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Cognitive Science Association for Interdisciplinary Learning

Hood River, Oregon

July 31 to August 4, 2008

Fourteenth Annual
Cognitive Science Association for Interdisciplinary Learning
July 31 to Aug. 4, 2008
Hood River Hotel
Hood River Oregon

Posters will be presented during breakfast.

Thursday, July 31

4:45 PM **Reception**

5:00 PM **Welcome And Introductory Remarks**

Talks – 10 minutes

5:10-5:20 Keisuke Fukuda and Edward K. Vogel
Individual Differences In Resistance To Attentional Capture

5:20-5:30 Lin Li and Peter Graf
Estimating Time In The Course Of A Time-Based Prospective Memory Task

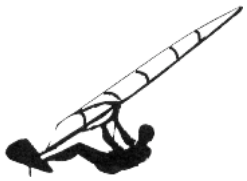
Talks – 30 minutes

5:30-6:00 PM Peter Graf
Monitoring Strategies In Time-Based Prospective Memory

6:10-6:40 PM Bob Uttl, Kimberley Baltimore, and Dylan Smibert
Prospective Memory And Aging After 25 Years

6:50-7:20 PM Susan M. Ravizza, Marjorie Solomon, Petrina Kaluzhny, Richard B. Ivry, and Cameron S. Carter
Basal Ganglia And Cerebellar Motor Contributions To Attentional Processes In Autism Spectrum Disorders

7:30 PM **Adjourn For Evening**



Friday, August 1

8:30 AM	**Breakfast - Posters**
9:00-9:30 AM	Karen B. Schloss and Stephen E. Palmer *The Berkeley Color Project: Color Combinations*
9:40-10:10 AM	Diane E. Marian and Arthur P. Shimamura *An Emotional Illusion: Dynamic Expressions Bias The Evaluation Of Neutral Faces*
10:20-10:50 AM	Paul Dassonville, Tim Sanders, and Brad Capp *The Rod-In-Frame And Simultaneous Tilt Illusions: Two Tests Of The Two-Wrongs Hypothesis*
11:00 AM	**Break until 5:00 PM**
4:45 PM	**Appetizers**
	Talks – 10 minutes
5:00-5:10	Ben Lester and Paul Dassonville *Attentional Capture Modulates The Induced Roelofs Effect*
5:10-5:15	Tim Sanders and Paul Dassonville *The Zöllner Illusion: Misperception Of Line Orientation Or Reference Frame*
5:20-5:30	François Vachon, Sébastien Tremblay, Robert W. Hughes and Dylan M. Jones *Capturing The Mask In The Auditory Attentional Blink: Unmasking Limitations Of Masking Accounts*
	Talks – 30 minutes
5:30-6:00 PM	Frederick J. Gallun *Rapid Processing Of Brief Non-Speech Auditory Stimuli*
6:10-6:40 PM	G. Christopher Stecker *Recency Effects In Auditory Sensory Memory For Sound Localization?*
6:50-7:20 PM	Pierre Jolicoeur, Christine Lefebvre, Stephan Grimault Francois Vachon, Robert Zatorre and Isabelle Peretz *Electromagnetic And Functional Brain Imaging Explorations Of Acoustic Short-Term Memory*
7:30 PM	**Adjourn For Evening ~ *Enjoy Hood River's First Friday Festival***

Saturday, August 2

8:30 AM **Breakfast - Posters**

9:00-9:30 AM Matthew S. Cain and Arthur P. Shimamura
When Practice Doesn't Make Perfect: Practice-Induced Task Switching Costs

9:40-10:10 AM Catherine M. Arrington,
Eliciting Voluntary Behavior In Multitask Environments

10:20-10:50 AM Stephen R. Mitroff
The Malleability Of Visual Cognition: Effects Of Videogame Playing On Vision And Motivation

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

4:45 PM **Appetizers**

Talks – 10 minutes

5:00-5:10 Clayton E Curtis
Persistent Neural Activity In The Human Frontal Cortex When Maintaining Space That Is "Off The Map"

Talks – 30 minutes

5:10-5:40 Ian P. Rasmussen, Daniel I. Brooks, and Andrew Hollingworth
The Interaction Between Global And Local Scene Features In Contextual Cueing

5:50-6:20 PM Elisabeth Hein, Cathleen M. Moore, and John Palmer
Perceptual Structure Facilitates Spatial Filtering

6:30-7:00 PM Michael Esterman, Yu-Chin Chiu, Benjamin Rosenau and Steven Yantis
Decoding Cognitive Control

7:10-7:30 PM Bill Prinzmetal
What Causes IOR And Contingent Capture?

7:40 PM **Adjourn For Evening**

Sunday, August 3

8:30 AM **Breakfast - Posters**

9:00-9:30 AM Philip L. Smith
The Computational Dynamics Of Visual Attention

9:40-10:10 AM Serap Yigit, John Palmer, and Cathleen Moore
Partially Valid Cueing And Spatial Filtering Reveal Different Kinds Of Selection

10:20-10:50 AM Alec Scharff and John Palmer
Distinguishing Serial And Parallel Models Using Variations Of The Simultaneous-Sequential Paradigm

11:00 AM **Break until 4:50 PM**

No appetizers on Banquet Night

Talks – 10 minutes

4:50-5:00 Neil B. Albert, Edwin M. Robertson, and R. Chris Miall
Spontaneous Fluctuations In BOLD Signal Reflect Prior Experience

5:00-5:10 Igor Dolgov, Michael McBeath, Ellen Campana, and David Birchfield
Mobility And The Axis-Aligned Motion Bias: Locomotive Judgment Techniques Outperform Stationary Perceptual Prediction In Judging Trajectories Of Moving Geometric Shapes

5:10-5:20 Joseph Austerweil and Thomas L. Griffiths
Analyzing Perceptual Feature Learning As Nonparametric Bayesian Inference

Talks – 30 minutes

5:20-5:50 PM Timothy D. Verstynen and Philip N. Sabes
Variability Vs Flexibility: How Experience Can Adaptively Change Motor Representations

6:00-6:30 PM Kimberly M. Halvorson, Eliot Hazeltine, Sian Beilock, and Tana Truelove
What Is So Hard About Bimanual Coordination? Evidence For Conceptual Interactions Between Tasks

6:40-7:10 PM John Dewey, Adriane Seiffert, and Tom Carr
How Do We Know When We're Movers And Shakers? *Perception Of Causal Agency During Performance Of Actions*

7:20 PM **Adjourn**

Banquet At Pasquale's Restaurant 7:30

Monday, August 4

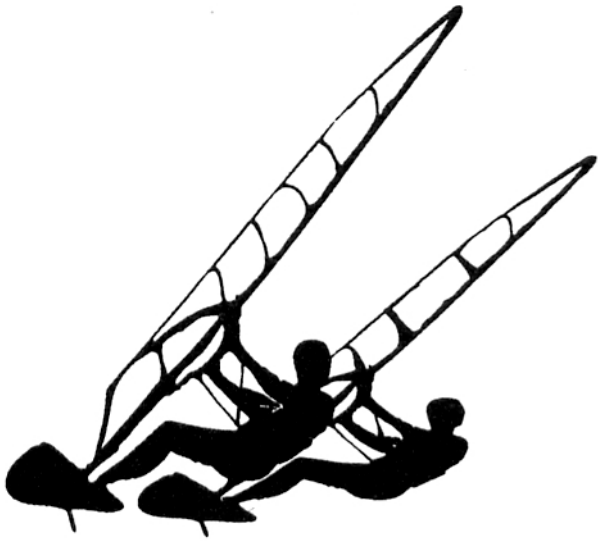
8:00 AM **Breakfast – Posters (Note earlier time)**

8:30-9:00 AM Edward F. Ester, Edward Awh, Edward K. Vogel and John T. Serences
Feature-Specific Mnemonic Representations In Human Primary Visual Cortex

9:10-9:40 AM Akina Umemoto, Miranda Scolari, Edward K. Vogel, and Edward Awh
Implicit Acquisition Of Statistical Regularities About Target Location Biases Encoding Into Visual Working Memory

9:50-10:20 AM Trafton Drew, Andrew Mccollough, Todd Horowitz, and Edward Vogel
Probing The Allocation Of Attention During Multiple Object Tracking With ERPs

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.

Posters

Elizabeth A. Franz, University of Otago
Charmayne M.L. Hughes, Purdue University
Alexandra Sebastian, Freiburg University

Conceptual Constraints And Levels Of Representation In Bimanual Actions

The conceptual constraint hypothesis was proposed by our laboratory to account for representational constraints in bimanual actions based on initial findings from trajectory drawing tasks (E.A. Franz, H.N. Zelaznik, C. Walter and S. Swinnen, 2001, Journal of Motor Behavior). According to this hypothesis, if a bimanual action is conceptualized as a (single) unitary task involving both hands (rather than as two separate tasks), some of the spatial, temporal, and motor constraints that normally regulate performance, can be overridden. In other words, with unitary representation, the bimanual task is reduced from a dual-task to a single task. We further hypothesized that different constraints are flexibly organized depending on attention to primary and subordinate goals: the levels of constraint framework (Franz, 2004, Journal of Motor Behavior). Here, we present additional support for these hypotheses based on a set of studies using reaching movements to target objects with specific manipulations on task goals. Poster

Anastasia V Flevaris, University of California, Berkeley
Shlomo Bentin, Hebrew University, Jerusalem
Lynn C Robertson, University of California, Berkeley

Attention To Hierarchical Level Influences Spatial Frequency Processing

Ample evidence indicates that different neural mechanisms support the efficiency of processing global and local levels of hierarchical stimuli (Navon patterns), although the nature of these mechanisms is debated. Some studies have associated global versus local perception with the use of relatively low versus relatively high spatial frequencies, respectively (e.g., Ivry & Robertson, 1998). Others have implicated differences in saliency of the two levels as the relevant variable (e.g., Mevorach et al., 2006). In the present study we asked if imposing a global or local bias would induce a subsequent bias to process low or high spatial frequencies, respectively. The association between global versus local perception and the processing of low versus high spatial frequencies was corroborated. Participants were faster at reporting the orientation of low than high spatial frequency gratings following attention to the global level of a hierarchical stimulus, and they were faster at reporting the orientation of the high than low spatial frequency gratings following attention to the local level. Poster

Ayelet N. Landau and Lynn C. Robertson, University of California, Berkeley

Spatial Attention Accelerates Inter-Hemispheric Transfer Time

The present study was designed to examine perceptual responses under different spatial attention conditions to lateralized stimuli. EEG was recorded from scalp electrodes while participants were either attending or ignoring faces presented to the right or left of fixation. Event Related Potentials (ERPs) to interspersed faces were measured for two attention conditions (attend-face/ignore-face). Each display contained a symbol at the center of fixation and a lateralized presentation of a face. Faces either appeared to the left of fixation or to the right of fixation (in separate blocks). In the attend-face condition, participants were monitoring the peripheral faces covertly for an inverted face. In the ignore-face condition participants were instructed to monitor the symbols for an 'x' and pay no attention to the subsequently presented face while maintaining fixation. ERPs to attended and ignored faces were compared in a group of 16 neurologically healthy participants. General perceptual markers (P1) and indices of face processing (N170) were modulated by spatial attention. The nature of this modulation for faces was different for right visual field (RVF) and left visual field (LVF). Most importantly, analysis of peak latencies for both P1 and N170 revealed a robust acceleration in the interhemispheric transfer with spatial attention. When the face was attended the time difference between ipsilateral and contralateral response over extrastriate channels was smaller compared to when the faces were ignored. The acceleration in transfer time between the hemispheres was symmetric and equal for LVF and RVF presented faces. These findings suggest that the speed of hemispheric cross-talk in addition to amplitude modulations is influenced by spatial attention in the visual modality. Poster

Alexander Stevens and Arun Garg, Oregon Health & Science University

Implicit Learning And Awareness

Implicit learning often precedes awareness of the relationships among stimuli. Once these associations enter awareness they are then available to selective attention. We studied how different implicit cue-target relationships influenced response times in a series of simple target detection tasks using rapid serial visual presentation. Implicit learning measured by decreases in response times (RT) was present in nearly all subjects, when the cue immediately preceded the target, although only 50% of the subjects detected the relationship. When a random foil separated the cue from the target, there was no evidence of implicit learning nor did any subject detect the cue-target relationship. When two sequential cues were separated from the target by a random foil, RTs did not decrease, however, variability in RTs was significantly reduced. These approaches provide the basis for studying the emergence of awareness from implicitly learned relations. Poster

Abstracts Thursday

Keisuke Fukuda and Edward K. Vogel, University of Oregon

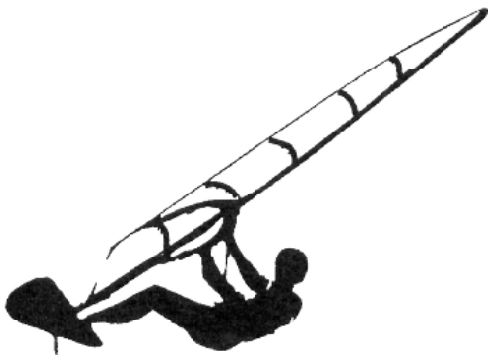
Individual Differences In Resistance To Attentional Capture

The visual short-term memory (VSTM) capacity for simple objects is known to be severely limited, yet variable across individuals. Such individual differences have often been ascribed to variability in storage space. However, it is also possible that it stems from the efficiency of attentional control that restricts access to VSTM. In the present study, we examined individual differences in the initial allocation of spatial attention towards target and distractor onsets by measuring P1N1 ERP components. Here we found that when targets were presented in isolation or with task-irrelevant distractors, all subjects allocated attention equivalently. However, when the target was accompanied by task-relevant (contingent) distractors, high capacity subjects maintained a tight focus upon the target location, whereas the low capacity subjects reallocated attentional focus to include the distractor locations. These results suggest that individual differences in VSTM may stem from variability in resisting attentional capture by the onsets of contingent distractors. Short Talk

Lin Li, East China Normal University & University of British Columbia
Peter Graf, University of British Columbia

Estimating Time In The Course Of A Time-Based Prospective Memory Task

Time-based prospective memory tasks require completion of a planned task either at a specified time (e.g., at 3 pm) or after a specified amount of elapsed time (e.g., in 20 minutes). For the present study, the time-based prospective task required undergraduate student participants to turn off the water flowing into a virtual bathtub to prevent it from overflowing. While concurrently occupied with making decisions about common words, they could press a key to display the bathtub fill level for exactly 1 second each time. In order to assess time estimation, we masked the bathtub fill level and informed participants that they would be able to see it again in exactly 3 minutes. We placed the 3-min mask either near the beginning, in the middle or near the ending of the filling interval (aka retention interval), in order to investigate how participants estimate time across conditions known to differ in fill-level checks. The results show that participants' time estimates vary systematically with their need for information, especially toward the end of the task when they are anxious about the bathtub overflowing. Short Talk



Peter Graf, University of British Columbia

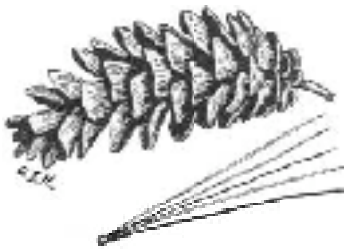
Monitoring Strategies In Time-Based Prospective Memory

Prospective memory is the ability to make plans and to recollect them later, either at the appropriate time (eg. in 20 min, at 3 pm) or on the occurrence of an appropriate event (eg. when you see a mailbox). One critical difference between these two forms of prospective memory, often called time- and event-based prospective memory, may stem from the linear unfolding of time which affords an opportunity for tracking or monitoring the proximity of a retrieval cue or context (eg. 3 pm). We used a dual task paradigm to explore the factors that influence the strategies subjects develop and use for monitoring the proximity of a retrieval cue that occurred always after 12 minutes. The proximity of the retrieval cue was linearly related to time under all conditions of the experiment. However, across condition we manipulated the feedback subjects received from their monitoring activity (ie. cue-proximity checks) by providing access to a clock, to the current fill-level of a cylinder or the current fill-level of a vase-shaped vessel. While monitoring, the subjects also performed either an episodic recognition memory task or a lexical decision making task, and across experiments, we manipulated the relative importance of the monitoring task versus the ongoing recognition or lexical decision task. The results revealed that subjects' monitoring schedule is influenced by the proximity of the retrieval cue, by the information obtained from each cue-proximity check (i.e., whether it yielded time vs. fill-level information), and by various aspects of the simultaneously ongoing task. Talk

Bob Uttl, Kimberley Baltimore, Dylan Smibert, Red Deer College

Prospective Memory And Aging After 25 Years

Prospective memory (ProM) refers to our ability to become aware of a previously formed plan at the right time and place. After two decades of research on prospective memory and aging, narrative reviews and summaries have arrived at widely different conclusion. One view is that prospective memory shows large age declines, larger than age declines on retrospective memory (RetM). Another view is that prospective memory is an exception to age declines and remains invariant across the adult lifespan. We present meta-analyses showing that (a) prospective memory declines with aging and that the magnitude of age decline varies by prospective memory subdomain, type of prospective memory cue, and test setting; and (2) previous claims of no age declines in prospective memory including claims of no age declines with focal vs. non-focal cues are artifacts of methodological and conceptual issues afflicting prior research including widespread ceiling effects, low statistical power, age confounds. Talk



Susan M. Ravizza, Michigan State University
Marjorie Solomon and Petrina Kaluzhny, University of California, Davis
Richard B. Ivry, University of California, Berkeley
Cameron S. Carter, University of California, Davis

Basal Ganglia And Cerebellar Motor Contributions To Attentional Processes In Autism Spectrum Disorders

Adolescents with autism often show difficulty allocating and shifting selective attention. In addition to abnormalities of the parietal and prefrontal cortices, autism is marked by widespread pathology in neural regions associated with movement disorders such as the cerebellum and the basal ganglia. Individuals with autism-spectrum disorders (ASD) often present with abnormal motor signs (e.g., mirror movements). We sought to assess the degree to which attentional impairments may be modulated by motor demands and evaluate if any such relationship was correlated with soft neurological signs of cerebellar or basal ganglia dysfunction. We tested a group of high-functioning adolescents with ASD (high-functioning autism (n=15) or Asperger's Disorder (n= 9)) and typically-developing participants (n=20) on tests of selective attention and attention switching under varying motor demands. We also rated soft neurological signs of cerebellar and basal ganglia pathology. In the Posner cuing task of spatial attention, no differences were observed between the groups on measures assessing the benefits and costs associated with valid and invalid cues, respectively, regardless of the motor demands of the tasks. In contrast, the ASD group was less accurate on trials requiring either rapid or slow shifts of attention. This impairment was evident even when the motor demands were reduced. When we correlated attentional performance with severity of motor symptoms, measures of attentional performance were related to soft neurological signs of basal ganglia dysfunction. These results suggest that some of the attentional deficits in ASD may be related to abnormal function of the basal ganglia rather than the cerebellum. Talk

Abstracts Friday

Karen B. Schloss and Stephen E. Palmer, University of California, Berkeley

The Berkeley Color Project: Color Combinations

We investigated preferences for color combinations by having the 48 participants in the Berkeley Color Project rate aesthetic preference, color harmony, and color similarity for all possible figure-ground pairs of the 37 colors described in the previous abstract. Preferences for the individual figure and ground colors in each pair accounted for only 19% of the variance, but adding people's ratings of color harmony increased the total to 71%. Consistent with claims by color theorists (e.g., Chevreul, 1839), the ratings of color harmony were highest for colors most similar in hue (harmony of "analogous colors"), but inconsistent with their claims, no increase was observed in ratings of complementary hues (harmony of "contrastive colors"). Harmony ratings decreased monotonically with differences in hue angle and correlated positively (.64) with ratings of color similarity. However, we also found that people generally rate a given color as more aesthetically pleasing against a strongly contrasting background (especially warm against cool and cool against warm) than against a weakly contrasting background. These differences in preferences for individual colors on differently colored backgrounds, which are probably due to simultaneous color contrast effects, may account for claims that contrastive colors are harmonious. Individual differences were found in the degree to which preference for color pairs was positively correlated with ratings of harmony (ranging from -.11 to .74), and these differences were examined for their relation to gender and artistic expertise. Talk

Diane E. Marian and Arthur P. Shimamura, University of California, Berkeley

An Emotional Illusion: Dynamic Expressions Bias The Evaluation Of Neutral Faces

Visual illusions have been studied for centuries because they are useful tools for investigating top-down influences on perception. Here, we discuss an emotional illusion in which facial expressions are perceived differently depending on their context. We constructed short video clips of dynamic expressions by morphing faces from happy to neutral or from angry to neutral. Participants rated the initial expression of a face, watched the face change to a neutral expression, and then rated the ending expression. The ending neutral faces were judged as displaying the emotion opposite that of the initial expression. These results demonstrate a context-based emotional illusion in which neutral faces seem to display different emotional expressions depending upon their prior appearance and movement. In many respects, this illusory effect is comparable to visual illusions in which a perceptual feature, such as size, color, or orientation is affected by surrounding context. Talk

Paul Dassonville, Tim Sanders, Brad Capp, University of Oregon

The Rod-In-Frame And Simultaneous Tilt Illusions: Two Tests Of The Two-Wrongs Hypothesis

Several studies have demonstrated a dissociation of the effects of illusion on perception and action (generally, perception is susceptible to illusions, while actions seem immune). These findings have been interpreted as supporting Milner and Goodale's hypothesis for the existence of separate visual processing streams. However, we have proposed a competing hypothesis (the Two-Wrongs hypothesis) that can explain the behavioral dissociation previously described for the induced Roelofs effect without presupposing the existence of separate processing streams. Here, we put the Two-Wrongs hypothesis to the test, by examining two other illusions (the rod-in-frame and simultaneous tilt illusions) for which the hypothesis makes very different predictions. We will present evidence for a class of illusions (which includes the Roelofs and rod-in frame illusions, but not simultaneous tilt) that lead to a dissociation of perception and action through distortions of the observer's spatial reference frame, rather than through the actions of separate processing streams. Talk

Ben Lester and Paul Dassonville, University of Oregon

Attentional Capture Modulates The Induced Roelofs Effect

When a visible frame is offset left or right from an observer's objective midline, the subjective midline is pulled toward the frame's center. Targets presented within this frame are then misperceived as being shifted in the opposite direction – an illusion known as the induced Roelofs effect. However, a large frame is not necessary to generate the effect – even a small peripheral square is sufficient, raising the possibility that the effect is driven by a shift of attention toward the stimulus. As a first test of this hypothesis, we set out to determine whether the illusion would be affected by a manipulation known to affect attention; namely, the color-contingency effect. Target and frame were presented in the same or different colors, along with variously colored distractors. The Roelofs effect was larger when the frame and target were the same color, suggesting that the effect may indeed be caused by an attentional shift. Short Talk

Tim Sanders and Paul Dassonville, University of Oregon

The Zöllner Illusion: Misperception Of Line Orientation Or Reference Frame?

Several illusions demonstrate that contextual cues can distort the perceived orientation of a line. However, there are two general mechanisms by which this effect can be achieved. First, it is possible that local interactions between the context and target line will directly cause the misperception of the line's orientation; for example, surround-inhibition from an array of left-tilted lines could cause a vertical target line to have a perceived rightward tilt. Alternatively, contextual cues may distort the observer's spatial reference frame, so that the perception of vertical itself is biased. Thus, when the orientation of a line is compared to this biased reference, it will appear to be rotated in the opposite direction. In a separate presentation, Dassonville will demonstrate that the simultaneous tilt illusion relies on the former mechanism, while the rod-in-frame illusion relies on the latter. Here, we will report on our findings with the Zöllner illusion. Short Talk

François Vachon, Université de Montréal
Sébastien Tremblay, Université Laval
Robert W. Hughes and Dylan M. Jones. Cardiff University

Capturing The Mask In The Auditory Attentional Blink: Unmasking Limitations Of Masking Accounts

When two targets (T1 and T2) are embedded in a rapid sequence of distractors, processing of T1 produces an attentional blink (AB), that is, an impairment of T2 identification. The present study focused on the auditory version of the AB. One key aspect of the phenomenon is that the presence of a post-T2 distractor is essential to produce the AB, accounted for conventionally in terms of masking mechanisms. Based on the recent development of alternative accounts that focus on target selection and distractor inhibition, we questioned the notion of masking as a causal factor in the AB by exploiting the phenomenon of auditory capture, namely, the tendency for similar sounds in a sequence to form a stream perceptually isolated from dissimilar members of that sequence. We employed monaural sequences of tones in which the T2+1 item could be presented either ipsilaterally or contralaterally to the rest of the sounds. As in the ipsilateral (control) condition, the contralateral presentation of T2+1 produced a reliable AB. However, when an additional induction sequence of irrelevant tones preceded the post-T2 distractor in the contralateral ear, the AB was abolished. We suggest that the contralateral T2+1 item was "captured" by—that is, perceptually grouped with—the induction tones. Such findings weaken masking accounts and favor theories of AB based on failure of inhibition and miss-selection. Short Talk

Frederick J. Gallun, Portland VA Medical Center and Oregon Health & Science University

Rapid Processing Of Brief Non-Speech Auditory Stimuli

Little is known about the ability (or inability) of listeners to make judgments about multiple brief non-speech auditory stimuli presented in rapid succession. That much of the previous work on rapidly presented stimuli has involved speech makes it difficult to distinguish basic mechanisms from language processing. Younger and older normal-hearing and hearing-impaired listeners were tested with non-speech stimuli. Judgments concerned changes in the amplitudes of three 1/3 octave noise bands. The stimuli were brief (50 ms) and were presented either in isolation, simultaneously, or successively. Successive stimuli were separated by either a 0 ms or a 150 ms interval of silence. In the first experiment, there were three bursts, while in the second the three were repeated four times. The results will be discussed with reference to the attentional blink phenomenon, backward recognition masking and theories of auditory short-term memory. The effects of age and hearing-loss will also be discussed. Talk

G. Christopher Stecker, University of Washington

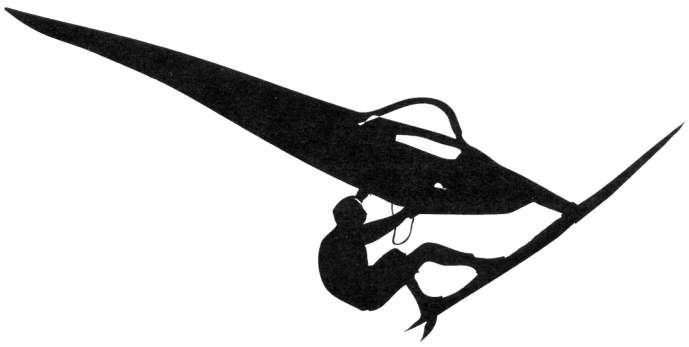
Recency Effects In Auditory Sensory Memory For Sound Localization?

Localization of even brief sounds requires the integration of multiple acoustic cues [interaural differences of time (ITD) and level (ILD), along with monaural spectral cues] that potentially vary across frequency and over time. In natural settings, it is generally assumed that these cues tend to agree with one another and with the veridical sound-source direction. However, echoes and reverberation can significantly distort the individual cues (late-arriving ITD, for example), and the auditory system responds by altering the relative weighting of each cue. In this talk, I will describe our research into how this weighting evolves over the duration of a brief sound (50-300 ms), focusing on evidence that late-arriving sound contributes strongly to listeners' perceptions of sound-source direction [although not, perhaps, to the discrimination of nearby locations] in a manner that suggests similarities to recency effects observed in memory tasks at longer time scales. Talk

Pierre Jolicoeur, Christine Lefebvre, Stephan Grimault and Francois Vachon
University of Monteral,
Robert Zatorre and Isabelle Peretz
McGill University

Electromagnetic And Functional Brain Imaging Explorations Of Acoustic Short-Term Memory

We used event-related potentials (ERPs), magnetoencephalography (MEG), and functional magnetic resonance imaging (fMRI), to study the functional and neural representation of simple sounds in acoustic short-term memory (ASTM). Although there is a rich literature on various aspects of the neural representation of working memory, generally, and of visual short-term memory (VSTM), the literature on ASTM is sparse and conflicting. We developed a new approach, in the context of ASTM, designed to isolate the purely acoustic aspect of ASTM in which we varied memory load by manipulating the number of distinct notes in short sequences of pure tones. Several ERP and MEG markers of ASTM were found and will be described in the talk, as well as convergence with fMRI. Similarities and differences between ASTM and visual short-term memory (VSTM) will be highlighted. Talk



Abstracts Saturday

Matthew S. Cain and Arthur P. Shimamura, University of California, Berkeley

When Practice Doesn't Make Perfect: Practice-Induced Task Switching Costs

One common experimental design is to intermix trials of different types using different stimuli or instruction sets. Some tasks, such as the antisaccade task, have large, asymmetric carryover effects from one trial to the next. That is, performance on the current trial is influenced by the task demands of the previous trial. Other paradigms, such as those using arbitrary manual stimulus-response (S-R) mappings, have not shown such carryover effects. While task history and task switching effects generally have been investigated, the differences between tasks that do and do not show carryover effects have been largely unexplored. In this study, we employed two arbitrary S-R mapping tasks of equal difficulty, one in which the color of the stimulus required a button-press response and the other in which the shape of the stimulus was the relevant dimension. Participants were first trained extensively on one of the tasks Later, they were tested with a mixed task session containing bivalent stimuli where they had to act upon either the practiced rule or the novel rule, based on an auditory cue. In the mixed block, participants were slower overall on the practiced than the novel trials. Asymmetric reaction time task switching costs also emerged, with a greater cost for switching from the novel to the practiced task than from the practiced to the novel task, demonstrating that relative levels of practice are a determining factor for the presence or absence of asymmetric switch costs. Talk

Catherine M. Arrington, Lehigh University

Eliciting Voluntary Behavior In Multitask Environments

The voluntary task switching paradigm allows for examination of task choice in multitask environments by having subjects chose which task to perform on every trial, typically with instructions to perform tasks equally often in a random order. While these instructions insure that subjects will perform both task repetitions and switches, the instructions may impose unnecessary structure on voluntary behavior, limiting the variability in task choice that would otherwise occur. Alternative methods for eliciting voluntary behavior in multitask environments were investigated. Subjects given no instructions (i.e. “choose which task to do on every trial”) often failed to treat the environment as “multitask” choosing to perform only a single task. Subjects provided with either explicit instructions (i.e. “perform the two tasks equally often”) or external constraints (i.e. trials affording only one task) performed both tasks, but switched tasks infrequently. These results will be considered in light of control processes guiding multitask behavior. Talk

Stephen R. Mitroff, Duke University

The Malleability Of Visual Cognition: Effects Of Videogame Playing On Vision And Motivation

An important aspect of visual perception that has gone relatively understudied is how, and under what conditions, a perceiver can influence his or her own visual system. How can specific training regimens and prior experiences influence how and what one sees? In a series of studies we explore the effects of videogame experiences on visual perception. Videogames are (or are becoming) a standard part of today's society and it is necessary to understand both their negative and positive influences. Mirroring previous work (e.g., Green & Bavelier, 2003), we find evidence that videogame expertise may lead to the honing of attentional and/or perceptual abilities. Expanding beyond previous work, we find that videogame expertise enhances motivation and strategy choice. Videogame players may perform more optimally due to a heightened level of arousal and a personal motivation to succeed. That videogame players perform well at visual tasks through non-visual enhancements raises several important implications for both the field of visual cognition and for society more broadly. Talk

Clayton E Curtis, New York University

Persistent Neural Activity In The Human Frontal Cortex When Maintaining Space That Is "Off The Map"

During the maintenance of visuospatial information in working memory, neural activity in the frontal eye field (FEF) persists. Such signals are spatially selective, where activity is greatest in neurons whose response fields match the retinal location of the visual cue. Here, we use fMRI to test if activity persists in the human FEF when subjects maintain non-visual auditory space, and test if the activity is selective for retinal space. First, with microphones placed within each subject's ear canals, we recorded binaural sounds emitted from 36 positions around the horizontal plane of the subject. Subjects perceived the replay of these sounds to be spatially localized because the recordings preserve the intraural time and level differences caused by head-related transfer functions. Then, we scanned subjects while they performed an audiospatial working memory task. They maintained the location of a sample sound (S1) over a long delay period and then indicated if it matched the location of a test sound (S2). Half of the sounds were emitted from locations that if visible would fall on the retina (i.e., in front of subject) and half were from behind the subject's head. Independent staircases equated the difficulty for front and back cued trials by adjusting the distance of the S1/S2 discrimination. Three main results were found: 1) activity persisted in the FEF when humans maintained aurally-cued locations, 2) this activity was larger in the hemisphere contralateral to the side of the cue, and 3) although FEF activity was more robust during the maintenance of locations in front compared to behind the head, activity clearly persisted above baseline during the maintenance of locations behind the head. These data suggest that the human FEF not only maintains representations of aurally-cued space, but it may do so for locations to which it is impossible to make a saccade. Short Talk

Ian P. Rasmussen, Daniel I. Brooks, and Andrew Hollingworth, University of Iowa

The Interaction Between Global And Local Scene Features In Contextual Cueing

In contextual cueing experiments, participants are sensitive to the repetition of contextual elements during visual search, resulting in faster search through familiar arrays than through novel arrays (Chun & Jiang, 1998). Studies using random arrays of simple objects have found that contextual cueing is driven primarily by memory for local elements near the target location (Olson & Chun, 2002). In contrast, studies using real-world scene stimuli have found that contextual cueing is driven primarily by memory for global scene features (Brockmole et al., 2006). Here we investigated whether the context provided by global scene structure and the context provided by local search elements can be used independently to cue target location or whether both are integrated within a holistic scene representation. Participants performed a feature negative search within a 3-D rendered search display. At the center of the display was a local search array consisting of vertically oriented "dumbbell" objects. The target was missing one dumbbell segment, and participants reported which segment was missing. This local search array was embedded within a 3-D rendered real-world scene. The search array and scene were spatially segregated, allowing us to manipulate the local search context and the global scene context independently. We found that repeated local context produced contextual cueing even when global scene context did not predict target location. However, repeated global scene context did not produce contextual cueing when local array context did not predict target location. Although we did not find contextual cueing on the basis of global context alone, when both global and local cues were informative, contextual cueing was disrupted if either context was changed in a transfer block. This suggests that although contextual cueing was driven primarily by local information, global and local context were integrated into a holistic scene representation. Talk

Elisabeth Hein and Cathleen M. Moore, University of Iowa
John Palmer, University of Washington

Perceptual Structure Facilitates Spatial Filtering

Our goal is to better understand object-based attention using the spatial filtering paradigm (Palmer & Moore, submitted). In this paradigm observers are asked to detect stimuli at a cued location (targets), while ignoring otherwise identical stimuli that are presented at nearby locations (foils). In order to measure an effect of perceptual structure on spatial filtering, we presented an outline rectangle in the visual field near where targets and foils appeared. The rectangle provided no specific information about the target location, but instead provided a visual context on which the spatial filtering paradigm was superimposed. Results showed that selection of a target location across a boundary from a foil location was substantially better than when they were not separated by a boundary. Additional experiments investigate the extent to which spatial filtering in this context can be accounted for by a contrast gain or an all-or-none mixture model as primary selection mechanism. Talk

Michael Esterman, Yu-Chin Chiu, Benjamin Rosenau and Steven Yantis
Johns Hopkins University

Decoding Cognitive Control

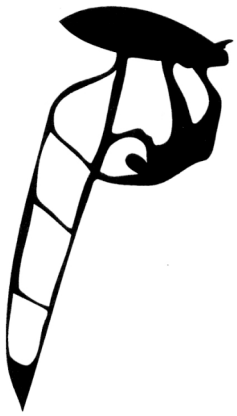
We have previously reported evidence from fMRI for a transient reconfiguration signal in medial superior parietal lobule (mSPL) that is time-locked to shifts of attention within several perceptual domains. In two new experiments, we examined two additional domains of cognitive control. Subjects shifted spatial attention between two RSVP streams, and either (a) shifted between two digit categorization tasks (high/low vs. even/odd) or (b) shifted between two working memory representations. Conventional univariate statistics revealed domain-independent activation for the different types of cognitive shift. Multivoxel pattern classification showed that the pattern of activity within mSPL could predict acts of control on a trial-by-trial basis. For three subjects who participated in both experiments, a classifier trained on data from one experiment could predict the type of shift in the other experiment. Although mSPL subserves cognitive control in multiple domains, domain-specific spatial patterns of activity are associated with different acts of control Talk

Bill Prinzmetal, University of California, Berkeley

What Causes IOR And Contingent Capture?

We proposed a taxonomy of spatial attention in vision whereby the first dichotomy is between voluntary (endogenous) and involuntary (exogenous) attention. Further, there are at least two forms of involuntary attention. One is based on a serial-search mechanism, the other involves priming in the response decision stage of analysis. Last year at CSAIL, we demonstrated that when the target is difficult to find, the serial model provides the best account of involuntary attention. In situations where the target is easy to find, the decision model provides the best account of involuntary attention.

Two effects that are found with involuntary attention are IOR (inhibition of return) and contingent capture. IOR is the finding that in a spatial-cueing task, as the time between the cue and stimulus increases, the facilitation at the cued location turns to inhibition. Contingent capture is the finding that the effectiveness of a cue is related to its similarity to the target. We asked, which of the two involuntary attention mechanisms is responsible for IOR and which is responsible for contingent capture. The results indicate that IOR and contingent capture are caused by different mechanisms. Talk



Abstracts Sunday

Philip L. Smith, University of Melbourne

The Computational Dynamics Of Visual Attention

The simplest attentional task, detecting a cued stimulus in an otherwise empty visual field, produces unexpectedly complex data. Cues interact strongly with spatial uncertainty and visual masks, and there is a dissociation in the effects of these variables on sensitivity and response time (RT). I describe a theory that accounts for these data at the level of the RT distributions. The theory links visual encoding, masking, spatial attention, visual short term memory (VSTM), and perceptual decision making in an integrated dynamic framework. Stimuli processed by early visual filters are encoded in VSTM under the control of spatial attention. The VSTM trace drives a diffusion process decision mechanism that determines the speed and accuracy of responses. VSTM trace formation is described by a two-channel shunting model, in which selection into VSTM depends on the total energy in the stimulus, but the decision in based on form information carried by an independent parallel pathway. The computational principles of the VSTM model are strikingly similar to the idea, currently influential in neuroscience, that visual experience is the confluence of information carried by parallel "where" and "what" pathways. Talk

Serap Yigit and John Palmer, University of Washington
Cathleen Moore, University of Iowa

Partially Valid Cueing And Spatial Filtering Reveal Different Kinds Of Selection

Selective attention was studied using spatial cueing and filtering paradigms. In spatial cueing, a flash of light was displayed at either a cued or an uncued location. The task was to discriminate the contrast polarity of the stimulus relative to the surround. In spatial filtering, a flash of light was displayed at a cued location (target) and another at an uncued location (foil). The task was to discriminate the contrast polarity of the target and ignore the foil. For spatial cueing, results were consistent with the contrast gain model predicting attenuated information from a stimulus at the uncued location. For spatial filtering, results were consistent with an all-or-none mixture model predicting complete blockage of information from a stimulus at the uncued location on some fraction of the trials. We suggest that spatial filtering reveals an aspect of selection that was hidden by cueing paradigms. Talk

Alec Scharff and John Palmer, University of Washington

Distinguishing Serial And Parallel Models Using Variations Of The Simultaneous-Sequential Paradigm

Alternative models of divided attention can be distinguished by the simultaneous-sequential paradigm. This paradigm compares accuracy performance between simultaneous and sequential presentations of otherwise equivalent stimuli. When processing capacity is limited, accuracy performance is better in the sequential-presentation condition. But when processing capacity is unlimited, performance in the two conditions is equivalent. Thus, the method can identify cases of unlimited-capacity, parallel processes. Our goal is to develop variations of this method to distinguish between other alternatives, including various limited-capacity parallel models and serial models. We describe one variant that can distinguish a fixed-capacity process and are in the process of developing a test for a serial process These methods are applied to two test cases: simple feature detection and semantic word categorization. The results provide evidence that contrast increment detection is an unlimited-capacity process, while semantic word categorization is a fixed-capacity process. Talk

Neil B. Albert, University of Birmingham
Edwin M. Robertson, Beth Israel Deaconess Medical Center
R. Chris Miall, University of Birmingham

Spontaneous Fluctuations In BOLD Signal Reflect Prior Experience

Highly coherent patterns of activity are observed in the human brain even when the individual is not engaged in any goal-directed behavior. Such "resting" activity is believed to support non-directed thought and underlie our ability to respond to future events. Since the consolidation of motor skills facilitated by the absence of explicit processing (Brown & Robertson, 2007), we predict that the so-called resting state networks (RSNs) may reflect the processing of recently performed actions. We used Probabilistic Independent Components Analysis to identify networks during rest and compared the rest after to the performance of a difficult visuomotor adaptation task with resting data before the visuomotor task. Two networks increased reliably following the visuomotor task. One encompassed much of the bilateral cerebellum; the other included the prefrontal cortex, posterior and inferior regions of the parietal cortex, and Crus II of the cerebellum. We suggest these results provide strong support for our hypothesis that the resting brain is modulated by past experiences. Our approach may prove to be a powerful tool for exploration of the systems involved in memory consolidation. Short Talk

Igor Dolgov, Michael McBeath, Ellen Campana, and David Birchfield,
Arizona State University

Mobility And The Axis-Aligned Motion Bias: Locomotive Judgment Techniques Outperform Stationary Perceptual Prediction In Judging Trajectories Of Moving Geometric Shapes

Research confirms that stationary observers reliably misjudge projected destinations of axis-trajectory misaligned moving figures toward the direction of primary axis deviation from trajectory, a phenomenon we named axis-aligned motion (AAM) bias. The current experiment evaluated the effects of this bias in the Situated Multimedia Arts Learning Laboratory (SMALLab), an immersive multimedia classroom environment in which participants estimated final destinations of moving, projected geometric shapes. Replicating previous work, we found that judgment errors corresponded to the direction of axial deviation from trajectory. However, given the opportunity to move concurrently with the targets, most participants used interceptive strategies and were significantly more accurate than when using stationary pointing judgments. Our findings confirm the existence of AAM bias in a floor-projection-based immersive multimedia environment and demonstrate that its influence on motion perception can be mitigated by utilizing ones locomotive system in making perceptual judgments. We propose that AAM is a natural regularity for which people have acquired a complementary perceptual regularity, the AAM bias – a mixed blessing that ameliorates perception of ecologically-consistent moving objects, i.e., when an the axis is aligned to trajectory, and is detrimental to object perception when the axis is not. Short Talk

Joseph Austerweil and Thomas L. Griffiths, University of California, Berkeley

Analyzing Perceptual Feature Learning As Nonparametric Bayesian Inference

Almost all successful machine learning algorithms and cognitive models require powerful representations capturing the features that are relevant to a particular problem. Empirical results from the perceptual learning literature suggest that the basic primitives underlying features change with experience. We draw on recent work in nonparametric Bayesian statistics to define a rational model of human feature learning that forms a featural representation from raw sensory data without pre-specifying the number of features. By comparing how the human perceptual system and our rational model use distributional and category information to infer feature representations, we seek to identify some of the forces that govern the process by which people separate and combine sensory primitives to form features. Short Talk

Timothy D. Verstynen and Philip N. Sabes, University of California, San Francisco

Variability Vs Flexibility: How Experience Can Adaptively Change Motor Representations

What if variability in movements does not reflect noise, but is instead part of the control strategy itself? We have found that initial movement variability for repeated reaches depends on recent experience. Initial reach variability drops during repeated movements to the same target location while variability increases when the target is likely to jump to a new location after reach onset (e.g.- target jump) or simply when the range of target positions is increased (e.g.- target spread). We explain these results in terms of an adaptive planning hypothesis. Specifically, changes in initial reach variability arise from to the dynamic retuning of a line attractor network that generates the planned movement vector. The adaptive planning hypothesis represents a radical departure from standard models of sensorimotor circuits, since both the network properties ("physiology") and its input-output function ("behavior") are continuously changing with recent experience. Talk

Kimberly M Halvorson and Eliot Hazeltine, University of Iowa
Sian Beilock, University of Chicago
Tana Truelove, University of Iowa

What Is So Hard About Bimanual Coordination? Evidence For Conceptual Interactions Between Tasks

Dual-task costs are robust when both tasks require manual responses, but the source of the bimanual cost is unclear. In some cases, RTs are longer when the two responses must be made with different hands than when they must be made with the same hand (Hazeltine et al, 2007). On the other hand, expert typists prefer letter dyads that, if typed, would produce the least motor interference (i.e. those using two separate fingers versus those using the same finger) while novice typists showed no preference (Beilock & Holt, 2007). We investigated this phenomenon to examine how task representation affected bimanual coordination. Expert typists saw two stimuli each indicating a single keypress. When spatially compatible stimuli were used, participants were slower when the two responses required different hands (i.e., there was a bimanual cost). However, when letter stimuli were used, no bimanual cost was observed. A third condition tested whether the bimanual cost resulted from stimulus properties or conceptualization of the task. In this condition, the numbers 1-3 were assigned to each finger and a color was assigned to each hand. In this condition a bimanual cost was again observed. The results suggest that bimanual costs emerge from conceptual codes and provide a glimpse into the central representations that underlie discrete reaction time tasks. Talk

John Dewey, Michigan State University
Adriane Seiffert, Vanderbilt University
Tom Carr, Michigan State University

How Do We Know When We're Movers And Shakers? Perception Of Causal Agency During Performance Of Actions

Imagine trying to follow road signs and steer while driving on an icy road. Are you in control or is the ice making things happen, and if something goes wrong, is your car misbehaving or did you make a mistake? Next imagine the same situation but in a driver-education car with two steering wheels, two accelerators, two brakes, and another driver sitting beside you who could have made the car do whatever it did. We report data from a series of experiments on judgments of causal agency in single-task, dual-task, and competitive/cooperative performance of actions. Sometimes outcomes mirror participants' actual responses, and sometimes actions turn out differently than participants' responses because of experimental manipulations. We find that inferences about causation vary with feedback from the performance environment -- if my goal is achieved, I feel in control, whether it was me, the icy road, or the other driver that really did the job. Talk

Abstracts Monday

Edward F. Ester, Edward Awh, and Edward K. Vogel, University of Oregon
John T. Serences, University of California, Irvine

Feature-Specific Mnemonic Representations In Human Primary Visual Cortex

Working memory supports the maintenance of information in an accessible state. An emerging view of working memory is that maintenance is supported by the same sensory neurons that encode the stored information. Here, we used fMRI and multivoxel pattern analysis to probe feature-specific activity in early visual areas during the retention period of a working memory task. We find that although the overall amplitude of V1 responses was not increased during maintenance in working memory, the pattern of activity in this region reliably represented the relevant feature of the memorized item. For example, when observers were asked to remember the color or orientation of a single gabor stimulus, the pattern of activity in primary visual cortex selectively represented only the feature that observers chose to hold in memory. These findings suggest that (1) sensory processing regions are involved in the maintenance of relevant information, and (2) top-down control enables the selective maintenance of only the relevant dimensions of encoded items. Talk

Akina Umemoto, University of Oregon
Miranda Scolari, University of California Irvine
Edward K. Vogel, and Edward Awh, University of Oregon

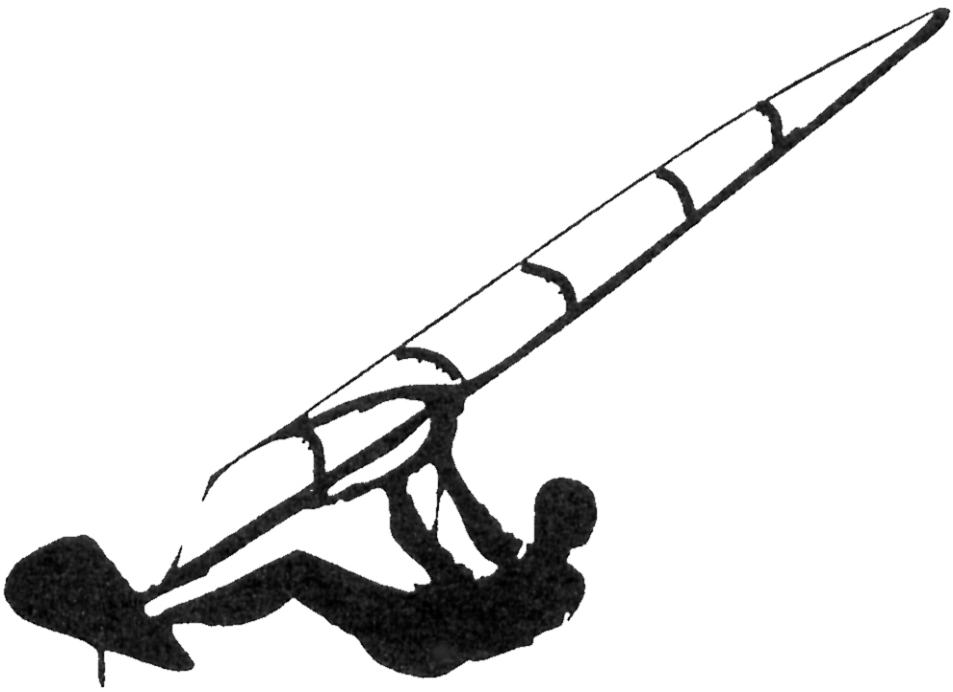
Implicit Acquisition Of Statistical Regularities About Target Location Biases Encoding Into Visual Working Memory

It is known that the contents of working memory are subject to top-down control. Here we examined whether implicit knowledge also influences what is encoded into this online workspace. We used a change detection task in which observers were required to remember the colors of simple squares over a brief retention interval. Unbeknownst to observers, an item in one quadrant of the display (dominant quadrant) was more likely to contain the changed item. Observers were no better than chance at identifying the dominant quadrant, but change detection accuracy was significantly better for items in that quadrant. We further show that this implicit bias influenced only which items were encoded into memory, rather than the clarity or resolution of the items that were stored. We suggest that implicit knowledge of the locations that are likely to contain useful information biases which items are encoded into this highly restricted mental workspace. Talk

Trafton Drew and Andrew Mccollough, University of Oregon
Todd Horowitz, Harvard Medical Center
Edward Vogel, University of Oregon

Probing The Allocation Of Attention During Multiple Object Tracking With ERPs

While most researchers agree that multiple object tracking (MOT) is an attentionally demanding task, the role of attention during tracking is not yet fully understood. For example, it is unclear whether attention during tracking enhances the target representations, suppresses the distractor representations, or some combination of excitation and inhibition of both the targets and distractors. In the present study, we used ERPs to examine the early visual evoked responses to task-irrelevant probes while subjects performed a standard MOT task in which they tracked a near capacity load of four targets. Brief probes were flashed on either targets, distractors, or stationary objects. The results showed a significant enhancement of the anterior N1 component for probes on targets relative to distractors and stationary objects which was correlated with the subjects' tracking ability. These results provide evidence that attention enhances the representations of tracked target items. Talk



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Internet

The Hood River Hotel has free wireless internet in the lobby, and several businesses have free wireless internet, so the area around the hotel is pretty well covered with free wireless internet.

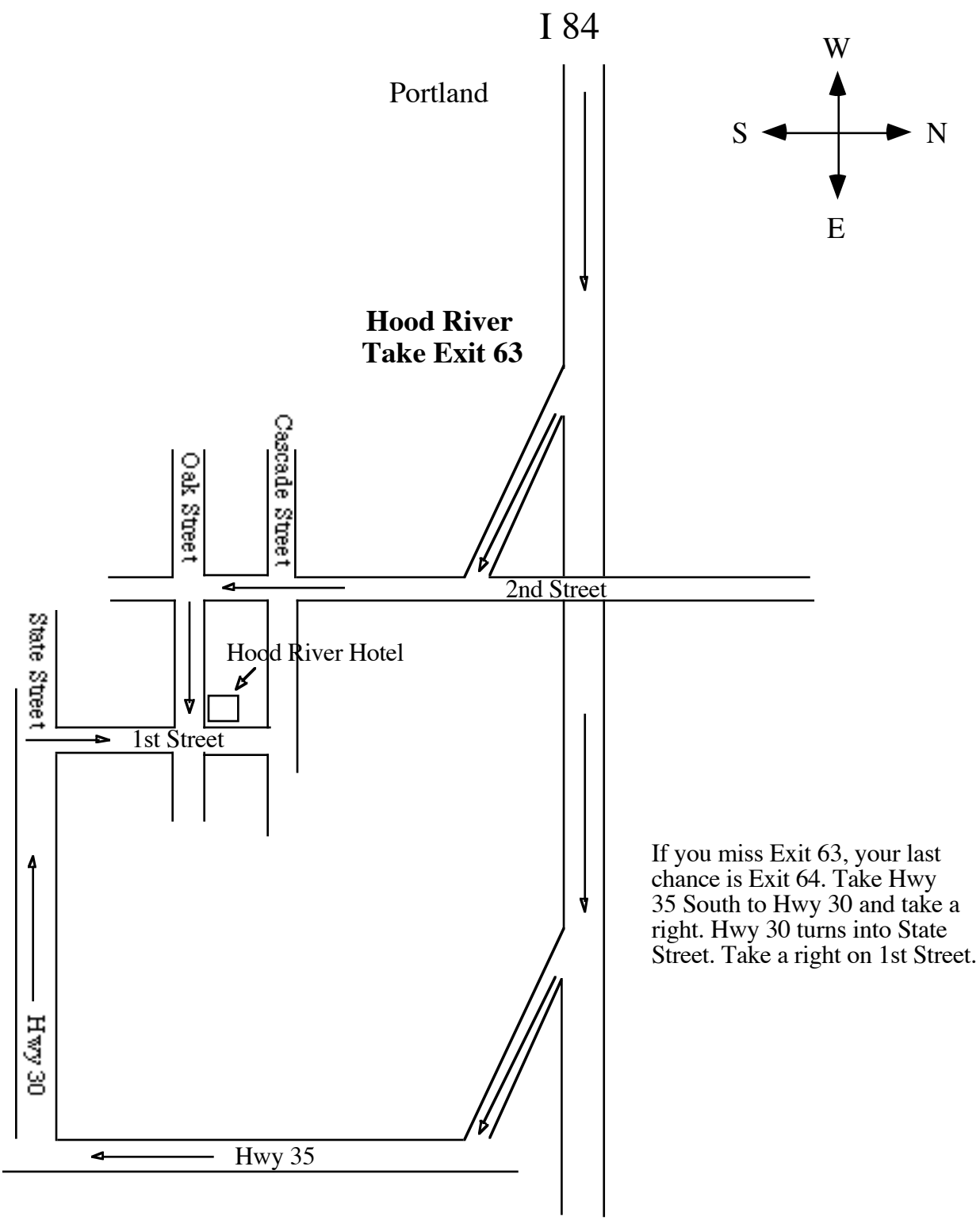
Useful web pages:

Conference Home Page:	http://www.ohsu.edu/csail/	
Hood River Hotel:	http://www.hoodriverhotel.com/	
Gorge Activities:	http://www.ohsu.edu/csail/billpages/	(Bill's picks)
	http://bingenschool.com.links.htm	(Almost everything)
	http://www.mind.net/dlmark/gorge.htm	(More sights to see)

Cover Design:
The cover was designed by Pia Amping.

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.