



Banff
Annual
Seminar
In
Cognitive
Science

May 4 and 5, 1996

Banff Park Lodge

Organized by Peter Dixon, Alan Kingstone, and Michael Masson.

Supported by University of Alberta, University of Calgary, University of British Columbia, University of Lethbridge, University of Saskatchewan, Simon Fraser University, and University of Victoria.

Conference Schedule

Saturday, May 4

8:45 Welcome - Alan Kingstone

9:00 Colin MacLeod, "Implicit Remembering: The Fluency of Reprocessing"
Introduced by Michael Masson

10:30 Break

11:00 Daniel Bub, "Agnosia for Biological Objects -- What does the Dissociation Imply for our
Understanding of Higher-Level Perceptual Processes?"
Introduced by Alinda Friedman

12:30 Lunch

2:00 Bruce Whittlesea, "Production-Evaluation Theory: My own PET theory"
Introduced by Cindy Lahar

3:30 Break

4:00 Mel Goodale, "Perception and Action in Human Vision"
Introduced by Peter Dixon

5:30 Adjourn

7:00 Banquet

Sunday, May 5

8:30 Michael S. Gazzaniga, "What are Brains For?"
Introduced by Alan Kingstone

10:00 Break

10:30 Morris Moscovitch, "What makes faces special? Evidence from agnosia"
Introduced by Jamie Campbell

12:00 Closing Comments - Peter Dixon

Implicit Remembering: The Fluency of Reprocessing

Colin M. MacLeod

University of Toronto at Scarborough

Processing of a word can be enhanced by a single previous episode involving that word, even when we have no intention to use memory for that prior episode nor any awareness of the relation between the two encounters. This is especially the case on tests of implicit remembering. Although typically attributed to perceptual processes, I will argue that the enhancement (or "priming") apparent on at least some tests of implicit remembering relies on both conceptual and perceptual processing. I will begin by presenting evidence from several different implicit tasks -- among them, masked word identification and speeded word reading (naming) -- to support this claim. I will then argue that this enhancement is produced by greater fluency of processing for previously encountered as opposed to new stimuli, and that this fluency relies on what Masson and MacLeod (1992) have referred to as an "initial interpretive encoding." In addition, I will present evidence that this fluency is not the result of improved perception, but instead derives from the automatic recruitment of memory for similar processing episodes.

Masson, M.E.J., & MacLeod, C.M. (1992). Reenacting the route to interpretation: Enhanced perceptual identification without prior perception. *Journal of Experimental Psychology: General*, **12**, 145-176.

Agnosia for Biological Objects -- What does the Dissociation Imply for our Understanding of Higher-Level Perceptual Processes?

Daniel Bub

University of Victoria

Recognition disorders following acquired brain damage can often affect particular classes of objects and leave others spared. Recently, a number of patients with temporal lobe damage have been described who have no trouble identifying items taken from categories like tools, clothing, and kitchen utensils but have serious difficulty when asked to identify objects (and line drawings) from categories like mammals, birds, fruits and vegetables, and insects. This tantalizing phenomenon, referred to as category specific visual agnosia (CSVA) has generated a great deal of speculation among cognitive neuropsychologists interested in the functional architecture of object recognition. We present a new analysis of a category specific visual agnosic (ELM). The pattern of confusions made by ELM in a picture/word matching task (items were fruits/vegetables) suggested a failure to fully integrate the shape features necessary for the unique identification of the target relative to other structurally related items. I will discuss evidence showing that the integration deficit is specific to the retrieval of shape knowledge from memory and does not affect the structural encoding of visual stimuli. CSVA has crucial implications for cognitive theories of visual object recognition and for an understanding of the visual function of the infero-temporal cortex.

Production-Evaluation Theory: My own PET theory

Bruce Whittlesea

Simon Fraser University

Memory serves two very general functions, namely remembering and control of behaviour. To many investigators, these functions appear to be qualitatively distinct, and to require at least two separate memory systems. My own work is premised on the idea that there is only one memory system, and that it always operates in the same way, regardless of whether it is being used reflectively or unreflectively. By my understanding, memory only does two things: it controls all performance, by responding to external and internal cues, and it preserves a record of the experience of performing in that way. The production of thoughts during the act of remembering is controlled by exactly the same principles that determine performance in non-remembering activities, such as concept learning. Ordinarily, memory is engaged in performing appropriately toward external stimuli. However, occasionally, the performance becomes itself the object of attention: for example, when an error is made, or when another person questions your performance. The processing performed on these self-reflective occasions is the same as that on non-reflective occasions: memory responds to cues and produces a mental event. Remembering and non-reflective performance are not alternate modes of processing: All behaviour is controlled by a single set of memory principles.

Perception and Action in Human Vision

Mel Goodale

University of Western Ontario

Sight is our pre-eminent sense and the world of objects and events beyond our bodies is synonymous with visual experience. We do not simply respond to visual stimuli; we experience them as integral components of a visual world that has depth, substance, and most important of all, an existence separate from ourselves. But even though the delivery of such phenomenology would appear to be the main reason we have vision, it should not be forgotten that vision evolved, not to provide perception of the world per se, but to provide distal sensory control of the many different movements that organisms make in that world. Moreover, many of the visual control systems for the different motor outputs evolved as relatively independent input-output modules. In humans and other primates, it is becoming increasingly clear that these visuomotor modules function quite independently from the neural mechanisms mediating perception-based knowledge of the world [1]. The division of labour between perception and the visual control of action can be seen in the organization of the visual pathways within the cerebral cortex: the ventral stream of projections from striate cortex to inferotemporal cortex is critical to the visual perception of objects while the dorsal stream projecting from striate cortex to the posterior parietal region mediates the required sensorimotor transformations for visually guided actions directed at those objects [2-4]. Both streams process information about the structure of objects and about their spatial locations; and both are subject to the modulatory influences of attention. Each stream, however, uses visual information in different ways. Transformations carried out in the ventral stream permit the formation of long-term perceptual representations which embody the enduring characteristics of objects and their spatial relations with each other; those carried out in the dorsal stream, which utilize moment-to-moment information about objects within egocentric frames of reference, mediate the control of a number of different goal-directed actions. Thus, to understand the organization of the visual system(s), it is necessary to understand the requirements of the different output systems that vision serves.

Goodale, M.A., Milner, A.D., Jakobson, L.S. and Carey, D.P. (1991). A neurological dissociation between perceiving objects and grasping them. *Nature*, **349**, 154-156.

Goodale, M.A. & Milner, A.D. (1992). Separate visual pathways for perception and action. *Trends in Neurosciences*, **15**, 20-25.

Goodale, M.A. (1993). Visual pathways supporting perception and action in the primate cerebral cortex. *Current Opinion in Neurobiology*, **3**, 578-585.

Milner, A.D. & Goodale, M.A. (1995). *The visual brain in action*. New York: Oxford University.

What are Brains For?

Michael S. Gazzaniga

University of California, Davis

The question of what brains are for is quite different from the question "what do brains do?" Evolution constructs brains that make decisions that will enhance reproduction. Brains, however, can do many other things as well and one can view the brain as a collection of special devices devoted to maximizing our reproductive behavior. Frequently, psychologists and neuroscientists study what brains do, make suggestions about the atomization of the processes they study, and forget that what they are studying may be epiphenomenal to what brains are for. In this talk, the modern scientific study of how the brain enables our conscious mind will be examined from the evolutionary perspective and insights will be offered on how our brains create our personal sense of conscious unity.

What makes faces special? Evidence from agnosia

Morris Moscovitch

University of Toronto

Typically, experiments on face recognition in brain-damaged patients are conducted on people, such as prosopagnosics, who have an acquired difficulty in recognizing faces. I have taken the opposite tack and studied face-recognition in CK, a person with severe dyslexia and agnosia for objects but presumably intact face recognition. The rationale was that in this way I could study the operation of an intact face-recognition device without contamination from processes involved in recognizing objects and words. In this way, I hoped to determine what makes faces special. I report over 20 experiments on this individual and show that recognition of faces is intact only if they are presented upright and retain their gestalt. Inverting faces and fracturing them makes identification very difficult for CK though it only causes slight problems for controls. I conclude that normal face-recognition may involve two mechanisms, one that is unique for faces (and perhaps other configural stimuli) and one that is also used for recognizing objects.