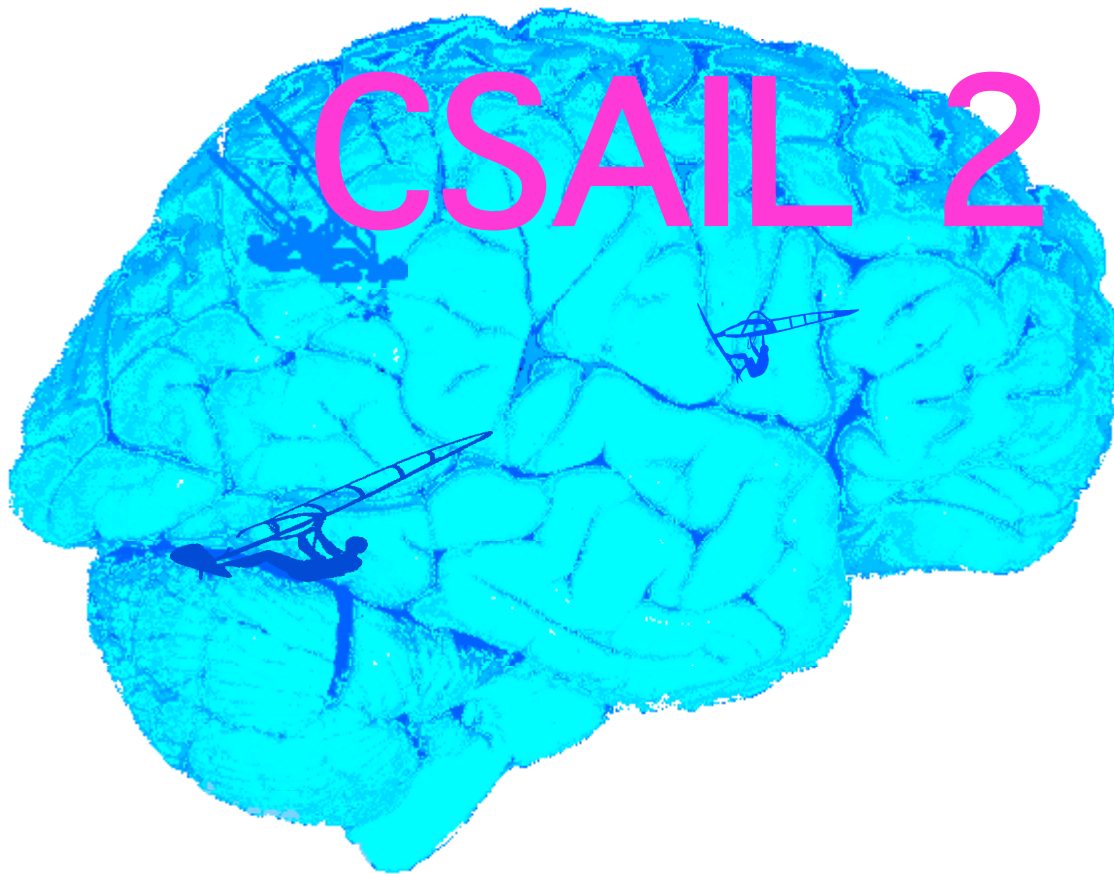


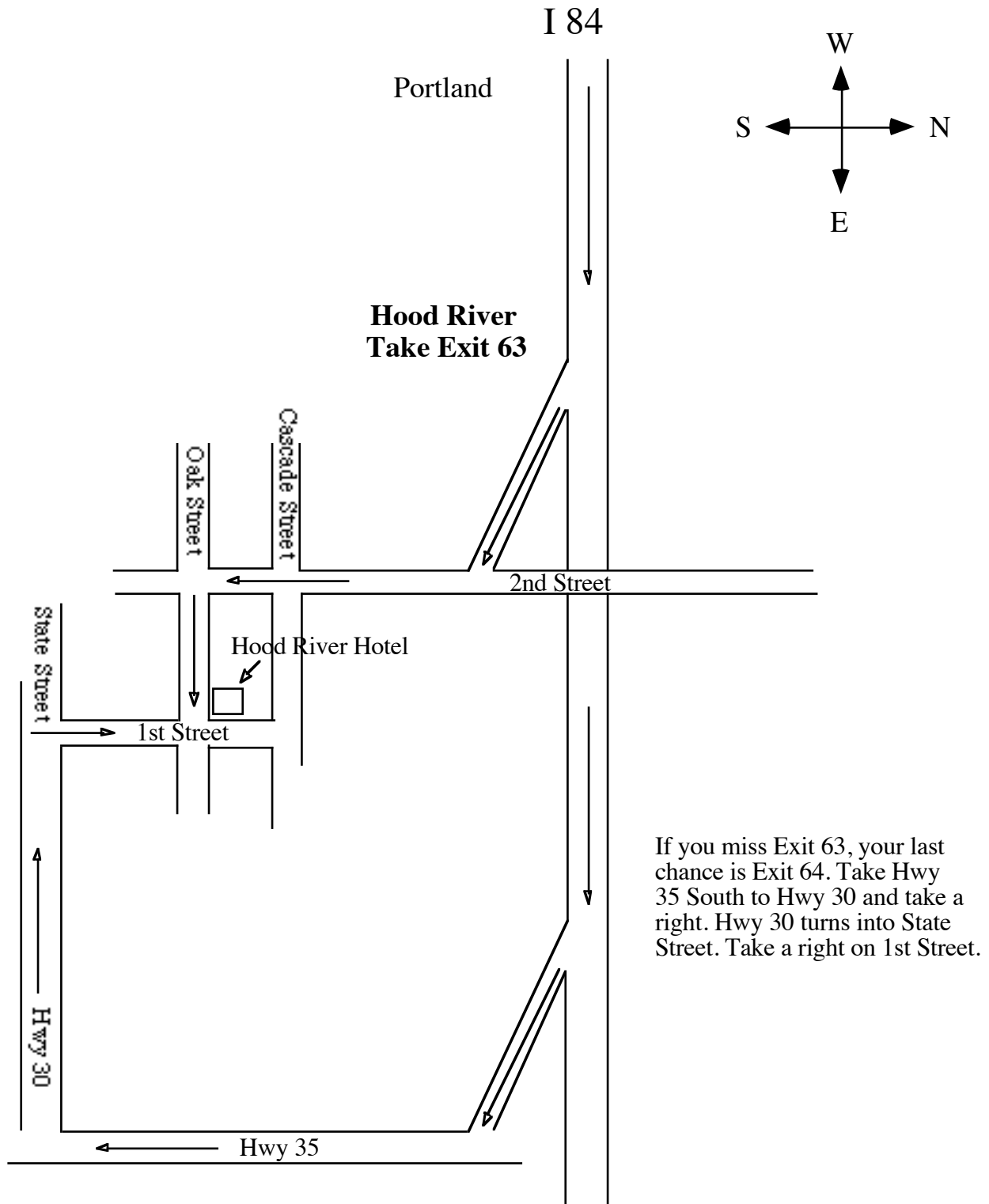
Cognitive Science Association for
Interdisciplinary Learning



July 13-17
Hood River Hotel
Hood River Oregon

Directions to Hood River Hotel from Portland

(Approximately 60 miles)



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

Thursday, July 13

4:45 PM

Reception

5:15 PM

Welcome And Introductory Remarks

Symposium on the Neural Basis of Response Generation

5:30-6:00 PM

The Neural Basis of Flanker Interference
Bob Rafal

6:10-6:40 PM

What Cognitive Function is supplied by the Basal Ganglia
Steven W. Keele, Amy Hayes, and Matt Davidson

6:50-7:20 PM

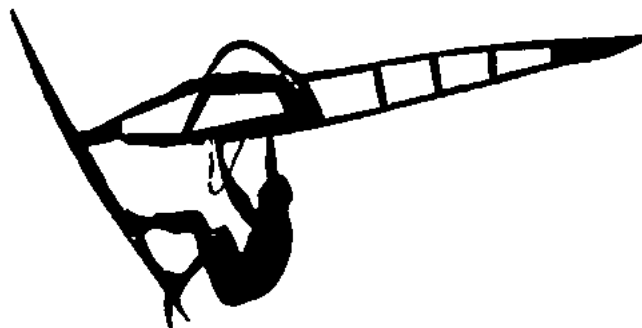
The PRP Effect Following Callosotomy: Residual Interference Despite Uncoupling Of Lateralized Response Codes
Richard Ivry, Liz Franz, Alan Kingstone, and Jim Johnston

7:30 PM

Adjourn For Evening

8:00 PM

Banquet At Pasquale's Restaurant



Friday, JULY 14

8:30 AM	Morning Refreshments
9:00-9:30 AM	<i>Using The Overlapping-task (PRP) Paradigm to Investigate Experimental Effects with Multiple Loci of Action</i> Mark Van Selst and Pierre Jolicoeur
9:40-10:10 AM	<i>Repetition Deafness in Computer Compressed Sentences with List-Like Prosody</i> Michelle D. Miller and Donald G. MacKay
9:40-10:10 AM	<i>Metaphor Comprehension In Context</i> Odie Geiger and Lawrence M. Ward
10:20	Break until 5:00
5:00 PM	Appetizers
5:20-5:50 PM	<i>Attentional Factors In Item Memory And Source Monitoring</i> Arthur P. Shimamura and Paul J. Jurica
6:00-6:30 PM	<i>Relating the Process of Source Recollection to Source Discrimination</i> Chad Dodson, Paul W. Holland, Bill Prinzmetal and Art Shimamura
6:40-6:50 PM	Short Break
6:50-7:20 PM	<i>Modelling List Strength and List Length Effects with a Distributed Memory Model</i> Andy Yonelinas
7:30-8:00 PM	<i>Interval Structure in Implicit Learning of Musical Tone Sequences</i> Victor A. Shames, Thomas F. Graham, Timothy L. Hubbard
8:10 PM	Ajourn For Evening

Saturday, July 15

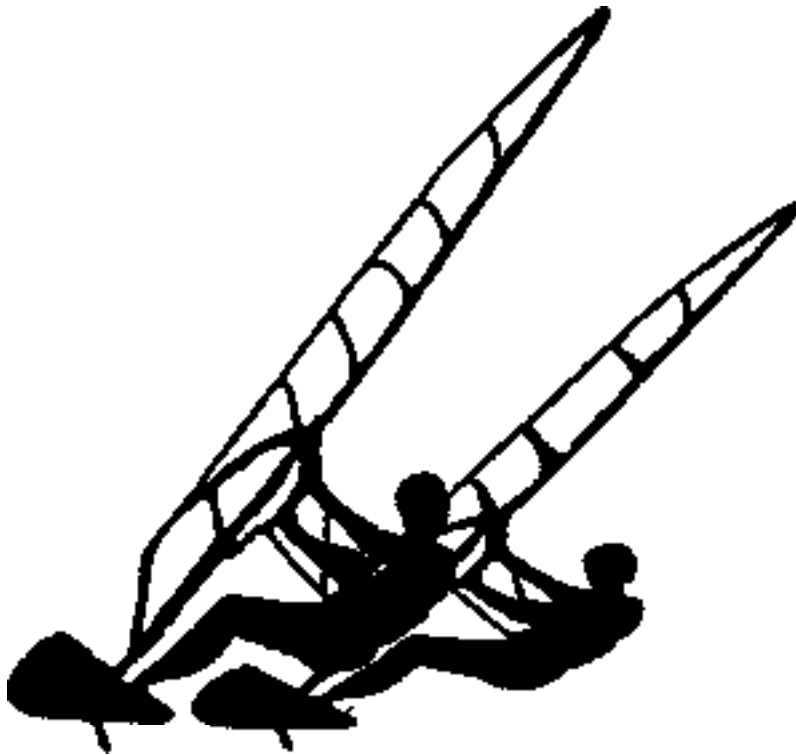
8:30 AM	Morning Refreshments
9:00-9:30 AM	<i>Orientation Biases in Figural Interpretation: "Projections" for Pattern Recognition</i> Diane J. Schiano, Michael K. McBeath and Kenneth W. Chambers
9:40-10:10 AM	<i>The Effects of Plane and Depth Rotation on Object Recognition</i> Rebecca Lawson, Pierre Jolicoeur, and Glyn Humphreys
9:40-10:10 AM	<i>Visual Temporal Masking at Scene Cuts</i> Lew B. Stelmach, W. James Tam, Limin Wang, and Daniel Lauzon
10:20	Break until 5:00
5:00 PM	Appetizers
5:20-5:50 PM	<i>Divided Attention Between The Eye And The Ear</i> Anne-Marie Bonnel and Ervin Hafter
6:00-6:30 PM	<i>Linear-Separability In Visual Search For Color</i> Pierre Jolicoeur, Ben Bauer and William B. Cowan
6:40-6:50 PM	Short Break
6:50-7:20 PM	<i>Quantal versus Continuous Dynamics of Spatial Attention: An Episodic Theory</i> George Sperling and Erich Weichselgartner
7:30-8:00 PM	<i>The Phenomenology of Attention</i> Bill Prinzmetal, Hedy Amiri, Kristin Allen, Ijeoma Nwachuku, and Laura Bodanske
8:10 PM	Ajourn For Evening

Sunday, July 16

8:30 AM	Morning Refreshments
9:00-9:30 AM	<i>Spatial Attention and Visual Synthesis</i> Dale S. Klopfer
9:40-10:10 AM	<i>Serial Position Effects In Children's Route Reversal Errors: Implications For Search Operations</i> Edward H. Cornell and C. Donald Heth
9:40-10:10 AM	<i>Event-Related Potential Correlates Of Working Memory Processes</i> Ivan Kiss and C. Pisio
10:20	Break until 5:00
5:00 PM	Appetizers
5:30-6:00 PM	<i>If They Are Illusions, Where Are They? Locating Illusory Conjunctions</i> Eliot Hazeltine, Bill Prinzmetal, and Katherine Elliot
6:10-6:40 PM	<i>Perception Of Geometric Illusions In Unilateral Neglect</i> Tony Ro and Robert D. Rafal
6:50-7:20 PM	<i>What Elicits the Indirect McCollough Effect ?</i> Lorraine G. Allan, Shepard Siegel, Tom Eissenberg, and Stacy E. Thomas
7:30 PM	Ajourn For Evening

Monday, July 17

- 8:30 AM** **Morning Refreshments**
- 9:00-9:30 AM** *Principles And Neural Processes Of Bimanual Spatial Coordination In Normals, Split-Brain Patients, And Amputees With Phantom Limbs*
Liz Franz
- 9:40-10:10 AM** *Selective Attention In Aging And Alzheimer's Disease*
Michael Sullivan, Mark Faust and David Balota
- 9:40-10:10 AM** *Abnormal Lexical Activation In Alzheimer's Disease: Evidence From Target Degradation in a Semantic Priming Task*
Gina McGlinchey-Berroth and Laura Grande
- 10:20** **Have a safe trip home.**



Abstracts

The Neural Basis of Flanker Interference

Bob Rafal, U.C. Davis
Neurology, VAMC, 150 Muir Rd., Martinez, CA 94553

When we learn to make a one motor response to one stimulus and another motor response to another, neural representations of these production rules are maintained as response channels in the brain. A nearby flanking stimulus, coding for a response incompatible with correct one, produces interference manifested as an increase in reaction time, presumably due to response channel activation by the incompatible information. We are using this flanker paradigm to identify the neural substrates for response channels held in working memory. Parietal lesions (in patients with neglect and Balint's syndrome) interfering with awareness of the flanking distractor did not reduce flanker interference. Thus, response channel activation does not require intact parietal lobe function, or conscious awareness of the flanker. Flanker interference was normal in Parkinson's disease. Unilateral lesions of the dorsolateral prefrontal cortex (DLPFC) reduced interference from contralateral flankers. Preliminary PET observations provide converging evidence implicating inferior DLPFC as the neural substrate for response channel activation.

What Cognitive Function is supplied by the Basal Ganglia

Steven W. Keele, Amy Hayes, and Matt Davidson, Department of Psychology, University of Oregon, Eugene, OR 97403

The basal ganglia have long been thought to subserve motor functions such as force regulation. Neuroanatomical data indicate that several parallel circuits originate in nonmotor as well as motor regions of frontal cortex, however, coursing in similar fashion through the basal ganglia and thalamus and back to cortical origin. The similar circuits suggest similar function is supplied to motor and nonmotor domains alike. Studies of Parkinson patients, such as with Wisconsin Card Sorting, suggest the function to be one of establishing and switching of set.

Two immediate problems face a set switching theory. How could set switching explain force regulation, a seemingly clear basal ganglia function? We have argued that force is regulated by the rate at which equilibrium points are switched from one set point to another (Bizzi and colleagues). The other problem is that specific tests of set switching theory have failed. Wright, Sharpe, and Rafal and their colleagues found no increase in the "switching" cost for Parkinson patients from an expected to an unexpected cue location in the Posner cueing paradigm.

We suggest that the cueing paradigm fails to capture the appropriate sense of set as involved in the basal ganglia, suggesting instead that setting involves mapping stimulus or intention such that an intended stimulus (or intention) produces an action, but an unintended one does not. In a sense, the setting involves transient mappings of input to action in accordance with instructions. This theory was tested in two paradigms. Parkinsonism impairs the switching of response requirement, as measured by reaction time, from color to form, or vice versa. Likewise, Parkinsonism impairs switching from one sequence segment to a different one, as measured by interresponse intervals.

The PRP Effect Following Callosotomy: Residual Interference Despite Uncoupling Of Lateralized Response Codes

Richard Ivry and Liz Franz, Department of Psychology, University of California, Berkeley, CA 94720

Alan Kingstone, Institute of Cognitive Neuroscience, University of California, Davis, CA 95616

Jim Johnston, NASA Ames, Moffett Field, CA

We will present the hypothesis that there is a subcortical gating mechanism that constrains when commands from central processes are implemented. According to this view, cortical processing involves a parallel competition for access to response systems. The subcortical gate provides a means for implementing the most active response(s) and, due to inhibitory properties, ensures that residual activation does not interfere with future processing. As such, the gate can play a critical role in "response selection", without having homunculus-like properties. Evidence for such a mechanism comes from a variety of tasks. In the motor domain, the gating mechanism provides a new slant on temporal constraints in bimanual movements. In the cognitive domain, the idea of subcortical gating is consistent with evidence showing that, on a dual-task paradigm, a callosotomy patient showed a robust psychological refractory period effect (PRP). However, other aspects of the data indicated that sectioning the corpus callosum eliminates interference resulting from competing stimulus-response codes.

Using The Overlapping-task (PRP) Paradigm to Investigate Experimental Effects with Multiple Loci of Action

Mark Van Selst, NASA Ames Research Center, mailstop 262-2, Moffet Field, CA 94035-1000
Pierre Jolicoeur, Department of Psychology, University of Waterloo, ON, N2L 3G1 Canada

Using dual-task methodology provides a means by which "early" and "late" influences on cognitive processing can be evaluated. To-be-discussed examples include the use of overlapping-task methodology (Pashler, 1989; Welford, 1956) to demonstrate multiple loci of the effect of word frequency in lexical decision and multiple loci for the effect of character disorientation on mirror/normal judgements. In both cases, the effects of known "perceptual" manipulations on performance (visual degradation through contrast reduction) on the second of two tasks (Task 2) are almost completely eliminated if the stimuli for the two tasks are presented in close temporal proximity. The attenuation is indicative of a "pre-bottleneck" ("early") locus of action. Other experimental manipulations (word frequency; orientation) are only partially attenuated under identical conditions. The attenuation indicates a "pre-bottleneck" locus of action. The large residual effects indicate a "post-bottleneck" (late) locus of action. There are multiple loci of action responsible for the observed effect of word frequency in lexical decision and of character orientation in mirror/normal (mental rotation) judgements.

Repetition Deafness in Computer Compressed Sentences with List-Like Prosody

Michelle D. Miller and Donald G. MacKay, University of California, Los Angeles, CA 90024

This study examines effects of prosody and acoustic similarity on repetition deafness, the reduced probability of recalling repeated words in computer compressed speech. Unlike sentences with normal prosody, sentences produced with list-like prosody generated a large and significant repetition deafness effect (28%). For these "aprosodic" sentences, acoustically identical repeated words and acoustically different repeated words (spoken by different speakers) generated statistically indistinguishable repetition deafness. Implications of these results for theories of repetition deficits are discussed.

Metaphor Comprehension In Context

Odie Geiger and Lawrence M. Ward, University of British Columbia, Vancouver, Canada V6T 1Z41

It has consistently been claimed that context is essential to the comprehension of metaphors. In the first of two experiments, we compare two-choice response times for six classes of single word endings (dead metaphors, novel metaphors, paraphrases, literal uses, surprising words, unfamiliar words) in developed contexts. Results show that dead metaphors take no longer to understand than paraphrases or the same words used literally, but novel metaphors do. Both are faster than surprising or unfamiliar words. In the second experiment, contexts were reduced to a few words with minimal content. Paraphrases and dead metaphors took the same time regardless of context content, while processing times for novel metaphors were considerably lengthened. Surprise endings, however, were comprehended more quickly with minimal context. Results are explained in terms of a class-inclusion model (Glucksberg and Keysar, 1990) where metaphor comprehension results from the expansion of meaning of an already lexicalized word.

Attentional Factors In Item Memory And Source Monitoring

Arthur P. Shimamura and Paul J. Jurica, Department of Psychology, University of California, Berkeley, CA 94720.

In everyday experiences, one often remembers some factual information but forgets the context in which the information was encountered. Such instances represent a failure in source monitoring. In several experiments, we assessed the role of attention on item memory and source monitoring. Subjects were presented trials in which one of three computer-generated faces presented items—either a statement ("I like to eat cereal for breakfast") or a question ("What is your favorite spot in California?"). Items presented as questions were thought to produce better item memory than items presented as statements (i.e., a "generation effect"). That is, questions were presumed to draw attention to item information and thus facilitate item memory. At test, subjects were given tests of item recall and source monitoring. In the source monitoring test, subjects were asked to recognize the face that presented an item. A "generation" effect was observed on the item recall test. That is, item recall was better for items presented as questions compared to items presented as statements. However, a "negative generation" effect occurred on the source monitoring test. These findings suggest that there is a tradeoff between remembering facts and their sources, and suggest a resource allocation model of fact learning and source monitoring. Findings from elderly individuals and patients with frontal lobe lesions will also be presented.

Relating the Process of Source Recollection to Source Discrimination

C.S.Dodson, P.W. Holland, W. Prinzmetal and A. P. Shimamura, Psychology Department, University of California, Berkeley, CA 94720

In two experiments, we examined the process of recollecting source information by varying the similarity of the sources of studied items. In Experiment 1, subjects either solved anagrams and word fragments (similar sources) or they solved anagrams and heard words (dissimilar sources). At test, subjects either completed a forced-choice source test or they completed the inclusion and exclusion tests from Jacoby's Process Dissociation (PD) procedure. In Experiment 2, subjects heard words spoken either by 4 different males (similar sources) or by 2 males and 2 females (dissimilar sources), and then completed a forced-choice source test. Both experiments suggest that the recollection of source information is not an all-or-none process. We discuss these results in relation to the PD procedure and current multinomial source models. We also present an alternative multinomial model that is successful at measuring the variety of recollected information.

Modelling List Strength and List Length Effects with a Distributed Memory Model

Andy Yonelinas, Department of Psychology, University of California, Davis, CA 95616

Increasing the length of a study list interferes with recognition memory performance, but increasing the strength of the study list does not. Shiffrin, Ratcliff, and Clark (1990) have argued that this pattern of interference effects exhibited by human subjects suggests that memory is not stored in a distributed fashion, because distributed memory models predict both list length and list strength effects. In the current study a simple distributed memory model (i.e., a linear associator) was used in conjunction with an feature-based closed-loop sampling procedure, and was found to produce the appropriate pattern of interference effects. It is concluded that the effects of list length and list strength do not prove to be a problem models.

Interval Structure in Implicit Learning of Musical Tone Sequences

Victor A. Shames, Thomas F. Graham, Timothy L. Hubbard, Department of Psychology, University of Arizona, Tucson, AZ 85721

An artificial grammar was used to generate sequences of musical tones that varied systematically by frequency (pitch sequences) or by duration (rhythm sequences). Exposure to pitch sequences generated by an artificial grammar enabled subjects to demonstrate greater-than-chance accuracy in discriminating between new pitch sequences that conformed to the grammar and sequences that did not (Exp.1). This finding also generalized to rhythm sequences (Exp.2). Transfer between the two types of tone sequences was not observed when both the frequency intervals in pitch sequences and the duration intervals in rhythm sequences were logarithmically scaled (Exp.3). However, with pitch intervals scaled logarithmically and rhythm sequences scaled linearly, a significant transfer effect was found (Exp.4). These findings indicate that interval structure is abstracted in implicit learning of musical stimuli, and that the mapping between intervals of pitch and duration requires a conversion from logarithmic to linear scaling.

Orientation Biases in Figural Interpretation: "Projections" for Pattern Recognition

Diane J. Schiano, Interval Research Corporation, 1801 Page Mill Road, Building C, Palo Alto CA 94304

Michael K. McBeath and Kenneth W. Chambers, Psychology Department, P.O. Box 5190, Kent State University, Kent, OH 4424-0001

The perceptual biases viewers "project" in interpreting random 2D figures was explored in a series of studies in which viewers saw filled polygons that varied in degree of bilateral symmetry, and described "what the figure looks like" and/or indicated perceived orientation. Methodology ranged from paper-&-pencil surveys to interactive computer graphics in which 3-D orientation of a comparison object was manipulated via computer "mouse". Results show virtually universal interpretation of figures as: 1) silhouette views of 3D bilaterally-symmetric objects, with 2) top-side up and 3) perceived orientation varying directly with figural symmetry. Vertically symmetric figures were typically seen as front or top views, asymmetric figures as profiles, and intermediate-symmetry figures as intermediate obliques. Since most salient 3D objects are indeed bilaterally symmetric, these common biases which constrain implied vantage in figural interpretation suggest surprisingly simple, effective and ecological pattern-recognition heuristics for human and machine vision alike.

The Effects of Plane and Depth Rotation on Object Recognition

Rebecca Lawson and Pierre Jolicoeur, Department of Psychology, University of Waterloo, Canada
Glyn Humphreys, Department of Psychology, University of Birmingham, U.K.

Recent studies have indicated strong effects of depicted viewpoint on the efficiency of recognizing familiar objects. Increasing plane disorientation increases naming latencies (Jolicoeur, 1985; Jolicoeur & Milliken, 1989). Similarly, increasing rotation in depth (to foreshorten the main axis of an object) increases naming latencies (Humphrey & Jolicoeur, 1988, 1993; Lawson, 1994; Srinivas, 1993). The studies to be reported investigated the combined effects of plane and depth rotation, both on initial measures of recognition, and following practice with the stimuli. The present studies were designed to determine whether plane and depth rotation influence the same processes in human visual object recognition. This issue has been examined in mental rotation studies (e.g., Shepard & Metzler, 1971), which typically present novel objects in a picture-picture matching task. However, in the current studies, picture naming of familiar object classes provided a more ecologically valid comparison of the effects of plane and depth rotation on object recognition.

Visual Temporal Masking at Scene Cuts

Lew B. Stelmach, W. James Tam, Limin Wang, Daniel Lauzon, Communications Research Center, 3701 Carling Ave., Ottawa, Ont., K2H 8S2, Canada

We examined the sensitivity of the human visual system to video coding artifacts following a scene cut. Based on classical studies of visual masking, we would expect that sensitivity to coding artifacts would be reduced following a cut. The video frames preceding the cut would function as a mask, while the coding artifacts following the cut would function as the signal.

Subjects viewed image sequences, each 2-seconds in duration, with a scene cut at the 1-second mark. The severity of coding artifacts in video frames following the cut was varied systematically by adjusting the scaling factor in an MPEG-2 coder.

It was found that masking effects were present in the first frame following a cut, but diminished markedly in subsequent frames and were virtually absent by the third frame. We conclude that masking effects may be utilized to improve the performance of video coders by allowing the bit-rate to be reduced following a scene cut.

Divided Attention Between The Eye And The Ear

A.M Bonnel, CNRS Marseille, France

E. Hafter, Department of Psychology, University of California, Berkeley, CA 94720

Past studies of simultaneous attention to pairs of visual stimuli have used the "dual-task" paradigm to show that *identification* of the direction of a change in luminance, either incremental or decremental, is "capacity-limited," but that simple *detection* of these changes is governed by parallel or "capacity-free" processes. Based on that, it has been suggested that the contrast between *identification* and *detection* reflects different processes in the sensory periphery, namely the responses of magno- and parvo-cellular receptors. The present study questions that assertion and investigates the contribution of central processing in resource-limitation by applying the dual-task to a situation in which one stimulus is auditory and one is visual. The results are much the same as before, with *identification* demonstrating the trade-off in performance generally attributed to a limited capacity while *detection* shows no loss compared to single-task controls. Thus, they imply that limitations on resources operate at a general stage of processing that is central to the auditory and visual peripheries.

Linear-Separability In Visual Search For Color

Pierre Jolicoeur, B. Bauer, and W.B. Cowan, University of Waterloo, Waterloo, Ontario, Canada

When a target is linearly separable from all distractors in a display, in the appropriate feature space, visual search is easy (the target often pops-out of the display). When the target is not linearly separable from the distractors, search is difficult and there is a significant cost in subjects' response times for each additional distractor in the display. Our previous attempts to demonstrate effects of linear-separability in visual search for color have confounded effects of separability with distractor-distractor heterogeneity. We present a technique for deconfounding these two possible causes of the change in search difficulty. The technique involves changing the ratio of the two distractor colors in the display, which also has an effect on distractor-distractor heterogeneity. We use manipulations of distractor-distractor ratio to create displays that have equivalent distractor-distractor heterogeneity in which the target is either linearly separable or not linearly separable from the distractors.

Quantal versus Continuous Dynamics of Spatial Attention: An Episodic Theory

George Sperling, Department of Cognitive Sciences, University of California, Irvine, CA USA 92717

Erich Weichselgartner, Fraunhofer Society, Munich D-80636, Germany

We develop the mathematical implications of a spotlight metaphor in which attention operates either as a single spotlight that moves to illuminate different physical locations on a stage (continuous theory) or as an array of fixed spotlights pointed at different locations, only one of which is turned on at any given moment (quantal theory). A particular instantiation of the quantal theory proposes that (1) visual attention can be resolved into a sequence of discrete attentional acts (episodes); (2) each attentional episode is defined by its spatial facilitation function $f(x,y)$; (3) the smooth transition at time t_0 between episodes is described by a temporal transition function $G(t-t_0)$; (4) f and G are space-time separable. This episodic theory quantitatively predicts performance in the various classical paradigms that use a spatial cue to stimulate a spatial movement of attention: go/no-go reaction times, choice reaction-times, attentionally-cued discrimination, attention gating, partial reports (iconic memory expts), and spatial localization during eye movements.

The Phenomenology of Attention

Bill Prinzmetal, Hedy Amiri, Kristin Allen, Ijeoma Nwachuku, and Laura Bodanske, Psychology Department, University of California, Berkeley, CA 94720

This paper concerns the effect of visual attention on the phenomenal experience of the observer. How is the perception of a stimulus changed by attention? Does attention make a stimulus brighter, have greater contrast, or seem clearer? Contemporary research on attention is incapable of answering this question because observers are not given an adequate opportunity to register the appearance of the stimulus. We introduce a new method for obtaining responses that makes it possible for observers to precisely register their sensory impressions. We apply this method to study the effects of attention on color (hue), brightness, contrast, location, and "clearness" (defined in terms spatial frequency). In most cases visual attention affects the variance of perceptual impressions, but it does not change the quality of those impressions.

Spatial Attention and Visual Synthesis

Dale S. Klopfer, Department of Psychology, Bowling Green State University, Bowling Green, OH 43402

In visual synthesis, parts of objects are presented individually and subjects perform a task that requires synthesis of a whole. Synthesis requires directing attention externally to the stimulus followed by directing attention internally to spatial working memory to store the encoded stimulus. Typically, internal and external attention are directed to corresponding loci: stimuli in the upper left of the world are encoded and stored in the upper left of SWM. This research examines the effects of breaking this correspondence. Subjects saw parts of patterns made from filling in squares of a 3 x 3 matrix; the parts were presented individually at various locations on a computer screen. In the Consistent condition, the locus of internal and external attention corresponded; in the Inconsistent condition it did not. Performance on a memory test requiring synthesis of the whole pattern was better in the Consistent than in the Inconsistent condition. Follow-up studies are discussed.

Serial Position Effects In Children's Route Reversal Errors: Implications For Search Operations.

Edward H. Cornell and C. Donald Heth, Department of Psychology, University of Alberta, Edmonton, Canada T6G 2E1

The purpose of this line of research is to illustrate how descriptions of way finding behavior can be applied to the problem of search for a lost person. In this study, we first establish a general pattern of errors that young way finders make when reversing a route. Eight- and 12-year-old children were escorted on a circular tour of a university campus and then were asked to retrace the route from the end point to the beginning. In one condition a correction procedure was used; children were asked to point to the correct path at 18 intersections, and if they erred, were corrected before continuing back along the previously traveled route. In an uncorrected condition, children were allowed to travel off route if they erred. In both conditions, errors at intersections indicated that the original paths were more likely to be remembered at the beginning and end of the route than in the middle. More errors were made mid route by younger than older children when their choices were uncorrected. The application of these findings is illustrated by incorporating the obtained serial position effects in an algorithm to estimate the probability that a lost person is within an area designated for search. The method is demonstrated in a simulation of an urban police search for a 12-year-old girl.

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Event-Related Potential Correlates Of Working Memory Processes

I. Kiss and C. Pisis, Toupin Psychophysiology Laboratory, Northern Alberta Regional Geriatrics Program and Departments of Psychology and Medicine, University of Alberta

We recorded event-related potential (ERP) correlates of operationally defined working memory (WM) processes. Subjects viewed randomly arranged, variable length series of individual, visually presented numerals. Sets of numerals were presented after each series. In the UPDATE condition, subjects decided whether sets matched preceding individual stimuli, requiring active revision of a memory set. The CONTROL condition utilised identical individual stimuli. Subjects were required to identify sets; a standard visual "oddball". ERPs recorded during individual stimulus presentation were averaged for each serial position. Averaged ERPs recorded in the CONTROL condition were subtracted from those in the UPDATE condition under the assumption that common perceptual, motor and conditional probability effects would be removed. Amplitude measures indicate that DIFFERENCE ERP's are relatively insensitive to encoding/storage but are augmented once subjects "update" the contents of WM; consistent with Baddeley's model of WM which postulates distinct storage and control components. Moreover, increases in ERP amplitude with increasing serial position suggest processes in addition to those required for memory set revision, unlike previous behavioural studies.

If They Are Illusions, Where Are They? Locating Illusory Conjunctions

Eliot Hazeltine, Bill Prinzmetal, and Katherine Elliot, Psychology Department, University of California, Berkeley, CA 94720

There is evidence that complex objects are decomposed by the visual system into features, such as shape and color. Consistent with this theory is the phenomenon of illusory conjunctions, which occur when features are incorrectly combined to form an illusory object. We analyzed the perceived location of illusory conjunctions to study the role color and shape play in the location of visual objects. In Experiments 1 and 2, subjects located illusory conjunctions about halfway between the veridical locations of the component features. Experiment 3 demonstrated that the distribution of perceived locations was not the mixture of two distributions centered at the two feature locations. Experiment 4 replicated these results with an identification task rather than a detection task. We conclude that the locations of illusory conjunctions are not arbitrary but determined by both the constituent shape and color.

Perception Of Geometric Illusions In Unilateral Neglect

Tony Ro and Robert D. Rafal, Department of Neurology and Center for Neuroscience, University of California, Davis, 95616

A patient with left unilateral neglect perceived the Muller-Lyer and Judd illusions while completely unaware of critical inducing features on the left half of the figures. When asked to explicitly discriminate between two figures which differed only on the left, the patient failed to notice the differences and reported that the figures were identical. When asked to bisect these same figures, however, her bisection performance was influenced by information from both the left and the right side of the figure. These results demonstrate that both shape and location information in the neglected field are represented and that these illusions are based on very early mechanisms of visual perception.

What Elicits the Indirect McCollough Effect ?

Lorraine G. Allan and Shepard Siegel, Psychology Department, McMaster University, Hamilton ON, Canada

Tom Eissenberg, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University, Baltimore MA

Stacy E. Thomas, Psychology Department, McMaster University, Hamilton ON, Canada

The McCollough effect (ME), typically induced with two complementarily-colored orthogonal patterns, may be induced with one pattern. For example, following alternating presentations of a green horizontal grid and homogeneous magenta square, the induced orientation (horizontal) appears pink, and the orthogonal noninduced orientation (vertical) appears green. Similarly, following alternating presentations of a pattern of green concentric rings and a homogeneous magenta circle, the induced pattern (concentric rings) appears pink, and the noninduced orthogonal pattern (spokes) appears green. The aftereffect on the noninduced pattern (the "indirect ME) has been seen as evidence for orthogonal coding mechanisms within the visual system. In contrast with such an interpretation, our results suggest that the indirect ME is not elicited by orthogonal stimuli that are absent in induction. Rather, it is directly elicited by stimuli (e.g., square or circular forms) paired with color during induction. The presence of the noninduced orthogonal stimuli actually attenuates the indirect ME.

Principles And Neural Processes Of Bimanual Spatial Coordination In Normals, Split-Brain Patients, And Amputees With Phantom Limbs

Liz Franz, Psychology Department, University of California, Berkeley, CA 94720

The ability to coordinate limb movements in different directions and orientations is essential to the performance of a large repertoire of skilled actions. In a series of investigations, normal subjects, split-brain patients, and amputees with phantom limb sensation produced bimanual movements with different spatial demands. Coupling in the spatial parameters of the movements occurs in normal subjects, and the movements are closely locked in time. Spatial uncoupling despite normal temporal coupling is observed in split-brain patients. Moreover, amputees with phantom limb experience demonstrate spatial coupling in the movements of the intact limb when paired with imaginary movements of the phantom. Together, these results lead to three important conclusions. First, spatial coupling is distinct from temporal coupling. Second, spatial coupling relies on the corpus callosum, whereas, temporal coupling does not. Third, spatial coupling occurs in the cognitive processes associated with planning of bimanual movements, and is not due solely to biomechanical factors.

Selective Attention In Aging And Alzheimer's Disease

Michael Sullivan, Department of Neurology, Oregon Health Sciences University, Portland, Oregon
Mark Faust and David Balota, Department of Psychology, Washington University, St. Louis

This talk will focus on the question of whether or not aging and dementia of the Alzheimer's Type (DAT) produce a breakdown in aspects of the inhibitory component underlying selective attention. The results of two experiments containing both distractor interference and identity negative priming tasks will be reported. In Experiment 1, subjects were presented with overlapping picture stimuli, and in Experiment 2, subjects were presented with overlapping written word stimuli. The results of both experiments produced reliable and similar size negative priming in young and old adults, but there was no evidence of negative priming in the individuals with DAT. In contrast, the naming latencies of all three groups showed a reliable and similar size distractor interference effect. However, the DAT individuals produced more semantic intrusion errors, but not unrelated intrusion errors, than the old adults. Given that some previous studies have failed to obtain evidence for inhibitory function during selective attention in both old adults and individuals with DAT, these results raise several questions regarding the nature of the inhibition underlying distractor interference and negative priming and the conditions that must be present to induce it.

Abnormal Lexical Activation In Alzheimer's Disease: Evidence From Target Degradation in a Semantic Priming Task

R. McGlinchey-Berroth and Laura Grande, Geriatric, Research, Education and Clinical Center, Brockton, VAMC, 1400 VFW Parkway/West Roxbury, MA 02132.

The nature of the semantic memory deficit in patients with Alzheimer's disease (AD) is controversial. Facilitation in semantic priming tasks suggests that the structure of semantic information is intact in AD. However, findings of larger-than-normal priming effects (hyperpriming) and semantic judgment deficits suggest possible structural problems with semantic memory. Using a semantic priming task, we investigated whether physical degradation of a target word, known to produce hyperpriming in normal subjects, would add to or interact with the priming effects in AD and thus suggest a possible locus of impairment. The data suggests that both related and unrelated primes had a reduced influence on the processing of targets whose identification had been slowed by degradation. This implies that the primed pool of structurally normal semantic associates shows a pattern of initial "hyperactivation" followed by rapid decay. Such a deficit in activation has general implications for the semantic memory function of AD patients.

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