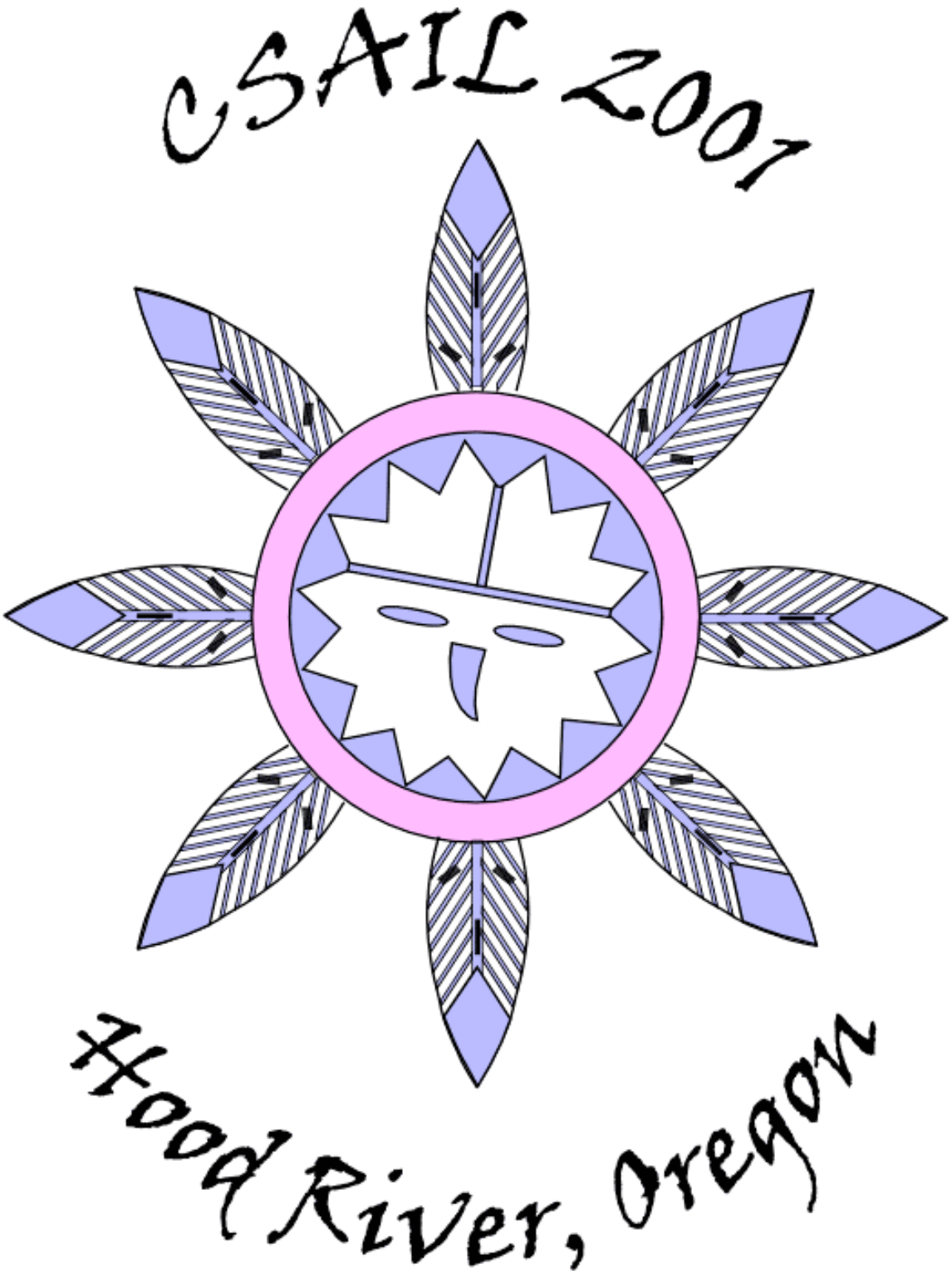

CSAIL 2001
Hood River, Oregon

Seventh Annual

Cognitive Science Association for Interdisciplinary Learning

July 26 to July 30, 2001
Hood River Hotel
Hood River Oregon

Note that all talks are 30 minutes and 10 minutes are allocated between talks for questions and discussion.

Thursday, July 26

4:30 PM **Reception**

5:15 PM **Welcome And Introductory Remarks**

5:30-6:00 PM Pierre Jolicœur
On the nature of capacity limitations in dual-task paradigms

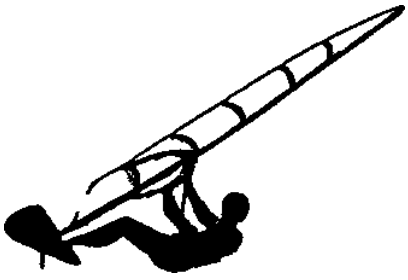
6:10-6:40 PM Ulrich Mayr
Task switching and long-term-memory retrieval

6:50-7:20 PM Edward Awh, John Serences, Paul Laurey, Harpreet Dhaliwal, and Michi Matsukura
Conscious visual perception of faces is unimpaired during the attentional blink

7:30 PM **Adjourn For Evening**

Cover Design:

The cover is a native American dream catcher, but created out of windsurfing boards. There are many different versions of the Legend of the Dream Catch, each tribe seems to have its own. Below is one version of the Legend



The Legend of the Dream Catcher

The Old Ones tell that dreams hold great power and drift about at night before coming to the sleeping ones. To keep the dreamer safe, Old Ones created a special web, the Dream Catcher, to hang above their sleeping places. When dreams traveled the web paths, the bad dreams lost their way and were entangled, disappearing with the first rays of daybreak. The good dreams, knowing the way, passed through the center and were guided gently to the sleeping ones. (http://home.att.net/~scorh2/DreamCatcher.html)

Friday, July 27

8:30 AM **Morning Refreshments**

Special Symposium:
Beyond the Perception/Action Dissociation

9:00-9:30 AM Bernhard Hommel
How we do what we want

9:40-10:10 AM Bruce Bridgeman
The information capacity of the sensorimotor visual system

10:20-10:50 AM Paul van Donkelaar and Ji-Hang Lee
The dorsal and ventral streams both contribute to pointing movements made to the Ebbinghaus illusion

11:00 AM **Break until 5:00 PM**

5:00 PM **Poster Session & Appetizers**

Featured Posters:

(5:00) Abigail B. Bautista
Inducing the Roelof's effect in visually open loop pointing: a case of non-dissociation

(5:10) Paul Dassonville & Jagdeep Kaur Bala
Roelofs' Illusion: Perception vs. Action, or Past vs. Present?

(5:20) Timothy Vander Velde, Anne Shumway-Cook, and Marjorie Woollacott
Visual Neural Mechanisms and Impact of Attentional Focus on Postural Control

5:30-6:00 PM Sarah Creem
Perceiving and Grasping Hand Tools: Interactions between the "Two Visual Systems"

6:10-6:40 PM Thomas Schmidt
Priming the kinetics of pointing movements: Online-control by barely visible isoluminant color stimuli

6:50-7:20 PM	Dennis Proffitt *Perceiving Geographical Slant*

7:30 PM **Adjourn For Evening**

Saturday, July 28

8:30 AM **Morning Refreshments**

Special Symposium Continued

9:00-9:30 AM Jörn Diedrichsen, Steven Kennerley, and Richard B. Ivry
The two autopilots for reaching movements do not talk to each other

9:40-10:10 AM Dan Meegan
I move, therefore I think: Shared mechanisms for cognition and motor control

10:20-10:50 AM Todd Parrish
Divining function with magnetic resonance imaging

11:00 AM **Break until 5:00 PM**

5:00 PM **Poster Session & Appetizers**

Featured Posters:

(5:00) Kim M. Goddard, Elzbieta B. Slawinski, Robert S. Sainsbury, and Peter Wass
Auditory and Visual Selective Attention Deficits in Schizophrenia

(5:10) Ani Flevaris and Dell Rhodes
What's left and what's right: Attention-centering of reference frames

(5:20) Bill Prinzmetal and Christin Hansen
Attention: Accuracy ≠ Reaction Time (*always)*

(5:30) Anthony S. Drew and Paul van Donkelaar
Allocation of Attention during smooth pursuit eye movements

5:40-6:10 PM Krista L. Schendel and Lynn C. Robertson
Reflexive Orienting to Moving Objects may Require Spatial Referents

6:20-6:50 PM Ervin Hafter
Signal detection flexibility in the magnitudes and levels of processing of receptive fields

7:00-7:30 PM Mark Van Selst and Mark Fillmore

The functional mechanism by which alcohol reduces inhibition

7:40 PM **Adjourn For Evening**

Sunday, July 29

8:30 AM **Morning Refreshments**

9:00-9:30 AM Elzbieta B. Slawinski and Kim M. Goddard
Age effects changes in auditory attention

9:40-10:10 AM Brent Edwards
Perceptually based algorithms that make the newest hearing aids radically better than anything proposed throughout the most of the 20th century

10:20-10:50 AM Bill Prinzmetal,
The X-Files theory of location perception

11:00 AM **Break until 5:00 PM**

5:00 PM **Poster Session & Appetizers**

Featured Poster:
(5:00) Jagdeep KaurBala, P. Dassonville, S.-G. Kim, and X.-H. Zhu
Correlates of perceptual awareness in a visual masking task

(5:10) Benjamin Levy and Michael Anderson
Inhibitory control during learning: Suppressing interference from semantic knowledge

(5:20) Rolf Nelson and Bill Prinzmetal
On pitch and roll: The relation between orthogonal dimensions in visual space perception

5:30-6:00 PM Steffen Werner
Sensitivity of human spatial memory to the perceived structure of the environment

6:10-6:40 PM Jeffrey M. Zacks and Barbara Tversky
Dissociable systems for mental spatial transformations

6:50-7:20 PM Edward H. Cornell, Autumn Sorenson, and Teresa Mio
Human sense of direction and way finding performance

7:30 PM **Ajourn**

8:00 PM **Banquet At Pasquale's Restaurant**

Monday, July 30

8:00 AM **Morning Refreshments (Note earlier time)**

8:30-9:00 AM Michael Anderson
Inhibitory control and the regulation of awareness

9:10-9:40 AM A.P. Yonelinas, N.E.A. Kroll, K. Baynes, I.G. Dobbins, C.M. Frederick, R.T. Knight, and M.S. Gazzaniga
Visual implicit memory in the left hemisphere: evidence from callosotomy and right occipital-lobe lesion patients

9:50-10:20 AM Kevin M. Sailor and Miriam Antoine
Is memory for stimulus magnitude bayesian?

10:30 AM **Have a safe trip home.**

Roll on, Columbia
Woody Guthrie

Roll on, Columbia, roll on,
Roll on, Columbia, roll on,
Your power is turning our darkness to dawn.
So roll on, Columbia, roll on.

Other great rivers lend power to you,
Yakima, Snake, and the Klickitat too,
Sandy Willamette and the Hood River too,
So roll on, Columbia, roll on.

And on up the river is Grand Coulee Dam,
The biggest thing built by the hand of a man,
To run the great factories and water the land,
So, roll on, Columbia, roll on.

Tom Jefferson's vision would not let him rest,
An empire he saw in the Pacific Northwest,
Sent Lewis and Clark and they did the rest.
So, roll on, Columbia, roll on.

Abstracts Thursday

Pierre Jolicœur
University of Waterloo

On the nature of capacity limitations in dual-task paradigms

Dual-task paradigms reveal sharp capacity limitations in our ability to process information. A general theme in this area is that central processing is capacity limited and that when Task 1 requires central mechanisms for a longer period of time, performance in Task 2 shows a larger deficit. I will present new evidence that supports this general view in the context of the attentional blink (AB) paradigm, in an experiment that teases apart effects of task difficulty from effects of task switching. Furthermore, I will contrast bottleneck models and capacity-sharing models of dual-task interference, and discuss criteria that can be used to distinguish between them.

Ulrich Mayr
University of Oregon

Task switching and long-term-memory retrieval

Switching between tasks produces substantial costs that can be reduced through opportunity for intentional, preparatory processes. Recently, Mayr and Kliegl (2000, JEP:LMC) provided evidence that this preparation-based switch component reflects nothing more and nothing less than LTM retrieval of upcoming task rules. One potential consequence of this notion is that much of what is usually referred to as task-switch costs actually reflects a switch in retrieval path rather than a switch in task demands (two aspects that are confounded in the typical task-switching paradigm). A task-switching paradigm with a 4:2 mapping between arbitrary letter cues and two different task sets allowed to implement trial-to-trial transitions with changes in cue (i.e., retrieval path) without corresponding changes in task, in addition to the usual task-repeat and task switch transitions. Results showed that at least 50% of the total task-switch costs can be attributed to the change in retrieval cue. Furthermore, this cue-related switch component proved to be identical with the intentional, preparation-related switch component. These results support the general view that operating in multi-task environments implies navigating a limited working-memory focus within a larger retrieval structure.

Edward Awh, University of Oregon
John Serences, Johns Hopkins University
Paul Laurey, Harpreet Dhaliwal, and Michi Matsukura, University of Oregon

Conscious visual perception of faces is unimpaired during the attentional blink

Identifying the fundamental limitations in visual processing has been a key strategy for determining the architecture of this system. One such limitation concerns the ability to process two visual targets in rapid succession. Numerous experiments have demonstrated that when a single visual target is identified there is a period of several hundred milliseconds afterwards when the processing of subsequent targets is impaired, a phenomenon labelled the attentional blink. The emerging consensus is that the identification of a visual target temporarily occupies a limited attentional resource that is essential for conscious visual perception. Here we show that at least one class of stimuli does not follow this rule. Face stimuli presented during the attentional blink period can be discriminated without any trace of impairment. The finding that an entire category of visual stimuli can evade the attentional blink presents an important challenge for our understanding of this otherwise robust form of dual task interference.

Abstracts Friday

Special Symposium:
Beyond the Perception/Action Dissociation

Dissociations and interactions of two visual processing-streams in sensori-motor control

The dissociation of visual processing for sensori-motor control (the dorsal stream) and for conscious perception and cognitive processing (the ventral stream) has emerged as one of the important concepts in contemporary cognitive neuroscience. However, motor control processes are able to take into account information from memory and context-dependent representations normally attributed to the ventral stream. This symposium will explore issues related to the integration of these two streams for adaptive motor control.

Bernhard Hommel, University of Leiden

How we do what we want

Voluntary actions are performed to achieve intended goals, suggesting that they are controlled through anticipating the effects they are expected to produce (the *ideo-motor principle*). According to the two-phase model of voluntary action proposed by Hommel and colleagues (Hommel, 1997; Elsner & Hommel, 2001) performing a movement leads to the automatic integration of its sensory effects and the motor pattern producing them. The resulting *action concept*, a truly sensorimotor structure, can then be used in the reverse direction: to activate the motor pattern by priming the effect representations. I present old and new evidence supporting this two-phase model from behavioral experiments in adults and infants, and from a PET study.

Bruce Bridgeman, University of California, Santa Cruz

The information capacity of the sensorimotor visual system

Recent work has differentiated two visual pathways, a cognitive pathway mediating normal perception and a sensorimotor pathway controlling visually guided behavior, but whose content is not accessible to awareness. A fundamental question is the information capacity of the sensorimotor system, how many objects it can represent and with what spatial and temporal resolution. We separate cognitive and sensorimotor pathways by response measure: a forced-choice estimate of target position probes cognitive information while an open-loop jab at the same target probes sensorimotor information. Cognitive information is distorted by a spatial illusion, the induced Roelofs effect, while sensorimotor information is insensitive to the illusion. Subjects can jab one of two simultaneously presented targets without a Roelofs effect (Bridgeman & Huemer, 1998), but the information remains in the sensorimotor pathway for only about 2 sec; here we measure performance for four targets, jabbed singly or in succession, approaching the capacity of working memory.

Paul van Donkelaar and Ji-Hang Lee
Dept. of Exercise and Movement Science, University of Oregon

The dorsal and ventral streams both contribute to pointing movements made to the Ebbinghaus illusion

The degree to which visual illusions affect motor output has become the topic of much recent discussion. We have previously demonstrated that the Ebbinghaus illusion affects the characteristics of pointing movements aimed at the central target circle: when the target circle appears big, pointing movements are faster and vice-versa, despite the fact that the target circle is physically the same size in both cases. Here we show that transcranial magnetic stimulation (TMS) delivered over either the ventral or dorsal stream disrupts the influence of the illusion on the action. By contrast, TMS delivered at a control site (SMA) had no influence on task performance. Taken together, this evidence suggests that both streams normally contribute to pointing movements based on relative object size information.

Abigail B. Bautista, Simon Fraser University & NASA Ames Research Center

Inducing the Roelof's effect in visually open loop pointing: a case of non-dissociation

Numerous studies have shown that visual information for action is veridical and is processed independently of perception (cognitive functions) in the presence of illusion generating visual context. Researchers have interpreted these findings as support for the Milner & Goodale (1995) Two-visual systems theory. The illusion known as the Roelof's was used to assess this view. We found that viewing a rectangular frame offset from the body's midline and that surrounds a central target results in a pointing bias in the direction opposite the direction of the frame's offset from the target location. These individuals that pointed with an unseen hand to the target were also instructed to stare at the target location while an ISCAN infrared eye tracking device recorded the direction of their gaze. The analyses of eye recordings found no difference in the direction of gaze regardless of the changes in the location of the rectangular frame. Additionally,

these participants were asked to stare and point to a position straight-ahead in the presence of the same rectangular frames used during the target pointing trial. Pointing to the straight-ahead was biased in the direction of the frame's offset for most but not all participants. Target pointing results contend with suggested hypotheses made in an earlier work by Bridgeman, Peery and Anaud (1997).

Paul Dassonville and Jagdeep Kaur Bala
Department of Psychology & Institute Of Neuroscience, University of Oregon

Roelofs' illusion: perception vs. action, or past vs. present?

Several investigations have provided evidence for two separate and dissociable brain systems for localizing targets in visual space: one controlled by a ventral processing stream (perceptual localization) that seems to be prone to spatial illusions, the other by a dorsal processing stream (sensorimotor localization) that seems to be immune to these illusions. However, when comparing the performance of these two systems with any experimental paradigm, care must be taken to ensure that they are being probed with tasks that ask the same question of each system. Even subtle differences in these queries (e.g., "Where is the target with respect to the body?" vs. "Where is the target with respect to an external reference?") can lead to faulty conclusions about the abilities of each system. We will discuss one particular illusion (Roelofs' Illusion) that was previously thought to differentially affect perceptual and sensorimotor localization - upon closer inspection, we find that the illusion differentially affects the localization of current and remembered targets, regardless of whether they are localized through perception or action.

Timothy Vander Velde, Univ. of Oregon
Anne Shumway-Cook, Univ. of Washington
Marjorie Woollacott, Univ. of Oregon

Visual neural mechanisms and impact of attentional focus on postural control

Aims of the current project were to investigate: (a) the nature of dual-task interference in stance postural control caused by distinct attentional demands designed to tax discrete (ventral vs. dorsal visual) processing streams in normal young adults (YA); (b) the impact of modulated attentional focus through varied instruction sets within a dual-task paradigm for YA, healthy older adults (HO), and balance impaired older adults (BIOA). Data from YA subjects suggest a weak negative relationship ($r = -.334$) between task performance employing dorsal processing and postural stability, which is not evident in dual-tasks employing ventral stream processing. This relationship may be indicative of a distinct dorsal stream processing bottleneck. Varied instructional sets indicate YA's and HOA's functionally and predictably modify performance. HOA's with a history of instability modify performance markedly less. Inability to modify performance based in attentional demands may be a significant factor contributing to falls in the elderly.

Sarah Creem, University of Utah

Perceiving and grasping hand tools: interactions between the "two visual systems"

Research has illustrated dissociations between visual cognition and visually guided action, suggesting that different representations may underlie phenomenal experience and visuomotor behavior. Other recent efforts have been made to define when these systems interact. In a series of experiments using a dual-task paradigm, we examine the dissociation and interaction of cognitive and motor representations in vision within the context of hand tools (Creem & Proffitt, 2001). We suggest that grasping a hand tool appropriately by its handle requires an interaction between the two systems. An effective grasp can be mediated by the visuomotor system alone. However, a grasp that is appropriate to the tool's functional identity requires information from the cognitive system. Our more recent studies examine the neural mechanisms involved in perceiving graspable objects using fMRI and the influence of motor representations on object recognition. Together, these studies will be discussed with respect to defining the factors that influence interaction between the two visual systems.

Thomas Schmidt, University of Goettingen

Priming the kinetics of pointing movements: Online-control by barely visible isoluminant color stimuli

Two-visual-systems theory (Milner & Goodale, 1995) states that color processing is generally separated from motor control in the primate brain. In order to use color information in a motor task, one would have to rely on color as consciously experienced, which would be very difficult if stimuli are efficiently masked. Here, a motor priming paradigm (Vorberg, Mattler, Heinecke, Schmidt, & Schwarzbach, in prep.) was used where participants were required to make a speeded pointing response toward the one of two target stimuli having a prespecified color. Targets were preceded by primes at the same positions having the same (consistent) or reversed (inconsistent) colors as the targets. Due to masking by the targets, discriminability of primes was uniformly low independent of prime-target delay. In spite of this, pointing movements started off in the direction specified by prime rather than target color, with a time course closely locked to prime onset. When the target arrived, this movement was either maintained when primes and targets were consistent or had to be reversed when they were inconsistent, with a time course now locked to target onset. These results strongly suggest a direct dynamic link between color processing and response control.

Dennis Proffitt, University of Virginia

Perceiving geographical slant

Hills appear to be far steeper than they are, and yet, we do not stumble whenever we step onto an incline. Hills appear steeper when we are tired, encumbered, in poor physical condition, or elderly and in poor health, and still, these conditions do not cause us to misstep when beginning an ascent. I will present evidence that our conscious perception of geographical slant is highly exaggerated, moreover I will argue that this overestimation is a good thing. I will also present evidence showing that our visually guided actions with respect to slant are accurate, and I will argue that this is also a good thing. Finally, I will discuss these results in the context of both a dissociation and an interaction between the ventral and dorsal streams of visual processing.

Jörn Diedrichsen, Steven Kennerley, and Richard B. Ivry
University of California, Berkeley

The two autopilots for reaching movements do not talk to each other

Following target displacements during unimanual reaching, online adjustments occur fast, effortlessly, and sometimes even without awareness. These results have given rise to the idea that an "autopilot" ensures the hand arrives at the correct target location. In this study we explore the operation of the "autopilot" during bimanual movements when the two hands move to separate targets. Both targets could be displaced at the onset of the movement. The initial adjustment to the hand trajectory began 180ms after the displacement, independent of whether the movement was made uni- or bimanually. During bimanual trials, the time of the adjustment was independent of whether the other target was displaced. We also failed to see cross talk between the spatial trajectories produced by the two hands. In another study, the change of target position was indicated by a color change. Under this condition, the adjustments occurred approximately 100 ms later than when the target jumps. However, the adjustments of the two hands were relatively independent from each other and performance in the bimanual task did not differ substantially from the unimanual task. These findings argue that the systems for online control of reaching can work in parallel for the two hands regardless of whether the change in target position is signaled through a spatial deviation or a color change.

Dan Meegan, University of Guelph

I move, therefore I think: Shared mechanisms for cognition and motor control

Neuropsychological and neuroimaging studies have repeatedly demonstrated the involvement of "motor" areas (e.g., cerebellum, basal ganglia, and frontal cortex) in cognition. One interpretation of these findings is that processes that evolved for motor control have been co-opted or adapted to subserve cognitive functions with similar processing requirements. I will review evidence that supports this interpretation for two types of processing: temporal and spatial. For example, training on a cognitive timing task transfers to a motor timing task with similar temporal processing requirements (Meegan et al., 2000, Nature Neuroscience, 3: 860). These results are consistent with other evidence that the cerebellum plays a role in both cognitive and motor timing. The involvement of dorsal premotor cortex in both spatial motor control and spatial cognition (working memory, imagery, attention) will also be discussed from this perspective (Meegan, 1998, Science, 280:1676).

Todd Parrish, Northwestern University

Divining function with magnetic resonance imaging

Functional magnetic resonance imaging (fMRI) utilizes an indirect method of inferring function. The assumption that neuronal activation is followed by an increase in blood flow is valid most of the time. However the mechanism of the signaling or the blood flow coupling is not well understood. Nevertheless, fMRI is now widely used to „understand how the brain works. Using this technology it is possible to investigate the impact of caffeine or Melatonin (both known vasoconstrictors) on the coupling of blood flow and neuronal activity. Subjects are able to perform tasks despite the dramatic decrease in blood flow. Furthermore, fMRI allows one to investigate the effect of acupuncture on the brain without assuming any type of mechanism. These studies show that there exists some connection between primary cortices and the acupuncture points on the leg of naïve subjects. Thus giving evidence for investigating acupuncture.

Kim M. Goddard, Elzbieta B. Slawinski, Robert S. Sainsbury
Department of Psychology, University of Calgary
Peter Wass, Alberta Mental Health Board, Ponoka, Alberta

Auditory and Visual Selective Attention Deficits in Schizophrenia

Schizophrenia is a psychiatric disorder associated with significant impairments in cognitive functioning. Indeed, key deficits in the areas of sustained attention and verbal memory are particularly robust and have been shown to act as rate-limiting factors in social and occupational outcome. However, the effects of other aspects of cognitive functioning, such as selective attention, are less clear, despite the observation that selective attention impairments have long been hypothesized to be a core feature in schizophrenia and may be an underlying factor in sustained attention and memory problems. Accordingly, using attentional blink tasks, we are investigating the extent to which selective attention impairments contribute to sustained attention and memory problems in a population of schizophrenia patients compared with controls. We will present our preliminary data and discuss the potential implications for cognitive theories of selective attention, as well as possible clinical applications.

Ani Flevaris and Dell Rhodes, Reed College

What's left and what's right: Attention-centering of reference frames

A few studies have documented "attention-centering" of a visual spatial reference frame. An influence of the fixation-based frame has sometimes remained, and has been attributed to a lack of complete control over the locus of attention. We modified a paradigm developed by Montgomery & Rhodes (CSAIL, 1999) to include a difficult shape discrimination at the locus of attention. Two spatial biases that occur in normal participants were used to establish the location(s) of the origin(s) of the functional spatial reference frame(s): a rightward scene-based bias in the letter reflection task and the Simon effect. With more control over the locus of attention (and using an eye tracker to monitor fixation), evidence for fixation-based processing disappeared. The rightward scene-based bias appeared around the locus of attention, modulated by target location eccentricity. The Simon effect appeared around attended locations when these were dissociated from fixation. These results indicate the importance of attention in establishing the origin of spatial reference frames.

Bill Prinzmetal and Christin D. Hansen, University of California, Berkeley

Attention: accuracy ≠* reaction time (*always)

In attention research, it is often assumed that accuracy and reaction time are interchangeable measures of performance. For example, in the Posner cueing paradigm, it is thought that there is a higher signal-to-noise ratio following a valid than an invalid spatial cue, leading to both more accurate discrimination performance and faster reaction time for validly cued trials. While this pattern of results holds for experiments with long SOA and predictive cues ("endogenous cueing"), several studies have failed to find an effect of cueing on accuracy with short SOAs (exogenous cueing). In four experiments, we directly ran equivalent reaction time and accuracy experiments. With long SOA's and predictive cues, speed and accuracy experiments show equivalent patterns of results. However, with short SOA's and nonpredictive cues, reaction time and accuracy show different patterns of results. The results can not be accounted for by a speed-accuracy tradeoff. Different mechanisms are proposed to account for endogenous and exogenous cueing.

Anthony S. Drew and Paul van Donkelaar, University of Oregon

Allocation of attention during smooth pursuit eye movements

Manual reaction times were recorded from individuals responding to changes in a pursuit display. The display was an "X" flanked by four targets to the left and right at 1, 2, 3, and 4o. Subjects pursued the "X" while the display moved rightwards at 5 or 10o/s. At 10o/s, latency was faster for changes occurring 1o to the right than it was for changes occurring 1o to the left. This latency benefit was not present for the more peripheral targets or for any of the peripheral targets at 5o/s. Application of Carpenter's LATER model showed that the latency benefit for the 1o rightward target during 10o/s pursuit was due to an increased rate of rise of the decision signal. Our results suggest that attention is directed ahead of a target during smooth pursuit and that the spatial extent of that allocation is approximately 1o when the pursuit velocity is 10o/s.

Krista L. Schendel and Lynn C. Robertson, U.C. Berkeley

Reflexive Orienting to Moving Objects may Require Spatial Referents

Recent evidence suggests separate location- and object-based attention mechanisms. Within the realm of reflexive attention, both facilitatory and inhibitory cueing effects have been observed for moving objects, suggesting that attention is capable of reflexively tagging an object independently of its spatial position. However, these findings have relied on paradigms in which the relative positions of the objects are maintained during stimulus motion. Thus, cueing effects may have been observed for cued objects either because attention was allocated to the objects themselves, or because attention operated on the objects' relative spatial positions within the display. The current studies examined attentional orienting in displays containing various types of motion. In some trials, the objects maintained their relative spatial positions as they moved, while in other trials, the objects moved more independently. Results indicate that object-based cueing effects are specific to conditions in which moving objects maintain their overall spatial configuration. This implies that reflexive orienting may require spatial referents.

Ervin Hafter, U. C. Berkeley

Signal detection flexibility in the magnitudes and levels of processing of receptive fields

Typical analyses and modeling of the detection of auditory signals in noise begin with the notion that performance is limited by the noise falling within the bandwidth of a single filter or receptive field initially set by peripheral processes in the sensory end organ. However, results from a study of the joint effects of signal uncertainty and a treatment meant to affect attention suggest a flexibility in the bandwidth of the filters in response to top-down processes, thus raising questions about the nature of such filters and where in the chain of processing they are located.

Mark Van Selst, San Jose State University
Mark Fillmore, University of Kentucky

The functional mechanism by which alcohol reduces inhibition

Depressant and anxiolytic drugs, such as alcohol, are suggested to temporarily weaken behavioral inhibition processes, leaving the activational processes to dominate behavior. Observations of extreme or antisocial behavior under alcohol have led many to infer that the drug "disinhibits" behavior. Only recently has behavioral inhibition under alcohol been measured directly (Mulvihill et al., 1997; Fillmore & Vogel-Sprott, 1999, 2000). That research used the stop-signal paradigm and found that a moderate dose of alcohol selectively reduced the drinkers' ability to inhibit their behavior while leaving their ability to activate behavior unaffected. These early findings support the notion that behavioral inhibition is particularly sensitive to the impairing effects of alcohol. Further experiments using the PRP paradigm demonstrate a within-subject dose effect of alcohol on no-go PRP. The implication (pending replication across a larger sample) is that we now have a method of experimentally investigating the processing underlying inhibitory control under alcohol. Potential cognitive and clinical applications will be discussed.

Abstracts Sunday

Elzbieta B. Slawinski and Kim M. Goddard, University of Calgary

Age effects changes in auditory attention

In spite of the many sounds simultaneously or successively entering the auditory system, listeners can readily focus attention on priority stimuli and analyze their properties in considerable detail, often at the expense of less relevant inputs. Thus, when attempting to manage the vast array of information available to listeners in their everyday world, one can selectively attend to, and process particular aspects of input, usually to the exclusion of other aspects. This suggests that the consequences of focusing attention on the processing of multiple stimuli whether simultaneous or sequential, is a function of selective attention. Previous results have suggested that processing information about a tone within a stream of tones presented at a rate of 11 tones/s can modify perception of subsequent tones. The results of the current study suggest that perception of subsequent tones is also a function of age.

Brent Edwards, Sound ID, Palo Alto, California

Perceptually based algorithms that make the newest hearing aids radically better than anything proposed throughout the most of the 20th century

Until recently, hearing aids had advanced little beyond the functionality of handheld "ear trumpets" in their ability to compensate for sensorineural hearing loss. Over the past decade, significant scientific advances toward understanding the physiological mechanisms and psychoacoustic consequences of hearing loss have occurred, in addition to considerable technological advances in the signal processing capabilities of hearing aids. The combination of these two developments have allowed us to address more sophisticated questions regarding the perception of the hearing impaired. Additionally, perceptual phenomenon that had been ignored or misclassified are now being addressed and understood. The real-time application of cochlear models, noise reduction algorithms, binaural processing, and other techniques to hearing aids are opening new areas of research in this field, including attention effects and acclimatization.

Bill Prinzmetal, University of California, Berkeley

The X-Files theory of location perception

The perception of the location of an object is central to many aspects of cognition. For example, in order to grasp an object, one must locate it. The integration of features for recognition depends on the location of the object's features. Finally, many visual illusions could be described in terms o f the misperception of location. The paper presents a neurally plausible theory of location perception, called the X-Files theory. Three aspects of location perception will be presented: (1) how the visual system integrates information for the perception of location; (2) how attention operates to affect the perception of object location; (3) how the visual system may deal with the locating an object when multiple objects are present in the scene.

Jagdeep Kaur Bala, P. Dassonville, University of Oregon, Eugene,
S.-G. Kim, X.-H. Zhu, University of Minnesota, Minneapolis

Correlates of perceptual awareness in a visual masking task

Perceptual awareness of a given event is vulnerable to many types of task manipulations. Backward visual masking is one such phenomenon, in which the presentation of a nonprimary image (the mask) can reduce or eliminate a subject's ability to detect or recognize a primary visual stimulus presented earlier. Under appropriate masking conditions, identical stimulus presentations result in trial-by-trial differences in the subject's awareness of the stimulus, providing an excellent opportunity to isolate patterns of neural activation that correlate with awareness. Following this logic, event-related fMRI was used to determine the pattern of neural activation in the fusiform face area (FFA) in response to masked images of faces. The activation of the FFA tightly correlated with the subject's detection of the stimulus rather than the contents of the stimulus per se, providing a glimpse of a neural signature of perceptual awareness. Furthermore, the activation was inversely related to recognition success, suggesting that FFA is additionally modulated by the effort required to recognize a face.

Benjamin Levy and Michael Anderson, University of Oregon

Inhibitory control during learning: Suppressing interference from semantic knowledge

Inhibitory control processes are thought to play an important role in resolving interference in a variety of cognitive tasks. In the current experiment, we sought to determine whether these inhibitory processes play a role in new episodic learning. Specifically, when you try to form a new association between two ideas, to what extent do people suppress related, potentially distracting information from their semantic memory? After studying word pairs (e.g., "thorn - irritate"), subjects were given an apparently unrelated semantic generation task where some of the possible responses were strong associates to words they had studied earlier (e.g., for "flower - r____ " subjects could have generated "rose"). The critical associated words were generated less frequently when the related words had been studied previously, suggesting that these semantic associates had been inhibited during learning of the word pairs. These results provide evidence that new episodic learning, in general, may involve suppression of pre-experimental semantic knowledge.

Rolf Nelson and Bill Prinzmetal, University of California, Berkeley

On pitch and roll: The relation between orthogonal dimensions in visual space perception

How do the perception of roll and the perception of pitch interact with each other in a 3D environment? Two experiments were conducted to address this issue. A rectangular structure with glow-in-the-dark vertical and horizontal lines was used. This structure could be adjusted along both its roll and pitch dimensions. Participants were asked to adjust a luminous rod (in the center of the structure) to be aligned with respect to gravity. When this rod could be adjusted along the roll dimension, an effect of the roll (but not the pitch) of the structure was found. When the rod could be adjusted along the pitch dimension, an effect of the pitch (but not the roll) of the structure was found. Finally, when the rod could be adjusted along a plane midway between the pitch and roll planes, both pitch and roll had an effect. The second experiment elaborated on this third condition. Several models are compared and contrasted in light of these results.

Steffen Werner, Department of Psychology, University of Idaho

Sensitivity of human spatial memory to the perceived structure of the environment

Remembering the location of objects in one's environment is one of the fundamental cornerstones of spatial cognition. Previous research suggests that access to such spatial knowledge depends on the orientation of an observer during learning (orientation-specificity). In contrast, our line of research indicates that alignment with the perceived geometrical structure of an environment largely determines the accessibility of spatial knowledge. In a number of studies we were able to show that alignment with salient axes of an environment (e.g., symmetry axes, gradient, functional relevance) leads to a decrease in error rate and retrieval time compared to misaligned conditions. These results suggest that human spatial memory uses salient geometrical features of the environment as a spatial reference system for encoding or retrieving positional information. Implications for the organization of spatial knowledge and for the design of spatial interfaces are discussed.

Jeffrey M. Zacks, Washington University
Barbara Tversky, Stanford University

Dissociable systems for mental spatial transformations

At least two classes of mental spatial transformation can be distinguished: OBJECT-BASED SPATIAL TRANSFORMATIONS are imagined movements of external objects, and EGOCENTRIC PERSPECTIVE TRANSFORMATIONS are imagined movements of one's point-of-view. Neuropsychological and neurophysiological evidence suggests these two classes of transformation may be performed by dissociable systems. In this study, participants made spatial judgments about pictures of human bodies and small, manipulable objects. Two kinds of judgment were made: parity (same vs. different) and handedness (left vs. right). Patterns of response time indicated that which system is selected to perform a spatial reasoning task depends on (a) the judgment performed, (b) the stimulus about which the judgment is made, and (c) the instructions provided to the participant. Performance on these tasks correlated in predictable fashion with psychometric measures of spatial ability. These results provide convergent evidence for the existence of multiple, specialized systems for performing mental spatial transformations.

Edward H. Cornell, Autumn Sorenson, and Teresa Mio, University of Alberta

Human Sense of Direction and Way Finding Performance

Over a century has passed since the construct of a human sense of direction began to be described in scientific literature (Darwin, in Romanes, 1883) Since then, explanations of the processes underlying a human sense of direction have diverged. Nevertheless, people's ratings of their own sense of direction may reflect their orientation skills, and the study of individual differences in self-ratings may provide clues about process explanations and potential applications for personnel selection and training. The purpose of the research described here is to examine the construct validity of self-ratings of sense of direction. We began by asking what people who are rating their sense of direction consider it to be. Their suggestions were the basis for three experiments that establish correlations between ratings of sense of direction and performance on real-world way finding tasks. The tasks include the ability to stay on course after confronting a detour on a familiar path, the ability to make a short cut in a new neighborhood, and the ability to infer which hallway leads to a room within a building complex that had been viewed from the outside.

Abstracts Monday

Michael Anderson, University of Oregon

Inhibitory control and the regulation of awareness

The ability to terminate prepotent responses is widely viewed as a crucial function of executive control. In this talk, I present evidence that these control processes can be recruited to terminate retrieval from long-term memory. When subjects were asked to view a retrieval cue and prevent an associated memory from entering awareness, delayed recall of that memory was significantly impaired. Memory for the event was impaired regardless of whether it was tested with the originally trained retrieval cue or with a new cue never presented in the experiment. The degree of memory impairment exhibited on the final test increased with the number of times that the memory was avoided, and was insensitive to incentives to recall items. These studies show that retrieval can be terminated by controllable inhibitory processes and that these processes cause forgetting. Implications of these findings for the regulation of awareness will be discussed.

A.P. Yonelinas, N.E.A. Kroll, K. Baynes, I.G. Dobbins, University of California Davis
C.M. Frederick & R.T. Knight, University of California Berkeley
M.S. Gazzaniga Dartmouth College

Visual implicit memory in the left hemisphere: evidence from callosotomy and right occipital-lobe lesion patients

Identification of visually presented objects and words is facilitated by implicit memory for past visual experiences with those items. Several behavioral and neuroimaging studies suggest that this form of memory is dependent on perceptual processes localized in the right occipital lobe. We tested this claim by examining implicit memory in patients with extensive right occipital lobe lesions, using lexical decision, mirror reading, picture fragment, and word fragment completion tests, and found that these patients exhibited normal levels of priming. We also examined implicit memory in patients with complete callosotomies, using standard and divided-visual-field word fragment completion procedures, and found that the isolated left hemisphere exhibited normal priming effects. The results indicate that the right occipital lobe does not play a necessary role in visual implicit memory, and that the isolated left hemisphere can support normal levels of visual priming in a variety of tasks.

Kevin M. Sailor and Miriam Antoine, Lehman College of CUNY

Is memory for stimulus magnitude bayesian?

Memory for stimulus magnitude is frequently less extreme than actual stimulus magnitude. One explanation of this bias is that memory for stimulus value is a Bayesian weighting of the magnitude of an exemplar and the central tendency of the exemplar's category (Huttenlocher, Hedges, & Vevea, 2000). In several experiments, we demonstrate that reproductions of simple stimuli were biased toward the mean of the combined distribution rather than the mean of each category. Reproductions were also influenced by the size of the stimulus on the preceding trial. Neither of these results is entirely consistent with the view that recollections are partially constructed from a consideration of the long run probabilities established by category membership.

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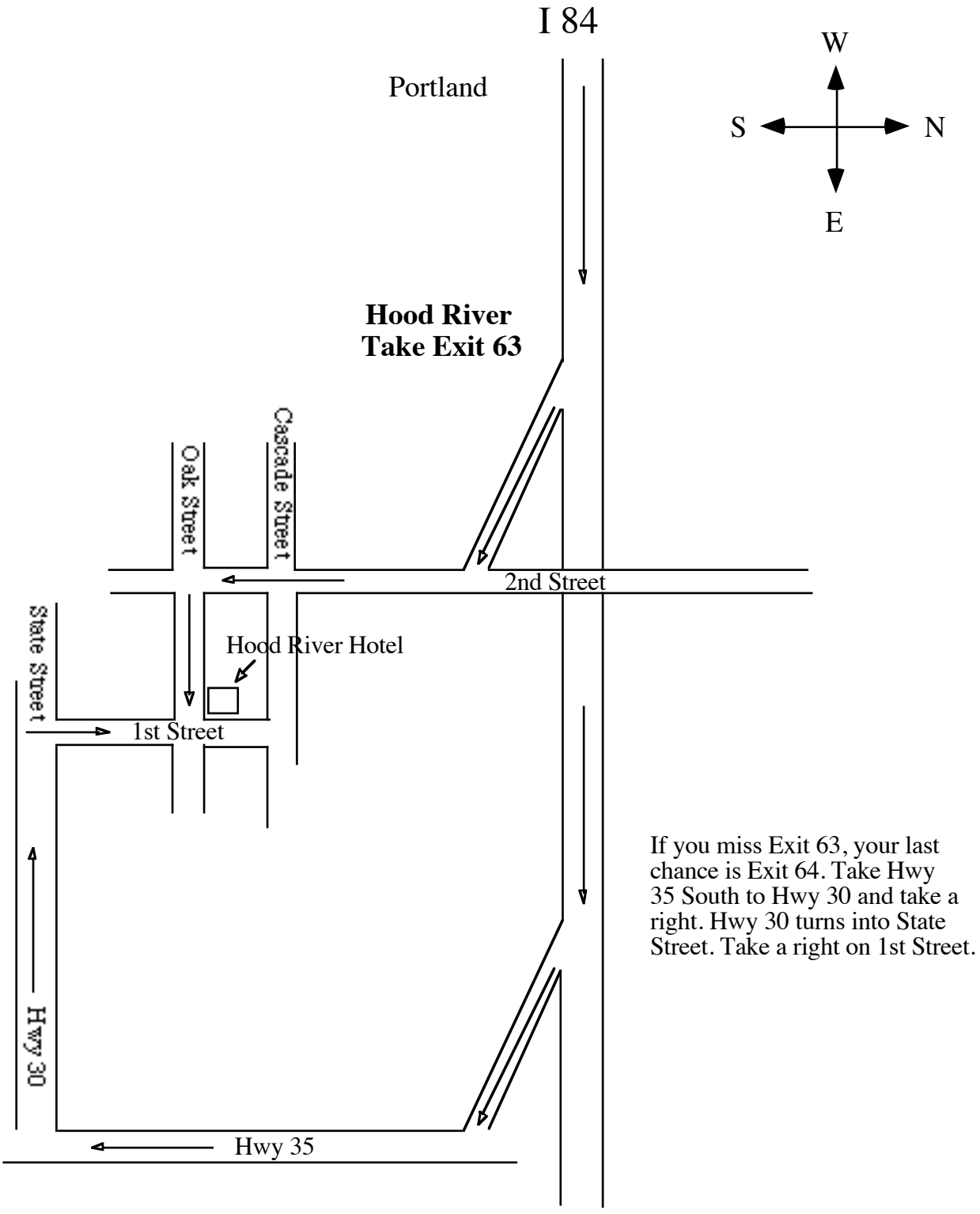
Directions to Hood River Hotel from Portland

(Approximately 60 miles)



If you miss Exit 63, your last chance is Exit 64. Take Hwy 35 South to Hwy 30 and take a right. Hwy 30 turns into State Street. Take a right on 1st Street.