices solely on what they perceive as the most valid – or 'best' – piece of information that discriminates between the alternatives. We report data from a series of experiments in which aspects of the experimental environment were manipulated to examine the parameters under which such a strategy operates. Clear evidence of TTB use was detected in all the experiments. However, the experiments also demonstrated that even under conditions contrived to promote the use of TTB – high cost of information, prior instruction as to the validity of cues, and a deterministic environment – there was a high proportion of behavior that was inconsistent with TTB. Together with the presence of large individual variability in strategy use in the experiments, these results question the validity of TTB as a psychologically plausible and pervasive model of behavior.

Gigerenzer, G., & Goldstein, D. G. (1996). Reasoning the fast and frugal way: Models of bounded rationality. *Psychological Review*, 103, 650-669.

Insensitivity to prior causal knowledge in inference

F. J. López¹, A. Caño¹, P. L. Cobos¹, J. Almaraz¹ and D. R. Shanks²

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In predictive causal inference people reason from causes to effects while in diagnostic inference they reason from effects to causes. Independently of the causal structure of the events, the temporal structure of the information provided to a reasoner may vary, e.g., multiple events followed by a single event versus a single event followed by multiple events. We report 2 experiments in which causal structure and temporal information were varied independently. The experiments use an overshadowing design that allows an unambiguous evaluation of sensitivity to prior causal knowledge. The results reveal that inferences were influenced by the temporal but not by the causal

structure of the task. These findings are relevant to the evaluation of two current accounts of causal induction, the Rescorla-Wagner (Rescorla & Wagner, 1972) and Causal Model theories (e.g., Waldmann & Holyoak, 1992).

Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. In A. H. Black & W. F. Prokasy (Eds.), *Classical conditioning II: Current theory and research*, (pp. 64-99). New York: Appleton-Century-Crofts. Waldmann, M. R., & Holyoak, K. J. (1992). Predictive and diagnostic learning within causal models: Asymmetries in cue competition. *Journal of Experimental Psychology: General*, 121, 222-236.

Utilising threat: Anticipated regret in deontic reasoning

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Three competing hypotheses were identified concerning the effects of varying threat material in deontic reasoning tasks, i.e., reasoning about what one should or should not do: attentional bias (Evans, 1996), decision theory (Manktelow & Over, 1991; Oaksford & Chater, 1994) and anticipated regret theory (Zeelenberg, van Dijk, Manstead, & van der Pligt, 2000). Experiment 1 discounted an attentional bias account because the effect of the threat material was observed for responses involving no explicit threat.

Experiment 2 discounted standard decision theory, because it predicts similar effects when the threat material relates to a response that should be made as when it relates to a response that should not be made. However, equal and opposite effects were observed, which was only predicted by anticipated regret theory. The results showed that anticipated emotions affect deontic reasoning suggesting a productive theoretical synthesis of research in emotional decision making and deontic reasoning.

Evans, J. St.B. T. (1996). Deciding before you think: Relevance and reasoning in the selection task. *British Journal of Psychology*, 87, 223-240. Manktelow, K. I., & Over, D. E. (1991). Social roles and utilities in reasoning with deontic conditionals. *Cognition*, 39, 85-105. Oaksford, M., & Chater, N. (1994). A rational analysis of the selection task as optimal data selection. *Psychological Review*, 101, 608-631. Zeelenberg, M., van Dijk, W. W., Manstead, A. S. R., & van der Pligt, J. (2000). On bad decisions and disconfirmed expectancies: The psychology of regret and disappointment. *Cognition and Emotion*, 14(4), 521-541.

Dissociating memory processes underlying misinformation effects in young children.

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This study investigated the contribution of automatic and intentional memory processes to 4- and 5-year-old and 8- and 9-year-old children's acceptance of misleading suggestions. Children were presented with an event and this was followed the next day by a post-event summary containing misleading suggestions that were either read to participants or were self-generated in response to semantic and perceptual cues.

Individual children were then given either a Structured Interview or a modified Cognitive Interview. A short time later, children were asked a series of yes / no questions on their memories for the video story under two instruction conditions (cf. Holliday & Hayes, 2000). In the inclusion condition children reported whether they remembered details from either the video or the post-event summary phases. In the exclusion condition children were instructed to exclude post-event suggestions. Evidence of a misinformation effect was found in both age groups. Moreover, children were more likely to accept misled-generated items compared to misled-read items in the inclusion condition, but the opposite was the case under exclusion instructions. Process dissociation analyses (cf. Holliday & Hayes, 2000, 2001; Jacoby, 1991) revealed that both automatic and intentional processes influenced misinformation acceptance, but that suggestibility was predominantly due to automatic processes. These findings support a dual-process theory of misinformation acceptance in children (cf. Brainerd & Reyna, 1998). Competing models of the misinformation effect in children are evaluated in the light of these findings.

Holliday, R. E., & Hayes, B. K. (2000). Dissociating automatic and intentional processes in children's eyewitness memory. *Journal of Experimental Child Psychology*, 75, 1-42.

Holliday, R. E., & Hayes, B. K. (2001). Automatic and intentional processes in children's eyewitness suggestibility. *Cognitive Development*, 16, 617-636.

Jacoby, L. L. (1991). A process dissociation framework: Separating automatic from intentional uses of memory. *Journal of Memory and Language*, 30, 513-541.

Session 6: Tracing Processing through Fixations and Saccades

Fixation positions on words in English sentences.

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Two experiments investigated the effect of orthographic regularity on first fixation landing positions and refixations on words in English sentences. In Experiment One, the first or second letters of words were misspelled. The misspellings formed frequent or infrequent word initial trigrams. The critical words were embedded within the same sentence frame for all of the conditions. First fixation landing positions were significantly nearer the word beginning for all of the misspelled conditions compared to the correctly spelled condition. Also, the second of multiple fixations was more likely to be to the left of the initial landing position for two of the misspelled conditions compared to the correctly spelled condition. In Experiment Two all of the words were spelled correctly. The critical words began with either high or low type and token frequency bigrams and trigrams. The critical words were matched for word length and embedded within the same sentence frame up to the word after the critical word. For saccades launched from near launch sites, landing positions were significantly nearer the word beginning for words with infrequent initial letter sequences. The results will be discussed in relation to current models of eye movements in reading.

Searching for information: Eye movements while attempting to verify statements about pictorial scenes

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Eye movements were recorded while 24 participants either searched for specific parts of a scene that would enable them to verify a previously read statement, or they first inspected the scene in preparation for the sentence verification task. The sentences made simple declarative statements about the events depicted in photographs of natural scenes. The order of presentation of picture and sentence was reflected in the fixation measures on both types of stimuli. When the sentence was read after the picture, average fixation durations and overall reading times were longer than when it was read before seeing the picture. The number of fixations, and overall inspection times on the picture were longest when they were seen before the sentence. These patterns reflect differences between general inspection and a specific search.

Bottom-up and top-down control in visual search

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Previous research suggests that visual selection is controlled either in a bottom-up or in a top-down manner. However, possibly both manners of control simultaneously determine visual selection. To date, no studies have been performed to estimate the relative importance of top-down and bottom-up control in visual search. In the present study observers were presented with search displays consisting of an array of line segments that were rotated at various orientations. The task of observers was to indicate the presence of a vertical line segment (the target) presented amongst a series of nontargets and one distractor. Manual reaction times and eye movements were recorded. By varying the absolute differences in orientation between the target, nontargets and distractors, relative target-distractor saliency and target-distractor similarity were independently manipulated to investigate the relative contribution of bottom-up and top-down control. The major result was that relative target-distractor saliency and target-distractor similarity affected search performance independently.

Saccadic responses indicate parallel set activation during task-switching

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When participants switch between tasks they reliably incur a time penalty (switch cost) which may reflect a discrete processing event of task-reconfiguration that is completed by the end of the first trial after a switch (e.g. Rogers & Monsell, 1995 and Goschke, 2000). However, we (Golding et al., 2001) reported evidence of switch costs persisting beyond the switch trial. Here we investigate further subtle effects task-switching has on saccade trajectories. In a computer-generated card sorting test participants matched a central card to one of 3 outer cards according to a pre-cued perceptual dimension (shape-matching or colour-matching task). Switching disrupted efficient search, causing an increase in: the initial saccade's latency; the number of saccades and the bias of the

initial saccade towards the relevant distractor. All of these switch costs persisted beyond the switch trial. Moreover, in both the switch and subsequent trial, the first saccade was frequently hypometric and followed by a secondary saccade to the target after a brief (<100ms) fixation. These hypometric saccades had abnormally high peak velocities, suggesting that they were truncated; their execution having been interrupted by the prior programming of the second saccade (McPeck et al., 2000). Such parallel processing of saccades to targets for both tasks is inconsistent with the serial stage models of task-reconfiguration.

Wednesday 10-04-02, 17:00 - 18:30, Sessions 7, 8, 9

Session 7: Modeling Semantic Structure

Verbal fluency from common and ad hoc categories: evidence from dementia

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Category fluency, generation strategy, generation stability, fluency following prompting and category judgement are examined in three studies with people with dementia of the Alzheimer-type (DAT). The same eight categories are used throughout, four common and four ad hoc. As previously reported, category fluency is reduced in DAT relative to controls. However, it is more impaired for common categories than ad hoc categories. There is also differential usage of generation strategies, with the DAT participants making more use of experiential strategies than semantic ones. In addition, strategy prompting is found to assist in the generation of additional items in DAT. Category judgement is largely intact in the DAT participants for both common and ad hoc categories, even for low frequency or uncommon items. These findings taken together suggest that item knowledge is relatively well preserved in DAT. As such, observed difficulties in retrieving item information may be attributable to impairments in the processes that act on stored information in the verbal fluency task.

Conceptual structure in the normal system: Domain differences in the time course of activation of correlated and non-correlated semantic information.

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We have recently developed an account of conceptual representation in which the structure of concepts differs systematically across domains and categories of knowledge in terms of the relative distinctiveness of semantic properties and the patterns of intercorrelation among them. Support for the Conceptual Structure Account has been derived from patterns of impaired and intact knowledge in patients with category-specific deficits and from neuroimaging studies (Tyler & Moss, 2001).

The current study explored the model's implications for the time course of activation of conceptual information in the normal system. We predicted that the activation of

distinctive properties of living things (e.g. elephant – has a trunk) would be delayed relative to that of shared properties (e.g. elephant –has legs) due to their paucity of correlations with other features. This prediction was supported in a speeded (respond-to-deadline) feature verification task. In a second experiment, where presentation was slower and there was no response deadline, no such differences between living and non-living things were observed, consistent with the view that in the normal system correlational structure affects the initial activation of information rather than its eventual state.

L.K. Tyler & H.E. Moss (2001). Towards a distributed account of conceptual knowledge. *Trends in Cognitive Sciences*, 5.6, 244-252.

On the Use of Scaling and Clustering in the Study of Semantic Disruptions in Patients with Alzheimer's Disease

Gert Storms¹, Trinette Dirikx¹, Jos Saerens^{2, 3}, Sonja Verstraeten^{2, 3} and Peter P. De Deyn^{2, 3}

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In the past decade, several studies have used scaling and clustering techniques to document semantic deficits in patients with Alzheimer's disease. In this presentation we argue that many of the conclusions drawn from these studies are unjustified by the data. We review the methodology used in these studies and present data from simulation studies to further investigate the validity of their conclusions. We also present empirical data from patients and normal control subjects to demonstrate that analyses of the patients' proximity data do not provide unambiguous evidence for a generalized semantic deficit.

Session 8: Phonology in Speech and Reading

In pursuit of the Syllabary: this Snark is a Boojum!

Stephen Monsell, Arie van der Lugt and Patricia Jessiman

University of Exeter, UK

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Some speech production theorists, notably Levelt, Roelofs and Meyer (1999), have proposed that during the translation of abstract phonological sequences into articulatory motor activity, the speaker retrieves articulatory "gestural scores" for familiar syllables from a "syllabary". That the speech-motor system learns and retrieves frequent patterns rather than recomputes them is plausible and would solve part of the coarticulation problem. But evidence for the existence of a syllabary has been in short supply. We report three attempts to demonstrate the contribution of the syllabary to speech production. We failed to find more rapid picture naming for words whose constituent syllables had just been primed by a production in another word. We failed to find any difference in the rapid production of prepared utterances consisting of matched nonword sequences composed of frequent syllables versus syllables that do not occur in English.

We found only a tiny difference in the latency for naming visually presented syllables of these two kinds, matched for orthographic difficulty. Either there is no syllabary, or the advantage it confers in production is very small.

Levelt W.M., Roelofs, A., Meyer, A.S. (1999) A theory of lexical access in speech production. *Behavioral and Brain Sciences*, 22, 1-75.

The role of the rime. A cross-linguistic comparison of rime effects in reading English and Dutch

Dominiek Sandra¹, James Booth², Heike Martensen¹, Astrid Geudens¹ and Charles Perfetti³

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Orthographies differ in the consistency of their grapheme-to-phoneme mappings. GP mappings are rather inconsistent in English (beat, bear) but quite consistent in Dutch. In English, consistency between orthography and phonology increases considerably at the rime level (fight, light). Such cross-linguistic differences might explain why rime effects were not found in Dutch (Geudens & Sandra, 1999; Martensen, Loncke & Sandra, in prep.). However, Booth & Perfetti's (2001) results suggest that even in English, rime effects do not reveal early recognition units in lexical processing (equal effects of rimes and non-rimes in brief identification) but depend on phonological assembly for reading aloud (effect in naming). We investigated this issue cross-linguistically, by comparing a language whose orthography-to-phonology mappings are quite reliable at the grapheme level (Dutch) to one in which such reliability emerges at the rime level (English). A masked priming paradigm was used to study the effect of VC primes on CVC targets, using brief identification and naming tasks (frequency-matching across languages). We obtained equal priming effects for Dutch and English in brief identification and no effects in naming. In Dutch, but not in English, a correlation between CV frequency and naming times was found. Follow-up experiments with CV primes are planned.

Lexical Bias in Spoonerisms: a 'related beply' to Baars, Motley, and MacKay (1975)

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Phonological speech errors occur more often when they form real words than nonwords. This 'lexical bias' effect has been taken as evidence for phoneme-to-word form feedback in word production, but also as evidence for pre-articulatory editing. The latter account seemed to be supported by the finding that the effect is modified by context (Baars et al., 1975). We further explored such context effects in order to test the editing account. We used a speeded naming task of nonword pairs ("pood gath") to elicit spoonerisms (responding "good path"). Critical items were all nonwords and either resulted in words when spoonerized (pood gath) or not (pooth gad). The critical items were either embedded in mixed lists of words and nonwords or in a pure nonword context. In the

mixed condition, nonword pairs with lexical outcome (pood gath) were spoonerized more often than nonword pairs with nonlexical outcome (pooth gad). This lexical bias effect disappeared in the pure nonword condition. Inconsistent with an editing account, we observed that lexical context increased the number of word outcomes, rather than decreased the number of nonword outcomes. We tentatively propose the alternative explanation that context influences the probability to misread nonword targets as real words.

Session 9: Object Discrimination

Context-dependent asymmetries in stimulus comparisons by monkeys

Hans Op de Beeck^{1,2}, Johan Wagemans², and Rufin Vogels¹

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Similarity is a core concept in theories of object recognition, categorization, and reasoning. It is often conceptualized as a geometric distance in a multidimensional stimulus space. However, research in humans has revealed that similarity judgments involve more than a simple distance calculation (e.g., Tversky, 1977, Psychological Review). Contrary to the central assumptions in geometric models, similarity judgments are asymmetric when stimuli differ in their prototypicality or salience. For example, most people judge Mexico to be more similar to USA than USA to Mexico. Here we provide the first evidence for marked asymmetries in nonhuman species. We trained two rhesus monkeys in a temporal same/different task with a parametric control of stimulus prototypicality. The monkeys made most errors ('same' responses) when the first stimulus in a trial was less prototypical than the second one. This effect of prototypicality became remarkably fine-tuned as the monkeys acquired more experience with the stimulus set: In the beginning of the experiment the asymmetries were sensitive to prototypicality in the context of the total set of stimuli, whereas the prototypicality for more local regions in stimulus space mattered in later sessions. We conclude that asymmetric similarity judgments also occur in non-verbal animals, and that they do so with a high sensitivity for stimulus statistics.

Advantage of low visual acuity of the retina in 2-month-olds infants: a statistical categorization model

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² Washington & Jefferson College, USA

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From the earliest moments of postnatal development, perceptual maturation is believed to place a functional constraint on the ability to recognize or categorize stimuli from the environment. Using a computer simulation of retino-cortical development, with a bank of Gabor wavelets providing the output of the V1 complex cells, we showed that reducing the range of spatial frequencies from the retinal map allows better categorization performances for a statistical model. The simulations provide a pattern of statistical data

showing that a statistical categorization model may be more efficient with low visual acuity retina. Moreover, we have found that this effect interacts with the type of category in such a way that super-ordinate level categories are enhanced by the simulated low visual acuity of 2-month-old infants whereas basic level categories are less or equally categorized with the low visual acuity. These data are convergent with empirical data showing that 2-month-olds infants acquired earlier and more easily super-ordinate level categories than basic level categories (Quinn & Johnson, 2000).

Interactions between view changes and shape changes in picture-picture matching

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Four studies presented pictures of different morphs of novel, complex, three-dimensional objects, similar to objects which we must identify in the real world. We investigated how viewpoint changes influence our ability to discriminate between morphs. View changes had a powerful effect on performance in picture-picture matching tasks when similarly shaped morphs had to be discriminated. Shape changes were detected faster and more accurately when morphs were depicted from the same rather than different views. In contrast, view change had no effect when dissimilarly shaped morphs had to be discriminated. This interaction between the effects of view change and shape change was found for both simultaneous stimulus presentation and for sequential presentation with interstimulus intervals of up to 3600ms. The interaction was found following repeated presentations of the stimuli prior to the matching task and following practice at the matching task as well as after no such pre-exposure to the stimuli or to the task. The results demonstrate the importance of view changes relative to other task manipulations in modulating the shape discrimination abilities of the human visual recognition system.

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Wednesday 10 April 2002, 18.30 - 19.30

9th EPS Prize Lecture

The Role of the Prefrontal Cortex in Actions and Habits

Simon Killcross

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The development of behavioural autonomy, or habits, has long been recognised as an effect that appears to result from extended experience of a particular sequence of events in the world. Research in rats has suggested that habit performance results from the enhanced influence of stimulus-response (S-R) associations over performance as a result of a decline in the importance of goal-directed response-outcome (R-O) associations. Experiments presented will examine the role of selective sub-regions of the prefrontal cortex in the development and maintenance of S-R performance in rats. This work indicates that two discrete regions of the medial prefrontal cortex - the infralimbic and prelimbic cortices - are involved in the control of behaviour by S-R and R-O associations, and suggests that there may be a mutually inhibitory relationship between the two. Implications of these findings for the development of behavioural autonomy and the nature of habit performance will be discussed.

Thursday 11-04-02, 9:00 - 11:00,

Symposium 6 Memory and Attention in Timing

Convenor

John Wearden

Manchester University, UK

Operating the timing system: from automatic to controlled processes

John Wearden

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The present paper discusses some operations of the human timing system in terms of automatic and controlled processing. Perhaps the best-known recently-discovered "automatic" effect is that of click trains on the subjective duration of events they precede. Another comes from an experiment where auditory and visual stimuli were present at the same time. Here, a completely irrelevant auditory stimulus made a visual one increase in subjective duration, but not vice versa, presumably the result of an *automatic* process. In another experiment, the auditory stimulus required processing, but was irrelevant to duration judgements of visual stimuli. This time, the auditory stimulus made the visual one seem shorter. This is consistent with the well-known effects of diversion of attention from temporal to non-temporal processing, but might be considered *semi-automatic* (i.e. the subject "voluntarily" shifted attention to the tone, but the effect on temporal judgements was uncontrolled by the subject). Examples of fully *controlled* processing come from experiments in which subjects must make judgements of tone duration, where some tones have randomly-placed 200 ms gaps in them. Different groups were required to *include* the gap as part of the total tone duration or *exclude* it. People were able to perform this task almost perfectly, thus demonstrating a high degree of precise voluntary control over their temporal processing. Understanding the ways in which the internal clock might be influenced, automatically, semi-automatically, or in a controlled way, may help us develop a more complete model of the factors which determine time judgements in humans, while maintaining a consistent internal clock model.

From behavioural data to underlying temporal processes: methodological considerations

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What is the real nature of the temporal information-processing model? To address this question, experimental methods derived from the peak procedure were used. One aim was to learn something about the temporal representations used by the subject, the formalization of the decision rules used, as well as the localization of variance within the timing system. In addition, models derived from the work of Gibbon and Church were used to compare simulated results with experimental data. Results from analyses of behavioural data obtained from rats in peak procedure variants with both single and multiple times of reinforcement were discussed. One conclusion is that the individual-trials analysis algorithm used may strongly influence the theoretical conclusions that might be drawn. A second aim was to analyse data obtained in transition situations (when the time of reinforcement is abruptly changed). I describe the dynamics of the adaptation to changes in reinforcement time which could be compatible with the temporal information processing models like scalar expectancy theory, initially designed to explain steady-state behaviours.

Temporal interval production and short-term memory

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Interference with time estimation from concurrent nontemporal processing has been shown to depend on the short-term memory requirements of the concurrent task (Fortin, Rousseau, Bourque & Kirouac, 1993; Fortin & Breton, 1995). In particular, it has been claimed that active processing of information in short-term memory produces interference, whereas retaining information does not. Here, four experiments are reported in which subjects are trained to produce a 2500 ms interval, and then perform concurrent memory tasks. Interference with timing is demonstrated for concurrent memory tasks involving only maintenance. In one experiment, increasing set size in a pitch memory task systematically lengthens temporal production. Two further experiments suggest that this is due to a specific interaction between the short-term memory requirements of the pitch task and those of temporal production. A final experiment directly investigated the short-term memory requirements of time estimation by requiring subjects to perform a concurrent memory task that itself required temporal processing. Interference with interval production was comparable to that produced by the pitch memory task. Results are discussed in terms of a pacemaker-counter model of temporal processing, in which the counter component is supported by short-term memory.

'Shooting stars': a review and development of the multiplicative transform K^* in explanations of temporal reference memory in SET

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A common way of positing scalar variance in the SET information-processing model of timing (Gibbon & Church, 1982/1992; Meck, 1983) is in the form of a multiplicative transform (K^*). This transform operates when the contents of the accumulator/working memory are transferred to reference memory, scalar variance being produced upon multiple presentations of the standard. A brief review of this concept and research findings that sheds new light on its validity and the general nature of temporal reference memory is presented. There were two main strands to the empirical studies presented: the first examined the effect of manipulating the number of presentations of the standard tone in a modified temporal generalization task. Some conceptualisations of the K^* transform predict an increase in temporal acuity with increased number of presentations. In fact, results suggested that the effect of multiple presentations of a temporal generalization standard was small or non-existent, over and above the effect of presenting a single example of the standard. The second strand of research examined the encoding of temporal reference memory. Does the formation of a reference memory require just encoding or is utilisation of that memory also necessary? The capacity of temporal reference memory was also examined by manipulating the number of standards to be encoded. This was achieved by the use of a modified version of the temporal generalization procedure called double temporal generalization.

The effect of knowledge of results on time estimation: Is there mediation by the reference memory?

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This study presents evidence for the role of knowledge of results in the estimation of medium time intervals (4 to 12 s durations). A series of experiments is presented. A first experiment tested the hypothesis that knowledge of results (KR) operates at the same stage of temporal processing as attention. The absence of an interaction of attention and knowledge of results is taken as evidence against this hypothesis. Next, two experiments studied the effects of KR in a reproduction and a production task, respectively. The effects of KR were small in the reproduction and substantial in the production task. The results are interpreted in terms of a clock-based timing model and the findings taken together converge on the interpretation that KR affects the reference memory, rather than the other components of the model.

Thursday 11-04-02, 9:00 - 10:00, Sessions 10, 11

Session 10: Codes in Memory

Semantic coding in the recall of picture and word lists shown at RSVP and STM rates

Veronika Coltheart, Stephen Mondy and Robyn Langdon

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Short-term memory serial recall provides evidence for the use of phonological codes with little, if any, involvement of semantic coding. However, when sequences of words or pictures are visually presented at high rates (8-12 items/second, termed RSVP - rapid serial visual presentation) there is evidence of early extraction of conceptual and semantic information. Such results led Potter (1993, 1999) to propose a model of Conceptual Short-term Memory. We report experiments which investigated the influence of thematic relationships among items in picture and word list recall when items were shown at RSVP rates (8/second) and low STM rates (1/second). The list items were selected from a large pool, and the nature of the semantic relationship among list items varied from list to list. Semantic relatedness benefited item recall, even when items were phonologically similar, at high and low rates of presentation. This is evidence for early involvement of semantic codes as hypothesized by the theory of Conceptual STM and it also indicates a role for semantic coding in STM.

Interactions between long- and short-term phonological memory: Evidence from an implicit phonological learning paradigm

Steve Majerus¹, Martial Van der Linden², Thierry Meulemans³, Ludivine Mulder³

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Verbal short-term memory (STM) is influenced by phonological and lexico-semantic knowledge stored in long-term memory (LTM), as evidenced by better STM for words than nonwords. This knowledge is highly over-learned and acquired early during development. In this study we show that STM can also be supported by very recently and implicitly acquired phonological information. In experiment 1, 20 adult and 20 eight-year-old participants passively listened to a thirty-minute sequence of CV syllables while they were performing a picture drawing task. The succession of the consonants and vowels and the CV syllables was governed by an artificial grammar, which the participants were unaware of. After this implicit phonological learning phase, a nonword repetition task was presented comprising nonwords of increasing length, which were either legal or illegal relative to the artificial grammar. STM performance was significantly better for legal than for illegal nonwords, in adults and children. In experiment 2, STM performance was similar for legal and illegal nonword lists when not preceded by a phonological learning phase. Our results suggest that STM can be supported by recently and implicitly acquired phonological information and directly reflects subtle changes in phonological LTM. Implications for current models of STM and LTM are discussed.

Session 11: Shape, Space, and Language

The cultural relativity of shape categories: Goodness had nothing to do with it.

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² Goldsmiths College, University of London, UK

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The Gestalt theorists of the early twentieth century proposed a psychological primacy for

circles, squares and triangles over other shapes. They described them as 'good' shapes and the Gestalt premise has been widely accepted. Rosch (1973), for example, found that speakers of a language lacking terms for any geometric shape nevertheless learnt paired-associates to these 'good' shapes more easily than to asymmetric variants. A cross-cultural investigation sought to replicate Rosch's findings with the Himba of Northern Namibia who also have no terms in their language for the supposedly basic shapes of circle, square and triangle. We found no advantage for these 'good' shapes in the organization of categories. It was concluded that there is no necessary salience for circles, squares and triangles. Indeed, we argue for the opposite because the general absence of straight lines and symmetry in the perceptual environment should rather make circles, squares and triangles unusual and, therefore, less likely to be used as prototypes in categorization tasks. We place shape as one of the types of perceptual input, like colour, that is readily susceptible to effects of language variation in categorisation tasks.

Spatial discourse: Processing, memorizing, and using navigational instructions

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Spatial discourse takes place in a variety of environmental contexts. The value of analyzing the cognitive processes involved in the processing of this type of discourse is to reflect the mind's capacity to translate verbal information into visuo-spatial knowledge, and reciprocally its capacity to express non-linguistic spatial representations in a linguistic format. The studies that we have conducted in the past years have focused on the processing, memory, and use of navigational discourse, in both laboratory and field settings. These studies provide information on the cognitive resources called upon during the processing of the descriptive and the procedural parts of spatial discourse. Because of the visuo-spatial nature of navigational information, the hypothesis that individual imagery capacities affect the processing of this type of discourse has been examined and has received substantial empirical support.

Thursday 11 April 2002, 10:00 - 12:30

Invited Symposium

The Relationship Between the Lexical and Semantic Systems in Word Processing

Convenor:

Marc Brysbaert

Royal Holloway, University of London, UK

Meaningful models of word recognition

Lorraine K. Tyler

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Models of word recognition aim to understand processes involved in mapping from form onto meaning. However, standard models of word recognition tend to ignore semantics, even though semantic information is clearly activated early in the process of recognising

a word. I will describe some of the studies which show this early activation of semantic information and then go on to discuss a variety of experiments which show how meaning influences form-based lexical processing.

While the results of these studies do not dictate a specific model of word recognition, they are most consistent with those models in which form-based and meaning-based constraints are integrated to achieve lexical recognition. I will argue that to make progress in developing models of word recognition we need to develop more specific theories of semantic representation. To this end, I will describe one distributed model of semantics - the conceptual structure account - which focuses on the internal structure of concepts, and show how the structure of concepts affects word recognition processes. Taken together these studies suggest that theories of word recognition will remain incomplete until they take semantics seriously.

The relationship between the lexical and semantic systems in word and object processing

Max Coltheart

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Research on patients with impairments of comprehension for pictures or environmental sounds or spoken words or printed words will be reviewed so as to demonstrate that lexical processing can be intact when semantic processing is severely impaired. It will be argued that these data indicate not only that the lexical and semantic systems are distinct but also that a phonological lexicon, an orthographic lexicon, and a lexicon of pictorial forms all exist as components of our cognitive architectures.

Thursday 11 April 2002, 13:30 - 15:30,

Symposium 7 -Category-specificity in Mind and Brain

Convenor

Glyn W. Humphreys

University of Birmingham, UK

Domain Differences in Semantic Dementia: Implications for Theories of Category-Specific Deficits

Timothy T. Rogers, Matthew A. Lambon-Ralph, David C. Plaut, John R. Hodges and Karalyn Patterson

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Semantic dementia (SD) is a syndrome marked by progressive and profound deterioration of semantic knowledge, consequent upon bilateral atrophy of the antero-lateral temporal lobes. This deficit is rarely characterized by significant category- or modality-specific effects: the great majority of SD patients are impaired for all semantic categories and all varieties of both input to and output from the semantic system, suggesting disruption to a unitary and a modal system of conceptual knowledge. Such patients do, however, show interesting differences in the kinds of errors they make in different semantic domains. We have attempted to explain these differences with

reference to a computational model in which central semantic representations emerge in a system that must learn the mappings among structured perceptual representations indifferent modalities. Domain effects arise as a consequence of differences in the degree to which objects in a given domain share structure in different modalities. We will consider the implications of this idea for theories of category-specific deficits, and will propose an extension of the unitary-semantics model that may account for different patterns of impairment in generalised semantic dementia vs category-specific cases.

A case of impaired conceptual knowledge for fruit and vegetables

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We report the case of a patient, RS, whose conceptual knowledge about fruit and vegetables appeared to be disproportionately impaired as compared to animals and nonliving things. RS was impaired when asked to retrieve semantic knowledge about fruit and vegetables whatever the modality of input (a picture or a word). The patient was also impaired when asked to retrieve colour knowledge about fruit and vegetables when the items were presented as word stimuli but not when the items were presented as picture stimuli. These findings suggest that (1) for a visually presented object, colour knowledge can be retrieved directly from the object's structural description (2) semantic knowledge about animals at the one hand and fruit and vegetables at the other hand can be damaged independently of each other and (3) impaired retrieval of object-colour knowledge is not at the origin of a category-specific deficit for fruit and vegetables.

Semantic category dissociation in Alzheimer's disease : a longitudinal study.

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Several cross-sectional studies on picture naming in Alzheimer's disease have reported inconsistent findings regarding dissociations in the recognition of specific semantic categories. To clarify this point, 15 patients suffering from dementia of Alzheimer's type (DAT) were examined four times, across a period of two years. These patients were given a naming task and a word-picture matching task based 120 colour photographs, which allowed us to take in account several variables (notably word frequency and stimulus familiarity) that might influence performance . The 120 target words, were drawn from 3 categories: animals, plants and objects. The findings are discussed in the context of two competing theories of semantic breakdown in DAT. One differentiates between domains of knowledge in terms of the structure of semantic representations within a single distributed network; the other emphasizes the importance of different brain regions in the category distinction.

The diversity of category-specific deficits for living things.

Glyn W. Humphreys

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Over the past twenty years there has been an increasing interest in 'category-specific

deficits' in object recognition and naming, and several conflicting accounts of these deficits have been offered (see Humphreys & Forde, 2001, for a recent summary). One problem with the literature, however, is that the tests used to assess the recognition and naming deficits have differed across patients, and the terms applied to particular tests have differed across investigators (e.g., for tests of 'functional' knowledge). In the present paper, I report results from a group of six patients, all with category-specific problems for living things. The results indicate that the nature of the deficits can differ across patients; using the same materials, patients can have impairments at different levels within the systems supporting object recognition and naming. In addition, the nature of the deficits appear to take a graded form, with visual factors modulating performance from small to large amounts, dependent on the particular patient. I discuss the data in terms of current accounts of category-specific deficits in the literature.

Humphreys, G.W. & Forde, E.M.E. (2001). Hierarchies, similarity and interactivity in object recognition: On the multiplicity of 'category specific' deficits in neuropsychological populations. *Behavioural and Brain Sciences*, 24, 453-509.

Category-specific representations for numbers and animals, commonly activated in two different semantic tasks

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Recent functional neuroimaging studies suggest that specific brain regions may be differentially involved in processing certain semantic categories such as *living things* or *artefacts*. In this study, we used PET to test the hypothesis of a segregation between the brain regions involved in the semantic processing of numerals and those involved in the semantic processing of another category of words (animals). Our experiment capitalized on the use of two different semantic tasks (classification and comparison) across two categories of words (animals and number words) in order to determine the brain regions more active for one category of words than for the other irrespective of the semantic task.

A first conjunction analysis revealed bilateral intra parietal activation during the semantic processing of numerals irrespective of the semantic task. On the other hand, the reverse conjunction showed significant activation on the ventral aspect of the left inferior temporal cortex for animals irrespective of the semantic task. Our results support the hypothesis of a segregation between numbers and the other semantic categories at the semantic level.

Thursday 11-04-02, 13:30 - 15:30,

Symposium 8 - The Perception of Biological Motion

Convenors

Karl Verfaillie and **Jan Vanrie**

Laboratory of Experimental Psychology, University of Leuven, Belgium

Recognising the Style of Human Movement

Frank E. Pollick

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The ability to perceptually organise point-light displays into the percept of a specific human action has long served as a demonstration that humans are adept at recognising the actions of their conspecifics. While much research has been directed at gaining an understanding of the processes involved in the perception of human movement, there has been little work directed towards quantifying the general limits of our abilities to recognise different styles of human movement. Moreover, there has been a general trend to conflate our remarkable abilities to perceptually organise point light displays with our sometime mediocre abilities to identify movement style. My research examines the recognition of movement style from a variety of approaches that relate the information available in human movements to their categorisation. These approaches include exaggeration, automatic pattern recognition, obtaining estimates of human efficiency and finally, designing algorithms for stylistic movement generation on a humanoid robot. Using psychological experiments on humans I have examined the recognition of gender, identity, affect and style of tennis serves from human movement. Taken together results from these experiments reveal complex interactions between information available and human classification performance. For example, in the case of identifying affect it appears that movement velocity and phase relations among the limbs act independently to support a 2-dimensional circumplex model of affect. It is argued that a more complete understanding of the recognition of movement style will not only contribute to understanding the mechanisms of human movement perception but also facilitate the design of humanoid robots.

Is biological motion perception modular?

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The perception of biological motion seems effortless. Biological motion refers to Johansson's point-light technique to investigate whether perceivers could recognise others from walking displays, solely on the kinematic pattern produced when walking, independent of form information. Motion and form information are commonly seen as being processed separately, especially in computational vision. Two basic assumptions have been prominent when investigating biological motion perception: a) modularity of vision and, specifically, b) form versus motion modularity. Examples of both, a low-level and a high-level approach to the perception of biological motion will be contrasted and evaluated in connection with the modularity assumptions. Furthermore, own studies on the role of kinematic patterns in the recognition of emotions will be discussed. Finally, it is argued that the new notion of 'motion integrators' seems valuable in trying to understand the effortlessness of recognising human movement.

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Interfering with biological motion

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Most studies of biological motion - regardless of whether they involve naïve observers trying to interpret a collection of dots, or informed observers trying to determine whether a walker is present or absent, walks left-to-right, or is male or female -- involve tasks with one central display focus. That is, observers are directly looking at one part of display and are trying to interpret what they see. Here, I report on two studies which deviate from this typical design. In the first, a dual-task paradigm is used to interfere with the observers' ability to actively process potential walkers. In the second, an Eriksen flanker task is used to explore whether task-irrelevant peripheral walkers have any impact on a central direction discrimination task. Dual-task results show very little impairment in performance as long as masking elements do not preclude local-to-global integration strategies. Flanker task performance indicates that peripheral walkers are processed and can influence the central task. Both sets of results suggest that the incidental processing of biological motion is highly efficient, making minimal demands on attentional resources.

The role of limb movements in the perception of orientation of meaningless point-light actions

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Without occlusion, a point-light figure constitutes a perfectly ambiguous stimulus: From all viewpoints, multiple interpretations are possible concerning the figure's depth orientation. In previous experiments, we demonstrated that a bi-stable point-light walker can indeed be perceived in different orientations. Moreover, we also observed a clear bias to interpret the walker as facing the viewer instead of facing away from the viewer, regardless of whether the figure was walking forwards or backwards. Subsequent research, however, suggested that this tendency was not a general property of point-light figures, but depended on the pattern of articulatory movements, i.e. the specific action the figure performed.

The present experiment was set up to investigate more closely the effect of different limb movements on the perception of depth orientation of human point-light figures. We recorded four meaningless movement patterns in which the direction of motion of the upper and lower limbs was systematically manipulated. These four actions were shown to participants which were asked to indicate the global orientation of the figure. We

observed a strong effect of the direction of motion of the upper limbs, confirming the importance of the specific articulatory movements in the perception of the global orientation of point-light figures.

Thursday 11-04-02, 15:30 - 16:30, Sessions 12, 13

Session 12: Social Attitudes & Beliefs

A Recurrent Connectionist Model of Attitude Formation

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This presentation discusses a recurrent connectionist network of current dual-process approaches of attitudes, focusing on the common processing principles that may underlie both central and peripheral processes. Major findings in attitude formation and change involving both forms of processes are reviewed and modeled from a connectionist perspective. The majority of these processes are illustrated with well-known experiments, and simulated with an auto-associative network architecture with linear activation update and delta learning algorithm for adjusting the connection weights. All of the phenomena considered were successfully reproduced in the simulations. Moreover, the proposed model is shown to be consistent with algebraic models of attitude formation (Fisbein & Ajzen, 1975). The discussion centers on how the particular simulation specifications may be used to develop novel hypotheses for testing the connectionist modeling approach and, more generally, for improving and unifying theorizing in the field of attitudes as well as social cognition in general.

Openness to Experience and Boundaries in the mind

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The present research investigates whether Openness to Experience and Boundaries in the mind are related to conservatism. In the first study, a positive relationship between several scales of the Boundaries in the mind questionnaire and indicators of conservative beliefs were obtained in an adult sample (N = 78) as well as in a sample of political party activists (N = 44). In the second study, these relationships were replicated in an adult sample (N = 225). Moreover, two dimensions representing Boundaries in the mind were identified, one positively related to Openness to Experience and negatively related to conservatism, and the second showing high positive correlations with Neuroticism. The exceptional strong correlations between some Boundaries in the mind facet scales and conservatism are discussed, as well as the relationships between Openness to Experience and cultural and economic conservatism.

Session 13: Development of Concepts & Percepts

Cognitive factors and concept learning: A developmental approach.

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Many experiments have shown that in concept learning, children reach classification criterion faster when the criterion correspond to their preferred dimension. In this experiment, we tried to replicate this phenomenon with 4, 6 and 8 year-old children and to link their categorization performance with different cognitive factors (attention, memory, cognitive flexibility, cognitive inhibition and planning). First, we assessed the hierarchy of dimension preference for two sets of stimuli composed of 3 dimensions (colour, number and shape for the first set and texture, number and shape for the second set). Then, children participated in two concept learning tasks, one in which their preferred dimension was the relevant feature and one in which their least preferred dimension was relevant. Contrary to previous experiments, there was no difference between the two concept learning tasks. For the 4 year-old children, memory factor was associated with performance. Cognitive inhibition factor was the factor correlated with performance for the 6 year-old children. For the 8 year-old children, there was only an association between performance and a cognitive factor, in this case planning factor, in the condition of learning on the least preferred dimension.

Perception of Partial Collision Events in Infancy

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Studies about object perception have revealed fundamental insights in the mechanical interactions between objects in infants. Several studies showed a developing understanding in infants of the way in which relations between object properties constrain the course and outcome of interactions between those objects (o.a. Aguiar & Baillargeon, 1999 ; Aguiar & Baillargeon, 1998 ; Sitskoorn & Smitsman, 1995). In this study we first questioned whether infants of 6, 9 and 12 months old perceive whether the rims of a box would provide passing through. Infants were habituated to block movements approaching a box lied in different positions, all providing enough room to pass through. In a subsequent test phase, identical block approaches were presented with the exception that the rims of the box were widened. Consequently, two collision actions and one control action (non collision) emerge. The results showed that infants of 9 and 12 months old perceived whether the width relation between block and box specified passing through. In addition we found that both the age of the infant and the amount of overlap between the block and the opening of the box played a significant role in the perception of these passing through interactions.

Thursday 11 April 2002, 13:30 - 16:30, Session 14

Session 14: Strategy, Working Memory Capacity, and Inhibitory Control

What makes an insight problem? An investigation into the role of strategy-goal congruency.

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We have previously demonstrated that part of the difficulty of some insight problems (such as the nine-dot problem) stems from the adoption of rational local strategies that lead to impasse. Here, we explore the problem factors that influence strategy formation. A single experiment is presented, using as its basis the six-coin problem, for which we have independent evidence of the use of certain operators. Four variants of the problem were presented to subjects, with four different goal conditions: (i) abstract, in which the goal was specified only verbally, (ii) concrete-congruent, in which the goal was visually presented, and application of the operator would not result in impasse, (iii) concrete-incongruent, in which application of the operator would likely result in impasse, and (iv) both concrete goals together. Participants in conditions (iii) and (iv) solved the problem significantly more often than those in condition (i). Furthermore, there was a marked preference in all participants for concrete-congruent goals. These data support the notion that goal-directed strategy formation may - somewhat paradoxically - underlie impasse in certain classes of problem.

Strategy use in relation to mathematical ability: Developmental delay or deficit?

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In this study we investigated the variability, frequency, efficiency, and adaptiveness of young children's strategies in the domain of early arithmetic, using the choice/no-choice method (Lemaire & Siegler, 1995; Siegler & Lemaire, 1997). Seventy-seven beginning second- and third-graders, divided in three groups according to age and mathematical ability (MA), solved a series of 36 simple additions and subtractions up to 20. The first group consisted of 26 second-graders with strong MA, the second of 25 second-graders with weak MA, and the third of 26 third-graders with weak MA. All children solved the series of problems in four conditions. In the first condition, children could choose between retrieval, decomposition up to 10 (e.g., $8 + 3 = 8 + 2 + 1 = 10 + 1 = 11$), and counting (e.g., $8 + 3 = (8), 9, 10, 11$) to solve each problem. In the second, third, and fourth condition, children had to solve all problems with one particular strategy, respectively retrieval, decomposition up to 10, and counting. The results demonstrate that second-graders with weak MA use the same (retrieval, decomposition, and counting) strategies as their peers with strong MA, but differ in the frequency, efficiency, and adaptiveness with which they apply these strategies. Furthermore, our results indicate that the development of children with weak MA is, compared to normally progressing children, marked by a developmental delay: Third-graders with weak MA use the same strategies as second-graders with strong MA, and execute these strategies equally frequently, equally efficiently, and also equally adaptively. Finally, this study illustrates the value of Siegler's theoretical and methodological framework to describe young children's strategy use in the domain of early arithmetic.

Lemaire, P., & Siegler, R.S. (1995). Four aspects of strategic change: Contributions to children's learning of multiplication. *Journal of Experimental Psychology: General*, 124, 83-97. Siegler, R.S., & Lemaire, P. (1997). Older and younger adults' strategy choices in

multiplication: Testing predictions of ASCM using the choice/no-choice method. *Journal of Experimental Psychology: General*, 126, 71-92.

The role of working memory in the carry operation of mental arithmetic

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We investigated the role of working memory in the carry operation of mental arithmetic. The value of the carry and the number of carries were manipulated, so that there were problems with 1 or 2 carries (= number of carries) of which the value could be 1 or 2 (e.g., in $183 + 122 + 601 = 906$ there is one carry with a value of 1; in $249 + 388 + 269 = 906$ there are two carries with a value of 2). These problems were solved in a control condition and in experimental conditions in which the phonological loop and the central executive were loaded. We found that the number of carries determines the difficulty of a problem and that executive processes contribute to this effect. An important new finding is that also the value of the carry is an important variable and that the phonological loop is responsible for maintaining the value of the carry. This leads us to the straightforward conclusion that the central executive is responsible for the number of carries, whereas the phonological loop handles the value of the carry.

Working memory capacity in causal reasoning: blocking background knowledge

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We present two of the first experiments that examine the role of working memory in reasoning with realistic, causal conditionals. A Dutch adaptation of the OSPAN (La Pointe & Engle, 1990) test was used to measure working memory span. A first experiment ($n=66$) established that high span participants (top quartile of first-year psychology students) were better at retrieving disabling conditions from semantic memory than low span participants (bottom quartile). Retrieving a disabling condition is known to suppress the valid Modus Ponens (MP) and Modus Tollens (MT) inferences (Cummins, 1995). In Experiment 2 ($n=60$) we presented participants a conditional reasoning task where the number of possible disabling conditions of the conditionals was manipulated. Participants did not receive explicit deductive reasoning instructions. Results showed that, despite the better disabler retrieval, high span participants rejected MP and MT less than low spans. However, inferences in both span groups were affected by the conditionals' number of possible disablers. These data show that both high and low span reasoners use their background knowledge when drawing conditional inferences. However, when this background knowledge conflicts with logic, high span reasoners manage to block this impact more efficiently. Implications for current reasoning theories and the debate on human rationality are discussed.

La Pointe, L. B., & Engle, R. W. (1990). Simple and complex word spans as measures of working memory capacity. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 16, 1118-1133. Cummins, D. D. (1995). Naive theories and causal deduction. *Memory and Cognition*, 19, 274-282.

How to know what to inhibit: Action-effects are used in response-suppression

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Although many experiments have investigated the time-course of response inhibition mechanisms, few have been directed towards identifying the representations involved in the inhibition process. In the present study we started from the idea that effect codes are the cornerstones of both preparatory and inhibitory activity. This was investigated by means of a series of dual-task experiments in which subjects selectively inhibited a signalled manual response (Task 1) and quickly prepared and executed a congruent or incongruent response in a different modality (Task 2). The results showed that after successful inhibition, congruent responses were executed more slowly than incongruent responses. The consequences for behavioural inhibition are derived and discussed.

Aging effects in inhibitory control over no-longer relevant information during a garden-path sentence task

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The goal of the present work was to analyse the assumption according to which cognitive ageing is associated with inefficient inhibitory mechanisms (Hasher and Zacks, 1988). In contrast, Burke (1997) assumed that a decline of memory for context could better explain the age differences. We used a modified version of the Hartman and Hasher (1991) task. Two experiments were conducted, differing by the kind of indirect memory test used. In the first stage, older and younger adults read a series of sentences whose final word was a member of semantic different categories (e.g.: flowers). Then, subjects received the same list of sentences, each missing its final word, and they had to complete them by re-using the previous words (inclusion), or by a new word (exclusion). Finally, two indirect memory tests - perceptive identification (exp. 1 & 2) and category exemplars generation (exp. 2) - and a direct memory - recognition (exp. 1) or free recall (exp. 2) - were used to examine the view of impaired inhibitory mechanisms in ageing: do older adults show equal priming of inhibited (exclusion) and facilitated (inclusion) words? The findings of the first experiment are consistent with an inhibitory framework. The second experiment is being analysed.

POSTERS

Evidence for evaluative but not for spatial learning in a human fear conditioning experiment

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Evaluative conditioning refers to the changes in liking of a neutral stimulus (the CS) as a result of merely pairing it with another already liked or disliked stimulus (the US). This type of learning can be seen as a form of referential learning: as a consequence of repeatedly pairing the CS with the US, the CS in itself will activate the representation of the (valence of the) US, thereby changing the perceived valence of the CS. We used a fear-conditioning paradigm to examine whether non-evaluative stimulus properties of the US can also be activated by the CS. Participants were exposed to a contingency between the colour (CS) of a word and both the valence (aversive loud noise present vs no noise) and the direction (loud noise from left vs right) of the US. Two variants of a Simon procedure were used to assess whether transfer of a property occurred. The results only showed evidence for a CS-induced activation of the US-valence (evaluative referential learning) but not for activation of the US-direction (spatial referential learning).

Pavlovian Associations in Single Cue Fear Conditioning with Humans: Failure to Assess the Importance of Contingency and Contiguity using the Affective Priming Task

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We examined the relative importance of contingency and contiguity for the acquisition of Pavlovian associations. Seventy-two volunteers underwent a single cue fear conditioning procedure followed by affective priming. Response latency modulation in the latter task was used as index of acquired Pavlovian associations. Three groups were run: (a) a random group, (b) a high excitatory group, and (c) a low excitatory group. In the first group there was a random relation between conditioned stimulus (CS) and unconditioned stimulus (US). In both excitatory groups the US was presented only in the presence of the CS. The high excitatory group received as many US presentations as the random group. The low excitatory group received as many CS-US pairings as the random group. All groups failed to exhibit the acquisition of Pavlovian associations in affective priming responses. These results contrast with the observed ability of the affective priming task to detect acquired associations in a differential paradigm. The interested conditioning researcher may consider to adhere to differential paradigms.

The cognitive fallacy: Associative learning is more than expectancy learning

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We set up a stimulus-response compatibility task in which dimensional overlap did not occur between stimuli and responses, but between stimuli and response-generated outcomes. In such a task, the correspondence effect that one obtains can be taken to reflect the acquisition of response-outcome associations. To measure response-produced outcome expectancy, we instructed participants to categorise the outcomes

that their responses produced as fast as possible. Outcome categorisation times decreased progressively during R-O training, indicating that participants came to anticipate the outcomes that their responses produced. R-O training also resulted in an associative S-R compatibility effect. When outcomes were subsequently omitted for several trials, outcome expectancy was completely abolished: Outcome categorisation times when outcomes were again presented were at a level comparable to the level at the start of R-O training. However, outcome omission did not abolish the associative S-R compatibility effect, indicating preservation of the associative links connecting responses and outcomes.

Delay and Knowledge Mediation in Causal Inference

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Contemporary theories of causal induction have focussed largely on the question evidence in the form of covariations between causes and effects is used to compute measures of causal strength. A very important precursor enabling such computations is that the reasoner notices that a cause and effect have co-occurred. Standard laboratory experiments have usually bypassed this problem by presenting participants directly with covariational information. As a result, relatively little is known about how humans identify causal relations in real time. What evidence exists, however, paints a rather unflattering picture of human causal induction and converges to the conclusion that humans cannot identify causal relations if cause and effect are separated by more than a few seconds. Associationism has interpreted these findings to indicate that temporal contiguity is essential to causal inference. This paper re-investigates a paradigm commonly used to study delay in causal induction (Shanks et al., 1989), but employed one crucial additional manipulation regarding participants' awareness of potential delays. This manipulation was sufficient to reduce the detrimental effects of delay. Overall, results support the hypothesis that knowledge (both implicit and explicit) mediates the timeframe of covariation assessment in causal reasoning. Implications for associative learning and causal power theories are discussed.

Summation and overexpectation in causal learning

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Results from human casual learning tasks that employ multiple cues can be interpreted either in terms of an elemental approach such as that of Rescorla and Wagner (1972) or a configural approach such as that of Pearce (1987, 1994). One method of discriminating between these alternatives is through an investigation of summation and overexpectation effects. The Rescorla-Wagner model predicts both effects while configural models predict neither. Using a novel procedure in which the magnitude of the outcome varied, evidence for both summation and overexpectation was obtained in a human causal judgment task.

Consciousness and abstraction in sequence learning

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Whether people are sensitive to abstract structure constitutes a fundamental issue in domains such as language acquisition, categorization, implicit learning, or memory. Several authors have suggested that abstraction necessarily requires awareness of the relevant regularities. We explored the extent to which people become sensitive to abstract relationships between components of sequences of stimuli in the context of a 6-choice reaction time task. Participants were trained to react as fast and as accurately as possible to continuously changing sequences of 12 elements, among which the first 6 were random, with the constraint that each element appears once and only once. The next 6 elements obeyed the same constraints, but were entirely predictable based on their relationships with the corresponding initial elements. These relationships were changed during a transfer block. Participants were neither informed nor aware that the material contained structure. The results indicate impaired RTs during transfer, thus suggesting sensitivity to abstract structure in the absence of awareness.

What criteria to differentiate implicit from explicit sequence learning?

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In the framework of implicit learning, the chance level is of major importance, since it is used to tell apart implicit from explicit learning. With the classical SOCs (second order conditional) sequences introduced by Reed & Johnson (1994) and broadly present in the implicit sequence learning literature (e.g. Shanks & Johnstone, 1999), this chance level corresponds to the correct transitions that a naive participant would generate. Chance level can be calculated or established experimentally. Learning is considered implicit as participants produce above chance transitions of the training sequence when specifically instructed not to do so, i.e. generation under exclusion instructions (explicit knowledge would lead to successful exclusion of the learned transitions). We conducted a sequence learning experiment with the classical SOCs sequences and parameters known to result in explicit learning. We obtained a curious discrepancy between conclusions: Taking into account the calculated baseline one would conclude to implicit learning, and to explicit learning on the account of an experimentally established baseline. This paradox comes from the fact that calculated and experimentally established baselines are significantly different. We thus strongly recommend studies on implicit learning rely on a baseline performance established experimentally or include other indicators (e.g., Destrebecqz & Cleeremans, 2001).

Learning without awareness: The influence of sequence structure in the serial reaction time task

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Various authors since Nissen & Bullemer (1987) have used the serial reaction time task (SRT) to assess implicit learning. Still, there currently is no agreement about the extent to which the observed learning effects are due to unconscious knowledge. One possible answer to that question is Jacoby's Process Dissociation Procedure (Jacoby, 1991) adapted to the SRT by Destrebecqz & Cleeremans (2001). These authors clearly showed that variations in the Response Stimulus Interval (RSI) influence explicit learning of a sequence, while leaving implicit learning intact. Moreover, the material that was used in their study was a Second Order Conditional (SOC) sequence (involving complex associations). In our study, instead of manipulating the RSI, we used different sequence structures. Indeed, we used a standard SOC sequence and two types of probabilistic sequences. In these "noisy" sequences, non-grammatical trials were inserted all over the entire learning phase. Our results showed that small amounts of noise specifically influence explicit learning, while large amounts additionally impair implicit learning.

Investigating Response Mode, Latencies and Errors in Temporal Grouping

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Temporal pauses within an unfamiliar list of items can improve immediate serial recall with groups of three items being the optimal group size (Ryan, 1969; Frankish, 1985). Many of these previous studies have employed either a verbal response mode (e.g. Hitch, Burgess, Towse and Culpin, 1996) or a written response mode (e.g. Frankish, 1995). However, with a verbal response the voice may act as a suffix on the final item, and using a written response may provide feedback of items recalled to the participants. Experiment One employed a temporal grouping investigation comparing three response modes; verbal, written and response via a touchscreen. Results demonstrated that the optimal group size was three items for all three response modes, with differences at the recency portion of the serial position curve alone. Experiment Two (using the touchscreen response mode) investigated both grouping and transpositional errors for a temporal grouping experiment with experts (practiced in grouping in fours) and novice participants. Results demonstrated both the optimal group size (three) and the type of transpositional errors made were similar for both groups of participants.

Frankish, C. (1995) Intonation and auditory grouping in immediate serial recall. *Applied Cognitive Psychology*, 9, 515-522.

Hitch, G.J., Burgess, N., Towse, J.N., and Culpin, V. (1996) Temporal Grouping Effects in Immediate Recall: A Working Memory Analysis. *Quarterly Journal of Experimental Psychology*, 49A, 116-139

Ryan, J. (1969a) Grouping and short-term memory: A different means and patterns of group. *Quarterly Journal of Experimental Psychology*, 21, 137-47

Recognising the usual orientation of one's own face

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This study examined our ability to recognise the usual horizontal orientation of our own face (mirror orientation) as compared with another very familiar face (normal orientation). The proportion of participants who made a correct judgement was similar for the participant's own face and for the other familiar face. However, participants did not use the same kind of information in determining the orientation of self-face as in determining the orientation of the other familiar face. Most participants reported having based their judgement on the location of an asymmetric feature (e.g., a mole) when determining their own face's orientation, and on a global familiarity feeling (rather than on a particular feature) when determining the other familiar face's orientation. These results are explained from the fact that 1) we encounter our own face both in mirrors and on pictures (this experience creating competing forward and mirror-reversed representations of our own face) while we usually do not see other familiar faces in mirrors and 2) we develop precise knowledge about the location of asymmetric individual features through mirror self-inspection.

Gaze and facial expressions detection

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From an evolutionary point of view, it seems adaptive to detect very quickly when someone is looking at you and moreover if his/her facial expression is aggressive. To humans (and other animals) it seems very important as well to detect at once an angry face, so much so that some authors found a pop out effect for this kind of stimuli. A pop out effect is described when a stimulus is detected immediately while there is no increase in reaction time when the number of distractors increases dramatically. In our study, however, we compared reaction times for subjects to detect a staring or a non-fixed gaze in different contexts of facial expressions. The results were surprising because we found that there was no pop out at all and that a staring gaze from an angry face was not at all detected more efficiently than a non-staring gaze in a happy or neutral context. In conclusion, the results suggest that humans are not very specialised at detecting a staring gaze from an angry face.

Probing skilled visual pattern memory using faces as stimuli

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The human face is a complex visual pattern that can be recognised after a single presentation. In order to develop models of serial order and item memory that can be

compared across skilled processing in the verbal and visuospatial domains, we are exploring the use of faces as stimuli in a range of memory tasks. Investigations of item recognition after serial presentation of 4 or 5 faces are reported. Recognition was tested by asking for a yes/no judgement on a one item probe. Articulatory suppression was carried out across presentation and recognition. The effects of face similarity on recognition memory were examined by manipulating the similarity of target faces to one another and the similarity of foils to target faces. Correct rejection of foils remained invariant across serial positions whereas correct recognition of previously seen items was found to differ across serial position, for both similar and less similar faces. Serial position profiles obtained are best described in terms of linear/exponential trends rather than a simple last-item recency effect as has previously been found. Multinomial modelling revealed an emerging recency effect confined to the last two serial positions. The results indicate that visual pattern memory does not show one item recency when the structural properties of stimuli are well known, even although no stimulus has been seen before.

Irrepressibility and prior knowledge effect on the Ebbinghaus illusion

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In this study, we investigated the influence of prior knowledge on the magnitude of the Ebbinghaus illusion. Illusions are assumed to depend on irrepressible cognitive processes: learning shouldn't suppress them. Several studies have shown that some optical illusions decrease as a function of the length of time of stimulus presentation or inspection, without however disappearing altogether. However, some studies on the effect of repeated presentation suggested a disappearance of optical illusions as an effect of saturation. In the study we present here, 108 participants were trained to estimate the diameter of circles presented alone on different points of a computer screen using Psyscope program. They were then presented the two parts of the Ebbinghaus illusion successively and asked to judge the diameter of the central circles. After the judgements, they were asked whether they knew the illusion prior to the study. The illusion was significantly smaller for the 35 participants who already knew it than for those who did not, though still there. These results are discussed within the context of the question of irrepressibility in the perception of optical illusions.

Do chronometric manikin tasks provide evidence of egocentric perspective transformation?

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Two experiments evaluated a chronometric version of the manikin task that has been used to investigate behavioural and neurophysiological responses to transformations of one's egocentric perspective. Experiment 1 examined left-right judgements about the location of a visual target held by a manikin and made from the point of view of the manikin ("Which Hand?"). These judgements took longer when the manikin had a

contrasting perspective (front view) than the same perspective (back view) as the participant, and were also longer than those made from the participants' own perspective ("Which Side?"). In Experiment 2, a similar pattern of response times was observed when the targets were not accompanied by a manikin figure and participants were instructed to transpose a stimulus-response mapping when cued by an abstract visual pattern (that controlled for features present in the front view of the manikin). These results suggest that behavioural effects from chronometric manikin studies may be due to the attentional demands of setting up a spatially non-compatible stimulus-response mapping in response to a visual cue. They also question the interpretation of neurophysiological correlates of these effects as evidence for a specialised neural mechanism for egocentric perspective transformation.

Viewpoint-dependency of transsaccadic representations of saccade-target and flanker objects

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To account for the integration of extrafoveal and foveal views across eye movements Germeys et al. (in press) proposed a single-route, two-stage model of object perception. They examined transsaccadic preview benefits by manipulating (i) the spatiotemporal continuity of a to-be-identified object across a saccade, and (ii) the status of that object, i.e. saccade target versus flanker object. The results showed substantial preview benefit (reduced gaze durations) for the saccade-target object, regardless of its spatiotemporal continuity. For the flanker object, preview benefit was dependent on the object's spatiotemporal continuity. The results were framed in a model according to which at any given fixation only the saccade target object can attain the attentive stage where its separate features can be bound and long-term memory can be contacted. Features reaching only the pre-attentive stage remain unbound and are stored in an episodic object file. To get a better insight in the contents of these long-term and episodic representations, we transsaccadically manipulated the in-depth-orientation of the saccade-target and flanker objects. Any effects of this manipulation on location-independent preview benefits would suggest viewpoint-dependent representations at the level of the long-term memory object lexicon; effects on location-dependent preview benefits would indicate the representation of viewpoint information at the level of pre-attentive object files. The results are compared to recent work on the effect of intrasaccadic enantiomorphic transformations (Henderson & Siefert, in press) and on the coding of object orientation across saccades (Van Eccelpoel, Germeys, De Graef & Verfaillie, 2001).

Affordances and visual object recognition

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This poster reports evidence that viewpoint affects decisions about how to use objects more than access to semantic information about the objects. Experiment 1 demonstrated

that decisions about whether objects were used with a "twisting" action benefited when objects were placed in an appropriate orientation for manipulating them, relative to when they were not positioned appropriately. In contrast, categorization decisions about whether objects are found in the kitchen were unaffected by the viewpoint manipulation. Experiment 2 used semantic primes and showed that these affected semantic categorization but not action decisions about objects. In Experiments 3a and 3b we examined priming from objects that afforded the same action as targets. No effects were now found on semantic categorizations. The results suggest that action decisions to objects are affected by affordances derived from the visual properties of objects, and this is not necessarily contingent on access to semantic knowledge.

Vestibular evoked potentials in microgravity and under 1-G

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Vestibular evoked potentials during rotation of human subjects around their naso-occipital roll-axis were recorded. The effect of stimulating the vertical semicircular canals and otolithic stimulation was investigated by comparing the evoked potentials obtained under the 1-G condition with those recorded in microgravity conditions. Subjects lay on their side with the head in the center of rotation and were tilted feet upward (roll up) and back into the lying position (roll down). The microgravity environment was created by parabolic flight maneuvers. In microgravity, transient bell-shaped negativity was recorded for roll up and roll down motion. In the 1-G condition the potentials were superimposed on sustained components, probably due to additional otolithic stimulation. It seems to be possible to separate the evoked responses in a transient canal response and a sustained otolithic response. The results are encouraging with respect to the goal of developing a tool for the selective assessment of canal and otolithic responses of the vestibular system.

EEG correlates of perceptual phases during binocular rivalry

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During binocular rivalry periods of unambiguous percepts corresponding to one of the two stimuli presented simultaneously to the two eyes alternate with ambiguous percepts in which a mixture of both stimuli is seen. We here examined whether the unambiguous and the often neglected mixed phases have different electrophysiological correlates, and recorded the EEG at 10 active leads. Photographs of appropriately colourfiltered faces (one male, one female) were superimposed and viewed by means of red-green glasses. Our 15 subjects continuously reported their perceptual state by pressing buttons during the phases of coherent perception. Coherent and incoherent phases were analysed

separately with respect to EEG power and coherency.

Neither in the alpha (8-13 Hz) nor in the gamma range (22-48 Hz) did we find a significant change of EEG power between the phases. However, they were characterized by unique patterns of EEG gamma coherency: while local posterior effects dominated during perceptually incoherent phases, a widespread synchronisation process accompanied the coherent ones. If EEG coherency reflects the crosstalk between different cortical areas, our results indicate that under conditions of ambiguity the perceptual disambiguation requires activation of a widespread network prominently involving the right frontal and temporal electrode sites.

Macaque inferior temporal neurons faithfully reflect changes in metric shape dimensions

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Inferior Temporal (IT) neurons contribute to object recognition and categorization by coding for complex object features. Still, it is not clear how their responses can be related to similarities between complex objects. Op de Beeck et al. (2001) parametrically varied the amplitude of radial frequency components of 2D-shapes and found a faithful representation in IT-neurons. This illustrates the importance of systematically varying the underlying dimensions of high-dimensional stimuli to find a consistent presentation of a low-dimensional subspace in individual neurons. We recorded the responses of 80 IT-neurons to 3D shapes, composed of 1 or 2 single volumes. We manipulated broadness, height, and curvature or asymmetry of each volume. Most neurons were sensitive to at least two of these dimensions. Their responses could be accurately predicted by a quadratic regression using these dimensions as factors. (Median $r^2 = .83$, average number of stimuli = 21, average number of dimensions = 3). The same neurons were also sensitive to view and nonaccidental shape changes, indicating that faithfully reflecting metric dimensions is a property embedded in a population of neurons that's sensitive for different aspects of objects, rather than a 'specialized' function.

How does attention affect motion perception? Insights from motion blindness

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Transient deficits in visual motion perception can be obtained in normal observers by means of rapid serial visual presentation (RSVP). This 'blindness' to visual motion is induced if subjects are asked to redirect attention from local colour stimuli to global coherent motion targets with the onset of a predefined colour cue. In previous studies we have shown that variations of the paradigm modulate visual sensitivity (i.e. motion coherence thresholds), and that performance depends on attentional resources (i.e.

delay between cue and target). Here, we examined whether the temporal recovery from motion blindness depends on the salience of motion targets. In 10 subjects, we measured motion detection performance as a psychophysical function of increasing cue-target SOA (0 - 400 ms). Target salience was varied between 30% and 60% motion coherence. As expected, significantly reduced detection rates were obtained for targets that required a higher effort of motion integration. However, the slopes of the attentional recovery functions did not differ between the levels of motion coherence. Thus, our results confirm that attentional demands affect the process of motion integration. This modulation can be described in terms of a pure top-down regulation that acts independently of motion signal strength.

Motion processing and the embedded figures task in autism

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Some children with autism show elevated motion coherence thresholds, indicating a possible impairment of the Magnocellular visual pathway (Milne et al 2002, Spencer et al 2000). Children with autism can also show some visual processing strengths including enhanced performance on the embedded figures task (EFT) (Shah and Frith, 1983) where participants identify a target figure within a picture. Could impairment in the magnocellular pathway underlie enhanced performance on the EFT? The magnocellular pathway is known to carry motion and depth information, and may project low spatial frequency information to the cortex. Since low spatial frequency signals provide information about the global aspects of stimuli, an impaired M-pathway could lead to less efficient transmission of the global aspects of a stimulus. In turn, this may enable more rapid identification of the target figure in the EFT. A group of children with (N = 24) and without autism (N = 28) performed both a motion coherence task and the EFT. Motion coherence threshold in the children with autism correlated positively with number of correct items of the EFT and negatively with performance speed, indicating that there may be a relationship between the M- pathway and EFT.

Biased attentional competition in neglect patients

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Attentional competition in neglect patients was studied by means of contrast threshold measurements. We determined the effect of an irrelevant contralateral distracter stimulus on left and right hemifield contrast thresholds in right brain damaged patients with or without neglect, left brain damaged patients without neglect and controls without brain damage.

Task gratings were presented in the upper left or right visual field. Distracter gratings were presented at the homologous contralateral visual field position, the contrast being

20 times that of the contrast threshold previously obtained in left and right hemifield conditions without distracters. Subjects were instructed to direct their attention towards the cued target stimulus position and to disregard as much as possible the irrelevant distracter. In the neglect group, there was a highly significant effect of the right distracter stimulus on thresholds obtained in the left hemifield. Left distracter stimuli, however, had no effect on right hemifield thresholds. In the control groups, a small and symmetric distracter effect was observed. Although the thresholds in the left target right distracter condition were increased significantly, the neglect patients did reach reliable thresholds. Thus, the asymmetric competition in neglect patients can be completely resolved by increasing the contrast of the left target stimulus. The relative contrast of left and right input seems to be a more important factor than the mere presence of right hemifield stimuli in determining how neglect patients will perceive their left side.

Object-based selection and the effect of irrelevant peripheral onsets.

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Recently, R. A. Abrams & M. B. Law (2000) suggested that attention orienting using endogenous cueing can be object-based. They demonstrated that nonattended locations that were on a cued object had an advantage over nonattended locations that were not on the object. They concluded that attention radiates from a cued location on an object throughout the rest of the object. The aim of the present study was to investigate whether or not object-based attentional radiation is a mandatory or voluntary process. In Experiment 1, observers searched for a target circle at one of four ends of two outline rectangles. One rectangle end was reliably cued by a central arrowhead. The arrowhead was presented before (focused attention condition) or after (divided attention condition) the onset of the search display. At different SOAs an uninformative peripheral onset was presented at one of the four possible target locations. The results showed that the onset only affected performance in the divided attention condition but not in the focused attention condition. Experiment 2 demonstrated that nevertheless nonattended locations that were on the cued rectangle had an advantage over nonattended locations that were on the uncued rectangle. The results of Experiments 1 and 2 suggest that object-based attentional radiation is not a mandatory process. Object-based effects are possibly the result of a preference of observers to attentionally scan the same object first.

Abrams, R.A., & Law, M.B. (2000). Object-based visual attention with endogenous orienting. *Perception & Psychophysics*, 62, 818-833.

History matters: The preview benefit in search is not onset capture

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Visual search for a conjunction target is made easier when distractor items are temporally segregated over time to produce two separate old and new groups (the new

group containing the target item). The benefit of presenting half the distractors first is known as the preview effect. Donk and Theeuwes (2001) have recently argued that the preview effect occurs because the new stimuli capture attention. This was tested here by using a novel "top-up" condition. When previews only appear briefly before the search display, there is a minimal preview benefit (Humphreys et al., submitted; Watson & Humphreys, 1997). We show that effects of brief previews can be "topped up" by an earlier exposure of the same items, even when the preview disappears between its first and second presentations. This "top-up" effect demonstrates that the history of the old stimuli is important for the preview benefit, contrary to the account favouring new object capture. We discuss alternative accounts of how the preview benefit arises.

Color grouping in space and time: Evidence from negative color-based carry-over effects in preview search

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Four experiments are reported that addressed the role of color grouping in preview search (Watson & Humphreys, 1997). The task required participants to discriminate whether a target letter (N or Z) occurred in the second set of letters presented after a preview of half the distractors. The color of the letters was irrelevant to the discrimination task. Experiment 1 used biased opposite color ratios of distractors in the preview and second search displays, to create equal numbers of distractors in each color group in the final full display. Consistent with other findings (Braithwaite, Humphreys & Hodsoll, submitted), there was a selective slowing for new targets that were similar to the majority color of the old items. Experiment 2 showed that this effect held even when the new items biased the overall color ratio in the opposite direction to the initial display. Experiment 3 replicated the results from earlier experiments using either equal or biased color groups in both the initial preview and second search sets. In Experiment 4 we provided participants with foreknowledge of the target color on a trial. The color ratios matched those used in Experiment 1. There was still a selective slowing of RTs that bore the color of the majority old set, even though these targets were then in a minority new set in an expected color. Collectively, the results provide positive evidence for inhibitory feature-based carry-over effects in preview search.

Watson, D.G & Humphreys, G.W. (1997). Visual marking: prioritizing selection for new objects by top-down attentional-inhibition of old objects. *Psychological Review*, 104, 90-122.

Contrasting Explicit and Implicit Knowledge in Contextual Cueing of Visuo-Spatial Attention

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Chun and colleagues (Chun et al. 1998, 1999; Chun, 2000) have shown that visuo-spatial attention can be guided by incidentally acquired visual knowledge. In a visual

search task Ss have indeed been shown to make use of global contexts (the spatial layout of distractor items) to detect a specific target stimulus. Targets surrounded by invariant visual contexts are responded to faster than those embedded in variable contexts. Such 'contextual cueing effects' have been observed despite poor explicit recognition performance. In the present study, we present a replication of the contextual cueing effect with more heterogeneously distributed distractor configurations, in order to increase the distinctiveness of the various visual configurations. Furthermore, concurrent direct and indirect measures of performance were used for variant and invariant stimuli at the end of the experiment (Shanks & Perruchet, in press). Results will be presented at the meeting and discussed in the context of the current debate about the extent to which learning can occur unconsciously.

A comparison between Simon and SNARC in a number processing task.

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The Simon effect reveals a compatibility between a task-irrelevant stimulus location and the response location. This effect is believed to originate in the response selection phase. Furthermore, on the basis of the Sternberg hypothesis, Simon and Berbaum (1990) were able to differentiate between the Simon and the Stroop effect. Less is known about the origin of the SNARC (spatial numerical association of response codes) effect. This effect shows that relatively small numbers are responded to faster with the left hand and large numbers are responded to faster with the right hand. In our experiments, one digit is shown on the left or right side of a fixation point. Subjects have to indicate the parity of the target by means of a bimanual response or a verbal response. The results will be discussed in the framework of the Sternberg hypothesis. That is, if Simon and SNARC show an interaction, these effects are thought to have the same origin. More specifically, the SNARC effect would originate from the response selection phase. Differential origins can be postulated if SNARC and Simon are additive in nature.

EEG Biofeedback for the Enhancement of Cognitive Abilities in Normal Individuals

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Biofeedback training of electroencephalographic (EEG) activity in the theta and beta bands has been reported to improve attentional and cognitive abilities in children with attention deficit disorders. The current study applied a similar biofeedback protocol in normal adults. Twelve participants were randomly assigned to either an experimental condition, involving 24 active EEG biofeedback sessions, or a control condition, involving 24 non-contingent (i.e., inactive) EEG biofeedback sessions. All participants were measured at pretreatment and posttreatment on measures of vigilance, selective attention, fluid abilities and processing speed. With the exception of Rebus Learning, a measure of fluid abilities, there were no significant pre-post differences between the experimental and control group. Several methodological problems may explain why the

current study, by and large, failed to support the hypothesised outcomes. It is concluded that fundamental EEG research is necessary before the effects of any EEG biofeedback training protocol can be elucidated.

Route finding and climbing performance

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Before climbing, one might use route finding to find the easiest way to perform. Despite the widely recognized importance of such a process, only a few studies have focused on route finding and, to our knowledge, none has experimentally examined its impact on climbing performances. The purpose of this study was to determine if route finding affects subsequent climbing behavior (i.e. if it can enhance climbers' performances).

Thirty climbers of three different levels (moderate, good, and expert) climbed two different paths (of the same moderate level) set on an artificial wall by experienced route setters. Participants climbed one route "with" route finding (i.e. they were allowed to look at the route for three minutes just before climbing) and the other "without" route finding (routes and climbers' level were counterbalanced). The climbs were videotaped in order to evaluate climbers' performances. The independent variables were climbers' skill level (moderate, good, or expert) and route finding (with or without), and the dependent variables were climbing performance (duration and number of climbing moves and non-moves) and a self-assessment rating scale (e.g., processes and strategies used, climbers' self-confidence). Results will be presented, and theoretical and applied-field implications will be discussed.

Current status of Sport Psychology in the French-speaking part of Belgium

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In light of the work for a "certification" recognizing psychological fields (e.g., in Belgium regarding official political recognition of both "clinical psychologist" and "psychotherapist", in the United States regarding APA recognition of "sport psychology" as an area of proficiency within psychology), the present study was designed to gain insight into the real status of applied sport psychology in the French-speaking part of Belgium through questionnaires. Specifically, we identified, examined, and profiled professionals who are applying psychological aspects in the sport arena, independently of their academic background, membership, and/or recognized official diploma. The examination of these questionnaires reveals the current situation of sport psychology in a place where degree-holding psychologists and people without any officially recognized educational background cohabit. Conclusions highlight the imperative need for (1) developing specific trainings programs in sport psychology, (2) certifying people working as sport psychologists, and (3) informing the world of sport as well as collaborating with political bodies regarding sport psychology's status. Finally, it is argued that such a particular situation may not be so different from the current state abroad. Nevertheless,

since previous studies only focused on official scientific membership lists, more research considering any professional delivering sport psychology services is necessary to draw a more comprehensive conclusion on the subject.

The ability of readers to change saccadic motor plans

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Recent experiments (Vergilino & Beauvillain, 2000) showed that, in reading isolated items, intra-word saccades are preplanned before the execution of the primary saccade directed to a word, on the basis of the word length in the parafovea. Inter-word saccades, on the other hand, are planned during the fixation following the primary saccade. However, other work suggests that the motor plan may be cancelled during the first fixation on a word as a result of early linguistic processing of that word. Knowledge of how long the saccadic system needs to cancel an intra-word saccade may indicate the types of low-level visual or lexical information that influence eye guidance in reading. An experiment was conducted to test this question. 11-letter strings were changed to two 5-letter strings at different times after the primary saccade directed to the stimulus. Results demonstrate that the saccadic system is only able to cancel the preplanned intra-word saccade and plan an inter-word saccade if the new visual information is available 200-250 msec before the execution of the intra-word saccade.

Vergilino, D. & Beauvillain, C. (2000). The planning of refixation saccades in reading. *Vision Research*, 40(25), 3527-3538.

Studying a single linguistic phenomenon in written word recognition and production: Homophonous regular verb forms in a morphographic writing system.

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Psycholinguists studying the mental lexicon largely neglect spelling processes and focus almost exclusively on word recognition. This paper will present experimental data on the same linguistic phenomenon from both perspectives: written word production and recognition. The study object were regularly inflected Dutch verb forms with a homophone in their verbal paradigm (word/wordt - become/s). Even though the orthographic rule involved is transparent and leads to a morphographic spelling of Dutch verb forms, experienced writers sometimes spell the homophone instead of the correct form. Earlier spelling experiments in our team (Sandra, Frisson & Daems, 1999) demonstrated that relative homophone frequency is a major error source, suggesting that fully regular inflected forms are also stored. In two self-paced reading experiments the same verb forms were presented. In one experiment these verbs were spelled correctly, in the other they were spelled incorrectly (homophone was shown). The same

factors were manipulated as in the spelling experiments: relative homophone frequency - subject/verb distance - word between subject and verb form suggesting different grammatical features than the subject. Thus it was possible to study (i) whether the same factors operate in both modalities and (ii) under which conditions spelling errors mostly disturb the reading process.

The use of orthographic cues in homophones: a further exploration

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Starting from the finding that currently phonological models of visual word processing predominate, Brysbaert, Grondelaers and Ratinckx (2000) examined what happened when important morphological information is disclosed in the orthography but not in the phonology. To do so, they made use of a peculiarity in Dutch. In this language, some forms of the present and the past tense of verbs are homophones or homographs. This allowed them to look at the power of orthographic and phonological cues to derive the tense of the verb. In two self-paced reading experiments they discovered that orthographic cues suffice to recover the tense of the verb, and that this discovery does not take more time than tense recovery on the basis of a combination of orthographic and phonological cues. The authors concluded that orthographic cues are very efficient during silent reading. In this poster session new data will be presented of an eye tracking experiment examining the validity of their conclusions.

Acquisition of new orthographic representations in literate adults

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The purpose of this study was to investigate factors underlying the acquisition of new orthographic representations in normal adults. Thirty Spanish undergraduate students without any knowledge of French first learned the phonological form of French words, then learned their orthographic form (according to a procedure by Basso et al., 1999). The orthographic form of the French words was inconsistent with regard to Spanish phonology-to-orthography conversion rules. Tasks assessing phonological awareness, phonological short-term memory, serial order processing and Spanish spelling abilities were also administered. Results showed that a mean number of three visual presentations was sufficient to learn the new orthographic forms; this number varied with the degree of orthographic inconsistency of the French words relative to Spanish phonology-to-orthography conversion rules. Correlation analysis showed that speed of acquisition of French orthographic word forms was related to Spanish spelling ability and to speed of acquisition of French phonological word forms. Performance on phonological awareness, short-term memory and serial order processing tasks did not predict French orthographic word forms learning when speed of acquisition of French phonological

word forms was controlled for. These data suggest that the ability to acquire orthographic representations could mainly depend on the quality of their corresponding phonological representations.

Nature of the phonological representations in SLI French speaking children

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This study examined the quality of the phonological representations of children with specific language impairment (SLI) and children with normal development of language (NL). Twenty-six children with SLI, allocated in three subgroups following lexical age criteria (5 ; 6 or 7 year-old), as well as 70 lexical age control children participated in an auditory lexical decision task. Pseudo-words were built by applying different phonological modifications to frequent words. Some modifications were subtle (i.e. deletion of a phoneme), while others were important (i.e. deletion of a whole syllable). The kind (deletion or addition) and the position (initial - median - final) of the modifications were controlled. We predicted that children with refined phonological modification would be able to detect both subtle and important modifications. In contrast, children with holistic representation would have difficulties in the "fine modification" condition. As expected, the children with SLI performed more poorly than the controls only on fine modification condition. An important position effect was observed for SLI children only with a deterioration of the performance in initial and final condition. The findings supported the hypothesis of an under specification of phonological representations on SLI children.

The role of CV and Rime Frequency in Dutch Reading

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The role of the subsyllabic units CV (SPA in SPARK) and rime (ARK in SPARK) in Dutch word recognition was examined in two experiments (lexical decision and naming). Nonwords with existing CVs (GRUID) were compared to those with nonexisting CVs (BLUID). Similarly, nonwords with existing (GRUID) and nonexisting rimes (GRUIR) were compared. In this way, four classes of nonwords could be distinguished (nonexisting CV with nonexisting rime, nonexisting CV with existing rime, existing CV with nonexisting rime, and existing CV with existing rime). The frequencies of the constituent parts (onset, nucleus, and coda) were controlled for. Moreover, the frequencies of existing rimes matched those of the existing CVs. In the lexical decision task, nonwords with existing CV and/or rime were rejected more slowly and less accurately. The main effect of rime-existence was equal in size to the main effect of CV-existence. There was no interaction. This suggests that in Dutch, CV-neighbourhoodsize is as crucial for performance as rime-neighbourhoodsize. Thus, the special status of the rime, as observed in numerous English experiments, could not be confirmed. The results of the lexical decision task will be compared to those of a naming task.

Dutch stress: rules, lexicon and analogy

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Dutch occupies a middle ground between languages with fixed and free stress systems. Current (psycho)linguistic theory holds that stress assignment to Dutch words follows a rule system for the majority of the words (regulars), while a minority of words (irregulars) are stored together with their stress pattern. In a reading task involving 18 native Dutch speakers, we investigated how stress was assigned to Dutch-like pseudowords -which are by definition unmarked- and how well two competing models were able to predict the participant data. The first model implemented the rules of Metrical Phonology for Dutch, thus representing the rule-based account of Dutch stress. The second model was an item-based learning algorithm, representing a complete lexical account (no rules). Firstly, the item-based model predicted participants' responses significantly better (82%) than the rule-based model (56%). Secondly, the agreement between model and participant data was higher when both models predicted the same stress pattern than when they made conflicting predictions. Although this discrepancy can be accounted for under a dual mechanism model (DMM), a simulation involving 18 item-based "learners" suggested that the difference between these item types resulted from differences in neighbourhood density for regulars and irregulars. Our data can be accounted for by an item-based mechanism alone.

The model of Kroll and Stewart (1994) evaluated: Is it possible to observe a size effect in translating newly learned number words?

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The question whether translation is lexically or semantically mediated is a central issue in bilingual research. Concerning this topic, a language learning experiment was conducted. In a first phase of the experiment, subjects had to memorize nonwords ("Estonian") in association with the Dutch number words from one to fifteen. In the following test phase, subjects were asked to name or translate Arabic digits, Dutch number words and "Estonian" number words. A semantic size effect was found for both forward and backward translation. Translation from "Estonian" to Dutch was slower for number words representing larger quantities than for number words representing smaller quantities. These results cannot be reconciled with the model of Kroll en Stewart (1994), which assumes a lexical translation process in backward translation for beginning bilinguals.

Semantic Effects in Masked Priming from L2 to L1 in Episodic Decision and

Lexical Decision

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In this paper we addressed some current controversies concerning the representation of L2 words in bilingual memory. Two cross-language masked priming experiments showed evidence against the recently proposed episodic model of Jiang and Forster (2001), which mainly states that L2 words are not represented lexically, but in an episodic memory system. In a first experiment, we replicated the findings of Jiang and Forster (2001) in Dutch-English bilinguals. Secondly, we tested their main hypothesis by using semantically related masked primes instead of masked translation primes. The results of both experiments showed that cross-language masked priming from L2 to L1 is possible in lexical decision and in episodic decision, using both translation and semantically related primes. The results of Experiment 2 suggest that strong links exist between L2 words and the semantic system. Some recent other studies also found evidence for this hypothesis.

Forward and Backward Translation in Balanced and Unbalanced Bilinguals Requires Conceptual Mediation: the Magnitude Effect in Number Translation

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An important question in literature on bilingualism is whether translation is conceptually mediated or simply based on word-to-word association at the lexical level. In two number naming and number translation tasks with balanced and unbalanced Dutch (L1) - French (L2) bilinguals, we showed that there is a semantic number magnitude effect in both forward and backward translation of number words: it took longer to translate number words representing large quantities (e.g. acht, huit [eight]) than small quantities (e.g. twee, deux [two]). This effect was not found when the naming language corresponded to the input language of the number words. Moreover, the effects found did not interact with L2 proficiency. Our results strongly suggest that translation processes are conceptually mediated in both directions (even at moderate levels of L2 proficiency), and therefore are not in line with asymmetric models of bilingualism such as the revised hierarchical model of Kroll and Stewart (1994).

Cross-alphabet and cross-modal long-term priming in Serbian

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In three experiments we investigated long-term repetition priming effects in Serbian under cross-alphabet and cross-modal priming conditions. In all experiments we

obtained the same pattern of results: significant priming in all conditions, with the amount of priming in the cross-alphabet and cross-modal priming conditions equivalent. This outcome differs from the

results obtained in English where modality shifts are usually associated with reductions in priming. Findings are discussed within a theoretical framework in which long-term priming is a by-product of learning within the language system.

The influence of the context of presentation of stimuli on lexical learning

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Young children learn the name of new objects either presented alone or included in a scene. Our contribution explore to what extent the context associated with the object is beneficial or detrimental to the association between an object and its name in a production and a comprehension task. We assessed whether children (three and four year old) could learn four non-words associated with unfamiliar animals or musical instruments displayed in a scene (the context of presentation) and whether their performance would be influenced by the congruence of the context of presentation between the learning and the test phases.

We hypothesized that the contextual congruence between the learning and the test will enhance children's performance. In contrast, the association between an object and a different context in the test phase (compared to the association in the learning phase) would decrease performance. The results confirm our hypothesis and do not confirm the general hypothesis that children associate a name with an object independently of the scene. Consequences on lexical learning are discussed.

Body Image Experience in bulimic and anorexic female patients

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This present study is designed to assess the body image experience in bulimic and anorexic subjects. This multidimensional concept integrates cognitive, perceptive, affective components and opinion about one's own body. Subjects (20 bulimics, 21 anorexics and matched controls) complete the Body Image Assessment-Revised (BIA-R; Beebe, Holmbeck & Grzeskiewicz, 1999), the Eating Disorder Inventory, Drive for Thinness and Body Dissatisfaction Scales (EDI; Garner, Olmstead & Polivy, 1983), the Body Attitude Test (BAT; Probst, Vandereycken, Van Coppenolle & Vanderlinden, 1995) and a general perceptive test. The results of the BIA-R shown that bulimic patients overestimate their current body size (cognitively and affectively) more than control subjects while anorexic females do not differ from the control group. On the other hand, bulimics and anorexics both want a significantly thinner size than the matched subjects. They also have a body experience significantly more negative than the control subjects on BAT and EDI. The theoretical and clinical implications of these results are discussed.

Normative and psychometric data on the Body Image Assessment-Revised in a

French-speaking women's population

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This study is designed to create norms and psychometric data in french of the Body Image Assessment-Revised (BIA-R; Beebe, Holmbeck & Grzeskiewicz, 1999). This test consists of 9 silhouettes at varying body weights. Subjects have to choose a silhouette that represents their cognitive response (what they think they really look like), affective response (what they feel they look like) and optative response (what they want to look like). The discrepancy indexes between cognitive, affective and optative responses are also calculated. The sample is composed of 100 normal women. They completed the Self Esteem Scale (Rosenberg, 1965), the Beck Depression Inventory (1961), the Symptom Check-List 90-Revised (Derogatis, 1974), the Eating Disorder Inventory (EDI; Garner, Olmstead & Polivy, 1983), the Body Attitude Test (BAT; Probst, Vandereycken, Van Coppenolle & Vanderlinden, 1995), a general perceptiveness test and the BIA-R (Beebe & al., 1999). We examine the relationship between BIA-R responses and scores on the different questionnaires. The results support the convergent validity of the cognitive and affective responses and the affective-cognitive and affective-optative discrepancy indexes. On the other hand, our study could not confirm the validity of the optative response and the affective-cognitive discrepancy index. The theoretical and clinical implications of these results are discussed.

Reality monitoring for actions in hallucinatory-proneness

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Research exploring cognitive processes involved in source monitoring tasks in hallucinations have mostly utilised verbal tasks and few studies have investigated these processes on tasks tapping into other modalities. 65 normal subjects were administered a covert reality monitoring task. Subjects were presented motor actions and were asked either to 1) perform the action 2) watch the experimenter perform the action 3) imagine himself performing the action 4) imagine the experimenter perform the action 5) or say the action verbally. Following a delay, actions were presented consisting of those already presented in one of the 5 conditions (old), and those never before presented (new). For each action, subjects were required to identify if the action was old or new. If the action was identified as old, subjects were required to identify the source of the word (i.e., one of the 5 conditions). Compared with non-prone subjects, hallucination-prone subjects revealed significantly higher wrongly attributed imagined motor actions (where subjects were required to imagine themselves perform the action) as coming from the visual imagined encoding condition (where subjects were required to imagine the experimenter perform the action). These results are in agreement with studies confirming a relation between source monitoring errors and hallucinations.

Identification and evaluation of school phobia: Rationale for using Paige's

decision matrices

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School phobia is generally defined as a low-incidence set of heterogeneous behaviors characterized by a persistent difficulty with school attendance not due to a medical condition or truancy. Although there is wide agreement in the literature that the best predictors of a positive outcome include early diagnosis and prompt comprehensive treatment, relatively little has been written on the identification and evaluation of children exhibiting school avoidance and refusal behaviors. More recently, Paige has developed a series of decision matrices to guide teams of professionals through the process of diagnosis, problem analysis, and treatment based upon a cognitive-behavioral model of intervention for school phobia. The main objectives of this contribution are (1) to discuss the general foundations and procedures for using Paige's decision matrices, and (2) to recommend new directions for future training and research when considering this model of intervention.

Predictors of Parent Care and Caregiver Burden in Middle-aged Daughters

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Worldwide adult children provide parent care. Women are the main providers (Laditka & Laditka, 2000). Presented here are some results of a larger cross-cultural study. The aim of the present study was to examine a theoretical model of how apart from the functional dependence of the elderly mother, the recalled quality of experienced maternal care in childhood and other aspects of the adult daughter - elderly mother relationship (attachment, conflict, filial responsibility and filial concern) affect parent care provision and caregiver burden. Participants were 94 middle-aged daughters in Belgium (Dutch speaking, Mage = 46.9 years, SD = 6.0). Instruments included were the Parental Bonding Instrument, the Adult Attachment Scale, the Closeness and Conflict Scale, the Filial Responsibility Scale, the Filial Anxiety Scale, Parent Care Scale and the Caregiver Burden Scale. Results of the LISREL analysis indicate that apart from the functional dependence of the elderly mother, recalled quality of maternal care, attachment, conflict and filial concern predicted the enhancement or reduction of caregiver burden. Except for the functional dependence of the mother no other psychological factor predicted parent care. The model explained a substantial part of the variance, $R^2 = 55\%$ and 39% , for parent care and caregiver burden respectively.

The effect of aging on phenomenal characteristics of emotional and neutral autobiographical memories

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We investigated age-related differences in memory qualities for positive, negative and neutral autobiographical events. Younger and older participants recalled two personal experiences of each type that had occurred within the past five years and that were at least 6 months old. They rated their memories on several sensorial (visual, taste, etc.) and contextual characteristics (location, time, etc.). We found that positive and negative events were more detailed than neutral ones. In addition, older adults' memories were more vivid and detailed than memories of younger participants and the negative events reported by older adults encompassed more intense positive feelings than those reported by younger adults. These results indicate that emotion can influence phenomenal characteristics of autobiographical memories and that emotional regulation might be better for older adults.

Alexithymia and affective priming

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Alexithymia is a multidimensional personality construct which encompasses three central facets: difficulty identifying feelings, difficulty describing feelings and externally-oriented cognitive style. We examined, by using the affective priming paradigm, the moderating effect of alexithymia on the emotional processing at an automatic level of attention.

Previous studies showed that the time needed to evaluate the target stimuli is significantly shorter for affectively congruent pairs (e.g. positive-positive) than for affectively incongruent pairs (e.g. positive-negative). Affective priming paradigm is one privileged technique for assessing the early attention allocation in psychopathology. We hypothesized that deficits of emotional processing in high alexithymia scorers will be evidenced by lower facilitation effects for congruent pairs and by lower inhibition effects for incongruent pairs. Sixty-four participants were asked to rate the valence of emotional target nouns each preceded by neutral, positive and negative verbal and facial prime. Results showed that the influence of the negative face prime became smaller as participants' level of alexithymia increased and that the effects of faces on negative words response time become greater as participants' alexithymia score decreased. These results suggest that high alexithymia scorers are less efficient to process emotional facial informations, especially the negative one, at an automatic level.

The impact of high-level cognitive processes on emotional reactions.

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It has been documented that several conscious and volitional processes can modulate emotional responses (Davidson et al., 2000, Gross, 1999). However, little is known about the mechanisms by which these self-regulatory processes operate. The present research aimed at testing two competing models of the relations between high-level cognitive processes and emotional processing. 36 participants watched emotionally positive, negative and neutral pictures according to three conditions: In the first condition, they intentionally focused their attention on emotionally relevant elements of

the picture. In the second, they intentionally focused on emotionally irrelevant elements. The third was a control condition without any specific focus. Skin conductance responses to each picture were recorded. Results showed that emotional SCR responses decreased in the irrelevant focus condition compared to control condition. In the relevant-focus condition, a dissociation was observed between positive and negative pictures: Compared to control condition, negative pictures yielded lower SCRs, and positive pictures yielded higher responses. Results are discussed in terms of the functional relations between schematic and propositional levels of emotional processing (Philippot & Schaefer, 2001).

Emotional similarity effect on intergroup behavior. The particularities of gender-based groups.

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Two experimental investigations were designed to test emotional similarity's effect on intergroup behavior in the context of gender-based groups. Participants (all females) watched a stimulus video - used to elicit emotions - depicting an intergroup situation in which negative (study 1) or positive (study 2) interdependence between men and women was made salient. They were then confronted to an ingroup (female) or outgroup (male) target, whose reaction to the film was either similar or dissimilar to their own. Measures included desire of social contact and felt proximity with - as well as attitude toward - the target. Results of both studies were consistent with each other and revealed a positive effect of similarity on intergroup attitude. Moreover, the pattern of results suggests an outgroup extremity effect: participants in the similarity condition evaluated the outgroup member more positively than the ingroup member, whereas those in the dissimilarity condition evaluated the outgroup member more negatively than the ingroup one. These results are discussed in relation to the particularities of gender-based groups compared to other social groups and the effects of interdependence on intergroup behavior.

The processing of quantitative summary information in social judgements

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How do people encode abstract quantitative information as opposed to information of separate exemplars? One view (Shanks, 1991; Lober & Shanks, 2000) assumes that people develop, based on former experience, extensive meta-knowledge about the way in which exemplars (e.g., causes and effects) coincide. Based on this meta-knowledge, people then develop rules that they apply to summary information. An alternative explanation that we propose, is that summary information is first "transformed" into a number of specific mental models or implicit exemplars, and subsequently processed in a way identical to concrete exemplars. In order to investigate this question, we presented participants with sentences containing a reference to either small or large

categories, e.g., "The Belgian quality newspapers praised the prime minister's speech" versus "The Belgian media praised...", after which we asked them to judge the popularity of the prime minister's speech. We expect an effect of category size on participants' judgements. In order to explicitly demonstrate that this is due to a difference in the number of specific exemplars activated, participants perform a lexical decision task in which they are presented with category exemplars. There should be a clear difference in the number of activated exemplars.

Exposure to victims: emotional, cognitive and social responses

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Studies on the social sharing of emotions showed that people socially share their emotions to a very large extent. They believe that it is beneficial for them. They are also eager to listen to other people's emotional experiences. Yet, life event victims are often confronted to negative reactions of their social environment when they want to share their problem-related thoughts and emotions. The following studies examine this paradoxical attitude towards victims, and more specifically, towards ill persons.

After describing the characteristics of seriously ill person's social sharing, we will present a study investigating perceivers' reactions according to the victims' characteristics (severity of the disease and coping). Results of this study show that people who need support the most are those who are the most likely to be derogated. Results will be discussed in relation to the dilemma of emotional disclosure to which stigmatized individuals, such as seriously ill persons, are faced with: On the one hand, they may receive little social support if they do not share their emotions with others. On the other hand, they run a high risk to become derogated if they do so.

The impact of motivated social cognition on conservative beliefs and racism

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The present studies explore the differential relationships between right-wing authoritarianism (RWA) and social dominance orientation (SDO) on the one hand, and the motivated cognition measures need for closure, dogmatism and intolerance of ambiguity on the other hand. Moreover, it was investigated whether motivated cognition mediated the effects of RWA and SDO effects on racist and conservative beliefs, or whether RWA and SDO mediated the effects of motivated cognition on the target variables. Study 1 (N = 381) and Study 2 (N = 390) revealed significant correlations between RWA and motivated cognition, whereas no such relationship for SDO occurred. No evidence for a mediating role of any of the variables was found. Results are discussed in the context of previous failures to establish a relationship between cognitive styles and ideological variables.

Inadvertent plagiarism in everyday life

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An investigation of the occurrence of cryptomnesia, also known as inadvertent plagiarism, in everyday life was conducted. Participants (N=202) were asked to report one occurrence of inadvertent plagiarism and to fill in a questionnaire about different aspects of the episode, i.e. the time and location, the emotional and material consequences of the plagiarism, the characteristics of the plagiarised persons, etc. Fifty-four percent of participants reported an occurrence of inadvertent plagiarism. These episodes concerned fields related to arts such as music or literature, but also more mundane activities such as creating a cocktail or a new game for cubs. Consistent with laboratory research, it was found that plagiarisms oriented toward same-sex persons were more frequent than plagiarisms oriented toward opposite-sex persons. Classical cryptomnesia was distinguished from a more contextual form of inadvertent plagiarism (e.g., telling a piece of news to the person who precisely told you this piece of news previously). Results showed that classical cryptomnesia is almost exclusively hetero-plagiarism while contextual plagiarism was equally hetero and auto-plagiarism. The present investigation indicates that inadvertent plagiarism is not a memory error artificially provoked in laboratory settings or that occurs in the context of professional artistic creation: it may occur in everyday life.

The effects of divided attention on the occurrence of false memories

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In a previous study, two different explanations for the absence of false memories in the DRM Paradigm (non activation of the critical lure vs. efficient source memory) were explored (Brédart, 2000). The results showed that the absence of false memories fitted better with the second explanation. In this study we investigated the influence of an interferent task on the rates of false memories in this modified paradigm. Two groups of participants were presented with DRM lists either under full attention or under divided attention. They were later asked to make a source monitoring judgement. The results showed that participants assigned to the divided attention condition recalled fewer studied items and exhibited poorer source monitoring abilities than control participants. However, the rates of non-activation were similar in both groups. The results are discussed with respect to the importance of encoding factors on the resistance to false memories.

The Informational Value of Subjective Representations of Reality: Evidence of a Subjective Status Bias?

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In three experiments, involving 25 between Ss conditions, participants were asked to

draw two lines, one below the other, taking into account a specification that varied across conditions. In five control conditions the specification stated, in various ways across conditions, that the upper line was longer than the lower line. In 20 experimental conditions, the specification was the same, but it was presented, in various ways across conditions, as a mental or perceptual content (e.g.: "everybody sees that the upper line is longer than the lower line"). A consistent significant finding was that in experimental conditions, upper lines were drawn proportionally shorter than in control conditions. Taking into account effects of additional manipulations, the results were consistent with previous serendipitous observations but challenged established lay epistemological theories on how mental systems believe (Gilbert) and the role of consensus (Kruglanski). However, they could be explained as the joint effect of (a) Gricean conversational rules and related attributional processes (Hilton), and (b) a subjective status bias affecting the informational value of a mental or perceptual representation of reality making that, even in accurate subjective representations of reality, salient features of reality are assumed to be slightly tempered.

Influence of perceptual and semantic components in long term repetition priming

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Long term repetition priming, an indirect memory test that does not require an intentional recollection of the learning episode to be resolved, is explained differently depending on the point of view adopted concerning memory organization. Most authors who agree with an "abstractive" point of view assume that this effect results from a particular underlying memory system, P.R.S, which is independent of the test task. Memory, in this case, is assumed to be a collection of subsystems, each being composed of a dominant component (perceptual, semantic, episodic). On the other hand, most authors who agree with an "episodic" account of memory assume that priming effects depend on the components involved in the task under consideration and reflect different combinations of processes. Memory is seen as a unitary system functioning with simple, elementary mechanisms. We will present an experiment that will make use of two opposing components (perceptual and semantic) in order to highlight differences in the episodic versus abstractive accounts of long term repetition priming

Distinguishing a bark from a bang: Electrophysiological evidence for category-specific processing of environmental sounds

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Despite their ubiquitous presence in everyday life little is known about the semantic representation of environmental sounds. For other modalities evidence was found for a category specific processing (i.e. 'living' and 'non-living'). We examined whether this distinction extends to the processing of environmental sounds. Event-related brain potentials (ERPs) were triggered by 40 meaningful and 40 frequency-matched

scrambled sound samples of 2000 ms duration. 50% of the meaningful sounds originated from living beings ("biological sounds"), 50% from tools or instruments ("artefactual sounds"). Subjects (n=28) either named the sound's origin or performed a picture-to-sound matching. Subtracting the ERPs evoked by meaningless sounds, meaningful sounds elicited a stronger negativity starting at 350 ms. Category-specific processing was reflected in latency and topography of this difference wave: "biological sounds" evoked a negative ERP starting at 200 ms focused at right posterior scalp sites while "artefactual sounds" triggered a sustained negative wave starting at 500 ms over right anterior scalp sites. Our results indicate a category-specific processing of environmental sounds. The late anterior ERP-effect invites the inference that auditory identification of artefacts requires a more elaborate semantical search process. The early posterior ERP-effect suggests an automatic processing with the topography indicating an activation of visual representations

Normal people show category-specific deficits too.

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This study investigates the hypothesis that category specific impairments observed in individual brain-damaged individuals reflect variations in experience that can also be found in the normal population. Twenty five men and 25 women were asked to name 72 line drawings of objects selected from two categories of living things (fruit/vegetables, n=18 and animals n=18) and two categories of non-living things (implements n=18 and vehicles n=18), matched across categories for age-of acquisition. While men and women named items to an equivalent level overall, women named fruit and vegetables better than men, and men named vehicles better than women. In addition, men named living things significantly better than non-living things. Three women and three men showed significant deficits for particular categories when compared to their gender norm, and six men showed a significant discrepancy between living and non-living things. When the naming score of JBR (a male patient with a well-established and marked category-specific disorder for living things) was included in the male sample, his performance did not lie outside the normal range. It is concluded that category-specific deficits reflect variations in experience and interests, rather than differences in the organisation of semantic memory.

Specificity of autobiographical memory in Alzheimer's sufferers versus healthy older adults

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The present study aimed to establish the existence of a negative relationship between autobiographical memory specificity and cognitive impairment specific to Alzheimer's Disease. A between-subjects quasi-experiment was conducted. The experimental groups consisted of 10 Alzheimer's sufferers and 10 healthy controls, matched for age,

gender, and education level. The administration of an autobiographical memory specificity measure (Autobiographical Memory Test) followed the assessment of participant's cognitive status. A battery of neuropsychological tests produced an independent estimate of cognitive deficit severity in general intellectual function, working memory, immediate and delayed logical memory, general processing speed, and verbal fluency. A control for depression was also employed.

T-tests revealed that there was a significant difference in generating specific autobiographical memories ($p = .0135$). Additionally, the Alzheimer's group generated more categoric overgeneral memories ($p < .001$). There was a moderate correlation between cognitive status and production of categoric memories ($r = -.64$).

Obtained evidence supports earlier research indicating an association between specificity of autobiographical memory and cognitive impairment, and furthers it by demonstrating the existence of this relationship in a population of Alzheimer's sufferers.

Exploration of verbal short-term memory deficits in Alzheimer's disease and normal aging: the role of phonological loop, central executive and lexico-semantic representations

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A decrease of verbal short-term memory (STM) is frequently observed in Alzheimer's disease (AD) and normal elderly (NE). However, the nature of this deficit is not clearly established. This study explored the integrity of different cognitive subcomponents of verbal STM in AD and NE.

Fifteen mild to moderate AD, fifteen NE and fifteen young participants were administered different tasks assessing the phonological loop (word-length and phonological similarity effects), the central executive (dual-task coordination) and the contribution of phonological and semantic long-term memory (phonotactic frequency and lexicality effects) to STM.

Despite overall reduced performance in all STM tasks in the AD and only for long words in the NE, normal word-length and phonological similarity effects were observed in both groups, suggesting normal functioning of the phonological loop. An impairment in tasks assessing the central executive was observed only on the AD group. Regarding long-term memory effects, the phonotactic frequency effect was normal, but the lexicality effect was significantly reduced in AD and NE.

These results suggest that decreased verbal STM in NE and AD might arise from reduced support of lexico-semantic representations to STM. The central executive impairment found in AD patients might further contribute to their verbal STM deficit.

Interruptions in the Tower of London task: Some initial support for a goal activation approach

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Unexpected interruptions during execution of the Tower of London task incurred a cost in terms of time taken to make the next move in a solution sequence, but not in terms of errors (Experiment 1). Length of the interruption was found to have little effect on performance (Experiment 2). More critical was the time at which interruptions occurred; those occurring immediately following the planning stage were more disruptive than those in either the middle or towards the end of problem solving (Experiments 3 and 4). The cost of interruption was not reduced when participants were given prior warning, although expectation did result in a more cautious strategy as shown by longer planning times (Experiment 4). The results are consistent with Altmann and Trafton's (in press) goal activation model, and suggest this could be a useful theoretical basis for the study of interruptions.

Does the misunderstanding of the issues boost the framing effect in a risky choice?

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The aim of this paper was to explore the full understanding of the deterministic/probabilistic options presented in the Tversky and Kahneman life-death Asian disease decision problem. We suspected that a misunderstanding of the problem options might lead to a misestimation of the framing effect. A group of participants was tested with a modified version of the Asian disease problem. Given the near past societal context, the Asian disease was replaced by Anthrax. The comprehension of the issues was measured by a questionnaire where participants had to estimate the number of people that will actually be saved/lost within every issue of the problem. Results showed a classical framing effect. Interestingly, 15% of the participants did not fully understand the options. Nevertheless, those errors did not boost the framing effect but, rather, tended to overshadow it.

Working Memory Constraints on Genealogical Reasoning

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When solving genealogical reasoning problems, e.g. "If Peter is the brother of Marie and Marie is the mother of David, how is Peter related to David?", subjects report using a two-dimensional family-tree type representation (Van der Beken & Vandierendonck, 2001a, 2001b). This finding is in accordance with the mental models theory, which claims that an integrated representation or model of the information in the premises is formed. The present study further investigates to what extent visuo-spatial resources are used by persons solving genealogical reasoning problems by means of a dual-task paradigm. In addition the involvement of the central executive and the phonological loop is examined. A group of 20 subjects have been presented with series of problems

without (control) or with a secondary task (articulatory suppression, visuo-spatial suppression or central executive suppression); time to read the premises, problem solving time and free elaboration of solutions were recorded. The implications of the data for the working memory requirements of reasoning and for the mental model theory of genealogical reasoning are discussed.

An investigation of the role of implicit processes in deductive reasoning

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The present study investigated two predictions Evans (1989) made based on his theoretical analysis of Wason's (1966) selection task. Evans suggests that incorrect card selections are the result of an unconscious bias for selecting cards that match those named in the rule. He also suggests that unconscious attentional processes direct participants to spend more time considering cards they plan to select than reject. In the present study 40 participants were presented with 6 tasks. In 2 of the tasks participants were exposed to stimuli in quick succession and asked to respond rapidly; these tasks were designed to expose implicit processes. Two further tasks were based on standard abstract versions of the selection task, and one task involved tutoring. Finally, in a production task participants generated a conditional statement of their own and selected examples to test it, and from this it was possible to infer participants' understanding of conditionals after tutoring. The results do not support Evans' predictions. There was no difference in the amount of time participants spent deciding on cards selected or rejected. In addition, a significant proportion of participants responding with matched card selections in other tasks correctly solved the rapid response task after receiving tutoring; this suggests that participants have conscious insight into their card selections.

Evans, J. S. B. T. (1989). *Biases in human reasoning: Causes and consequences*. London: Lawrence Erlbaum Associates Ltd.

Wason, P. C. (1966). Reasoning. In B. M. Foss (Ed.), *New horizons in psychology I* (pp. 135-151). Harmondsworth, Middlesex, England: Penguin.

Irrelevant Speech Alternation Effects: Attentional capture by violation of the attentional set?

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It is well documented that irrelevant background speech disrupts serial recall of visual lists. However, we report a novel effect in which changing the nature of the irrelevant sequence every few recall trials incurred an additional 'alternation cost' at least for early serial positions. In Experiment 1, a cost was found when alternating between sequences containing 8 irrelevant speech tokens and sequences containing 16 irrelevant speech tokens (but not vice versa). However, a comparable alternation cost was obtained in Experiment 2 merely from changing the timing of the 8 irrelevant items from being concurrent to being interleaved with the to-be-remembered items thus making it

ambiguous as to whether the key factor in Experiment 1 was a change in dose per se or a change in timing between to-be-ignored and to-be-remembered events. Nevertheless, initial theoretical speculation centres on the idea that some types of changes in the nature of the irrelevant sequence, or/and its relationship to the to-be-remembered sequence, violates participants' attentional set hence momentarily capturing attention away from the primary task which in turn causes the additional disruption.

Effects of inhibition and compatibility in task switching

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Our study aimed at analysing the processes involved in the construction and maintenance of task intentions. We were especially interested in the role of inhibition in the reconfiguration of task-sets. To that end two choice-reaction time tasks and a detection task were implemented in a PRP-design with varying SOA's. A colored frame indicated the relevant choice-reaction time task: either deciding whether a digit was odd or even or deciding whether it was smaller or larger than five. The detection task consisted of a backward masked left or right pointing arrow. All tasks required a left-right response. The responses of the first and second task could thus either be compatible or incompatible. On 25% of the trials a nogo signal appeared and subjects had to inhibit their prepared response to the first task. The crucial comparison was between go trials following a go trial and go trials following a nogo trial for switch and no-switch trials, for short and long preparatory intervals, for compatible and incompatible trials and for three SOA conditions. The results are discussed in relation to task-switching and dual-task studies.

Speeded decision-making as a component of executive processing

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Several research groups are developing programs to clarify the concept of "executive processes", either via a strategy aimed at the fractionation of a unitary executive system or by specifying the processes involved in particular executive functions. The present paper contributes to this effort by exploring the hypothesis that decision-making is one of the fundamental executive processes. A series of short-term memory experiments based on a dual-task methodology is reported. The effects of a simple two-choice decision task relative to the effects of other secondary tasks, such as articulatory suppression, matrix tapping and random interval repetition on verbal span, visuo-spatial span and word fluency tasks were used to evaluate the importance of decision-making as a component of executive functioning. The implications of these results for our views on executive processing are discussed.

Mapping the updating process: Conjunctive brain activations across different versions of the running span task.

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Neuroimaging studies exploring the neural substrates of executive functioning, in general, have not investigated whether the non-executive characteristics of the specific executive task used could contribute to the observed brain activations. The aim of the present study was to determine cerebral activity in three different tasks each involving the updating executive function. The experimental updating tasks required subjects to process strings of items (respectively letters, words, and sounds) of unknown length, and then to recall or identify a specific number of presented items. Control tasks only required the temporary storage of the items (with the number of items to store in the control and experimental tasks having been equated). Changes in cerebral metabolism were analysed with SPM99 ($p < 0.05$, corrected for multiple comparisons. Conjunction analysis demonstrated that cerebral areas commonly activated in the three experimental tasks, by comparison to their respective control task, are the left middle and superior frontal gyrus (BA 10), the right middle and inferior frontal gyrus (BA 10/46), the cerebellum and the intra-parietal sulcus. These regions can be considered as underlying the updating function independently of the material to process. More generally, these results support the hypothesis of a fronto-parietal network involved in executive functioning.

Human supplementary eye field and self-control during response conflict

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Successful behaviour requires animals to monitor their actions and exert self-control, often requiring them to alter previous plans and select new responses. In humans such cognitive control has been associated with medial frontal cortex. Embedded also within this region are areas, such as the supplementary eye field (SEF), that are conventionally considered to be motor structures, although their precise function remains unclear. We present data investigating the function of the SEF using two tasks that evaluate self-control and error monitoring during eye movements. We show that a rare patient with a highly selective SEF lesion lacks the ability to exert effective control when required to change the direction of his eye movement. This deficit was evident both (i) when making an instantaneous change to an intended eye movement and (ii) when required to revise the rules governing all subsequent eye movements (i.e. to change behavioural 'set'). Despite profound impairment of self-control, his error monitoring was unimpaired and he was able to correct his mistakes. Our findings demonstrate for the first time that the human SEF has a role in implementing self-control, but not error monitoring, during response conflict.

Exploring the central executive by using individual differences in a dual-task approach.

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The present study uses an individual differences approach to explore Baddeley and Hitch's (1974) central executive (CE). Using the operation span task (OS), median-split based groups were created and equally assigned to two dual-task experiments. Experiment 1 combined backward letter serial recall with Random Interval Repetition (RIR) and Random Interval Decision (RID) tasks. Global task performance, omissions and order mistakes were considered. High span subjects performed better and made less order mistakes. The number of omissions was equal for both groups. Furthermore, RID had a disrupting effect on global task performance and omissions but not on the order mistakes. RIR had no effect. Experiment 2 combined backward spatial serial recall with RIR and RID. No individual differences occurred. However, RID had a disrupting effect on global task performance, omissions and order mistakes. Again, RIR had no effect. Converging the evidence from experiment 1 and 2 indicates that CE involvement may be different for spatial compared to verbal backward serial recall and that the OS only differentiates in verbal working memory tasks. Furthermore, the disrupting effect of RID compared to RIR emphasizes the functional separability of decision-making within the CE.

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