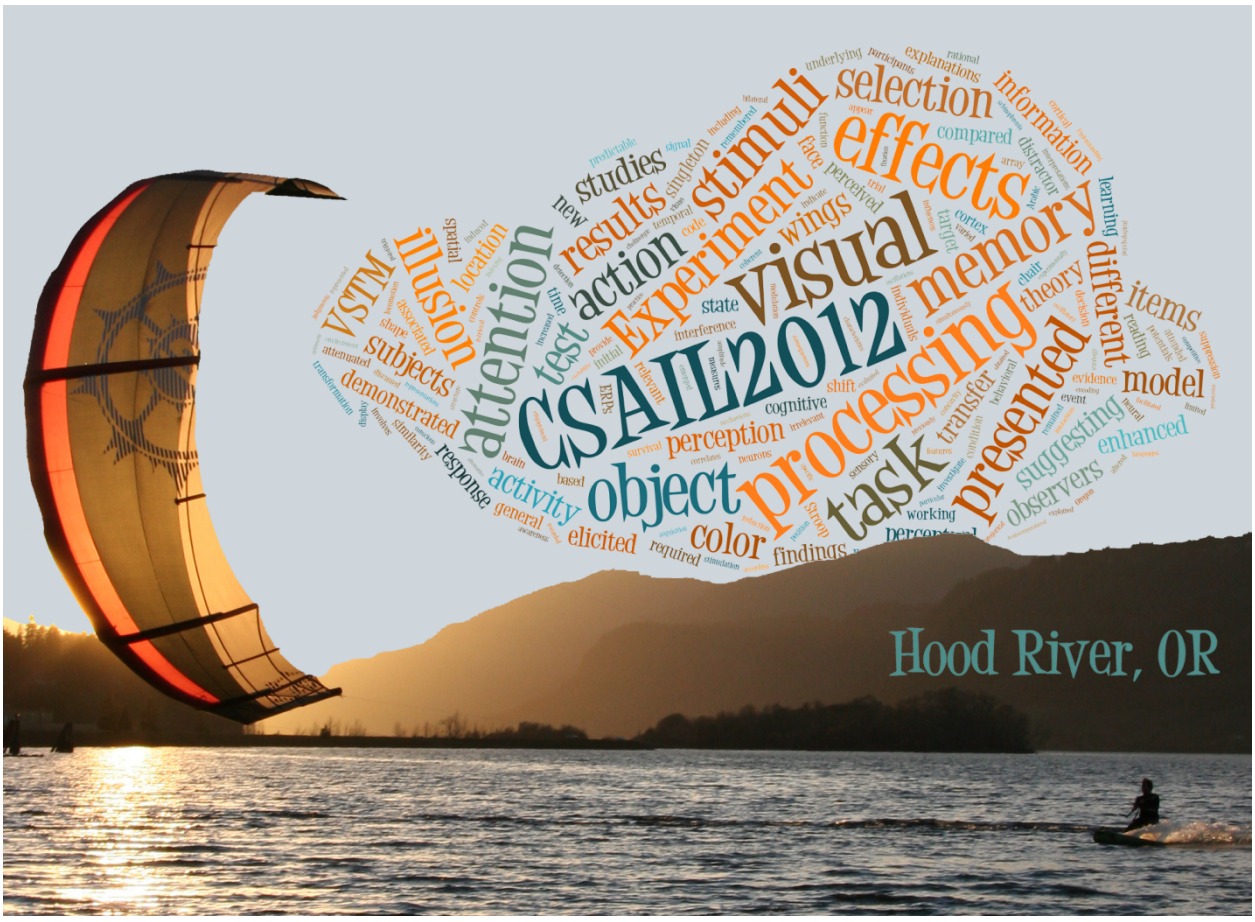
Eighteenth Annual Meeting



Cognitive Science Association for Interdisciplinary Learning

Hood River Hotel
Hood River, Oregon
July 26 to July 30, 2012

Thursday, July 26		
4:30pm	**Reception & Appetizers**	
4:45pm	**Welcome & Introductory Remarks**	
5:00-5:30pm	Karen Schloss & Bill Prinzmetal	*Müller-Lyer Illusion Reconsidered*
5:40-6:10pm	Gregory Christie & John McDonald	*Salience guides selection of relevant visual stimuli*
6:20-6:50pm	John Gaspar & John McDonald	*Within- versus cross-dimensional capture in fixed-feature visual search*
7:00pm	**---------- Adjourn for Evening ----------**	

Friday, July 27		
8:30am	**Breakfast**	
9:00-9:30am	John Dewey & Thomas Carr	*Attenuation of the predictable sensory consequences of actions: Does the action effect have to be self-generated to become attenuated?*
9:40-10:10am	Christina Karns, Mark Dow, & Helen Neville	*Touch and vision in the primary auditory cortex of congenitally deaf adults*
10:20-10:50am	Carly Leonard, Britta Hahn, James Gold, & Steve Luck	*Understanding variation in working memory capacity: A translational approach*
11:00am	---------- **Break until 4:15pm** ---------- 	
4:15pm	**Appetizers**	
4:45-4:55pm	Anastasia Flevaris, Antígona Martínez, & Steve Hillyard	*Neural mechanisms underlying perceptual integration in object perception*
5:00-5:30pm	Michael Pitts, Antígona Martínez, & Steve Hillyard	*ERPs and gamma oscillations modulated by visual awareness and task-relevance*
5:40-6:10pm	Edward Vogel & Keisuke Fukuda	*Oscillatory mechanisms underlying the VSTM capacity limit*
6:20-6:50pm	Pierre Jolicoeur, Stephan Grimault, Ulysse Fortier-Gauthier, Christine Lefebvre, Shannon O'Malley, & Roberto Dell'Acqua	*Beta-band oscillatory activity in the human brain related to perception, attention, memory, and action: Is beta the new gamma?*
7:00pm	---------- **Adjourn for Evening** ----------	

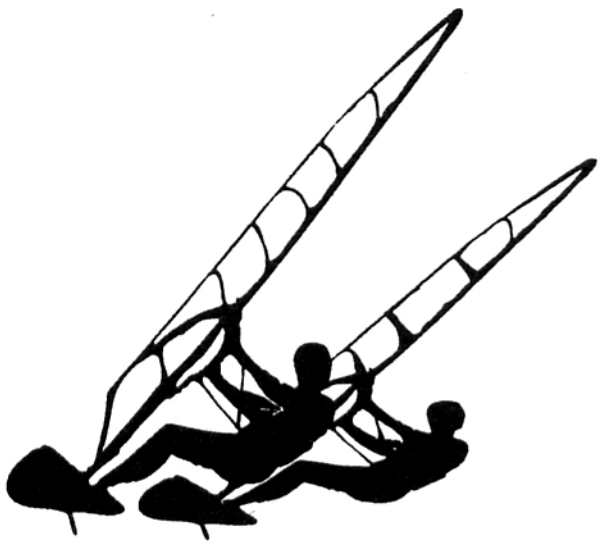
Saturday, July 28

8:30am	**Breakfast**	
9:00-9:30am	Mike Wehr	*A coding transformation within auditory cortical neurons*
9:40-10:10am	Andrew Lee, Antonello Bonci, Michael Stryker, Linda Wilbrecht, Jennifer Hoy, & Cristopher Niell	*Neural circuits underlying modulation of visual response gain by behavioral state*
10:20-10:50am	Jerome Cohen, Varakini Parameswaran, Marium Arain, & Corrine Keshen	*Extracting visuo-spatial working memory processes from rats' target object recognition performance in a foraging task*
11:00am	**---------- Break until 4:15pm ----------** 	
4:15pm	**Appetizers**	
4:45-4:55pm	Summer Sheremata & Michael Silver	*Spatial attention induces bilateral representations in right but not left topographic parietal cortex*
5:00-5:10pm	Sahar Yousef, Summer Sheremata, Rachel Kaneta, & Michael Silver	*Cholinergic enhancement improves visual short-term memory performance*
5:15-5:45pm	Brittany Dungan & Edward Vogel	*Stability of visual working memory representations across changes in eye position*
5:55-6:25pm	Philip Smith & David Sewell	*A neurocomputational theory of Attentional Selection in multi-element displays*
6:35pm	**---------- Adjourn for Evening ----------**	

Sunday, July 29		
8:30am	**Breakfast**	
9:00-9:30am	Kimberly Jameson & Natalia Komarova	*Quantitative theory of human color similarity relations*
9:40-10:10am	Zohar Eviatar, Raphiq Ibrahim, & Hanaan Asad	*Why is it hard to read Arabic?*
10:20-10:50am	Louis Narens	*Multi-model utility theory*
11:00am	---------- **Break until 4:45pm** ---------- *Rafters, be packed and ready to go with a sack lunch so you can make it to Zoller's before 12:00pm 	
	No appetizers on banquet night	
4:45-4:55pm	Lucy Troup, Nicholas Soderstrom, Maia Nguyen, & Jerimiah Lujan	*Zombies, predators, and pleasantness! Can survival processing effects be attributed to arousal?*
5:00-5:30pm	Michael Sullivan, Gina Griffiths, Mckay Sohlberg, & Steve Fickas	*Comprehension of expository text by returning veterans with mild head injury and psychological distress*
5:40-6:10pm	Pierre Jolicoeur & Louis De Beaumont	*Long-term consequences of multiple sports concussions: Evidence from electric brain activity.*
6:20pm	---------- **Adjourn for Banquet Dinner** ----------	
7:00pm	**Banquet Dinner at Cornerstone Cuisine**	

Monday, July 30

8:30am	**Breakfast**	
9:00-9:30am	Yu-Chin Chiu, Adam Aron, & Frederick Verbruggen	*Response suppression by automatic retrieval of stimulus-stop association: evidence from transcranial magnetic stimulation*
9:40-10:10am	Christopher Koch & Josiah Hotevec	*Re-evaluating explanations of Stroop interference: Evidence from nonverbal measures*
10:20-10:50am	*Eve Isham, William Banks, & Joy Geng*	*Saving free will from science*
11:00am	---------- **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.

Thursday Abstracts

Müller-Lyer Illusion Reconsidered
Karen B. Schloss & Bill Prinzmetal
University of California Berkeley

The Müller-Lyer illusion is one of the most familiar and dramatic of the classical visual illusions. The most popular theories of the Müller-Lyer illusion involve the assumption that in, some sense, the wings-in (arrowhead) portion are processed as closer to the observer than the wings-out version (arrow tail). There are several different forms of this theory (e.g., Gregory, Gillam), but they all assume that the wing-in forms a convex shape in the world while the wings-out form a concave shape.
In three experiments we challenge the assumption that the perception of convexity (for wings-in) and concavity (for wings-out) are necessary for the Müller-Lyer illusion. In Experiment 1, we demonstrated that the wings-out portion of the illusion yields as large an illusion when it is part of a convex object as when it is shown alone. In Experiment 2, a wings-in configuration located at a concavity in a natural scene still makes a line appear shorter, relative to a control line directly below it on the same surface. In Experiment 3, we demonstrated both wings-out and wings-in portions of the illusions when the wings-in are part of a concave surface and the wings-out are part of a convex surface. These results are counter to the most popular explanations of the Müller-Lyer illusion It is unnecessary to associate a wings-in stimulus with a convexity and wings-out with a concavity to obtain a Müller-Lyer illusion.

Salience guides selection of relevant visual stimuli
Gregory j. Christie & John J. McDonald
Simon Fraser University

According to the automatic-capture hypothesis of visual attention the most salient item in a display will always attract attention first, even if observers know that the item is a task-irrelevant distractor. However, recent ERP results from studies investigating the N2pc, a neuro-electric index of attentional selection, have demonstrated that observers can prevent selective processing of salient-but-irrelevant distractors when target and distractor features are fixed over trials. Here, we investigated whether observers would deploy attention initially to the most salient item if the task required evaluation of both a salient color singleton (previously used as an irrelevant distractor) and a less-salient form singleton. In other words, we asked whether stimulus salience would determine the order in which observers would evaluate the two task-relevant singletons. In our main experiment, we presented a color singleton (red circle) and a form singleton (green diamond) among four identical nontargets (green circles) on every trial. Each of the six items contained a horizontal or vertical line, and participants were asked to indicate whether the orientations of the lines contained in the two singletons were the same of different. Although there was no requirement to attend to either singleton first, we found that the salient color singleton elicited an earlier and larger N2pc than did the less salient form singleton. These results indicate that when salient items are relevant to the task at hand, observers reliably attend to those items before attending to less salient items.

Within- versus cross-dimensional capture in fixed-feature visual search

John M. Gaspar & John J. McDonald
Simon Fraser University

Recent ERP findings indicate that colour singletons fail to capture attention when observers search for a less salient shape that remains fixed across trials. This is consistent with the dimensional weighting account, according to which signals on the relevant (shape) and irrelevant (colour) dimensions are enhanced and suppressed, respectively. The goal of the present experiments was to examine the influence of prior knowledge of a target for over-riding a more salient distractor in a compound search task, when the target and distractor exist within the same visual dimension (colour versus colour; Experiment 1) and across different visual dimensions (shape versus colour; Experiment 2). More interference was found in the within-dimensional condition than the cross-dimension condition (18 msec vs. 7 msec). Both the within- and cross-dimensional targets elicited an N2pc component (indexing selection) and the distractor elicited a PD component (indexing suppression). In the within-dimensional experiment, the amplitude of the N2pc varied as a function of the proximity of the distractor to the target. These results indicate that when dimensional weighting is not a viable selection strategy, the visual system suppresses the location of the distractor while selectively processing the target.

Friday Morning Abstracts

Attenuation of the predictable sensory consequences of actions: Does the action effect have to be self-generated to become attenuated?

John A. Dewey & Thomas H. Carr
Michigan State University

Sensory attenuation refers the phenomenon that self-generated stimuli are often perceived as less intense than identical but externally generated stimuli. Such effects are usually explained in terms of predictive forward models that attenuate the predictable sensory consequences of actions (action-effects). An unsettled question is whether merely observing another agent performing a familiar action may also trigger a forward model with attendant sensory attenuation, or alternatively, if a motor signal is necessary. We conducted three experiments to investigate the hypothesis that sensory attenuation does not depend on a motor signal per se, but only on the predictability of the action-effect. In Experiment 1, perceived speed of self-triggered visual action-effects was attenuated (slower) compared to action-effects triggered by another human or the computer. In Experiment 2, we found that differences in perceived speed of self, other, and computer triggered action-effects remained even when each condition was preceded by a Go signal to make the onset of the action-effects equally predictable for all conditions. In Experiment 3 (under way), I will investigate the related hypothesis that unexpectedly incongruent action-effects are perceived to be extra intense compared to a context with equal proportions of congruent and incongruent action-effects. This would suggest a continuum where the more predictable the action-effect is, the more it becomes attenuated.

Touch and Vision in the Primary Auditory Cortex of Congenitally Deaf Adults

Christina M. Karns, Mark Dow, & Helen J. Neville
University of Oregon

The developing brain responds to the environment by using statistical correlations in input to guide functional and structural changes – that is, the brain displays neuroplasticity. Experience shapes brain development throughout life, but neuroplasticity is variable from one brain system to another. Recent evidence in hearing adults shows that touch and hearing are closely linked in behavior, brain, and perception. Do congenitally deaf adults show enhancements in remaining sensory modalities? We used fMRI to measure the response to touch, vision, and bimodal interactions between touch and vision in in the deaf "auditory" cortex. We found that somatosensation and bimodal stimuli elicited robust responses in the deaf auditory cortex (including primary auditory cortex). In addition, deaf adults perceived bimodal stimuli differently; in contrast to hearing adults, they were susceptible to a double-flash visual illusion induced by two touches to the face. Somatosensory and bimodal signal change in rostrolateral Heschl's gyrus predicted the strength of the visual illusion in the deaf adults in line with the interpretation that the illusion is a functional consequence of the altered cross-modal organization observed in deaf auditory cortex. Our results demonstrate that congenital and profound deafness alters how vision and somatosensation are processed in primary auditory cortex.

Understanding variation in working memory capacity: A translational approach

Carly J. Leonard, Britta Hahn, James M. Gold, & Steven J. Luck
University of California Davis; University of Maryland School of Medicine

Everyday functioning requires the coordination of both working memory (WM) and attentional selection. Understanding this relationship can be facilitated through translation research on people with schizophrenia (PSZ), a population that shows reliable reductions in WM capacity. Here we measure event-related potentials in both PSZ and matched controls during a lateralized change detection task that assessed WM capacity. We focused on contralateral delay activity (CDA), which correlates with WM capacity in healthy individuals, and found the expected pattern of results in controls. However, the typical relationship between CDA and WM was not present in PSZ. Moreover, PSZ had a greater CDA amplitude than controls at memory load 1. In PSZ, this tendency to be more selective of the to-be-remembered object in the face of one contralateral distractor correlated with decrease in WM capacity when memory load increased from 3 to 5 objects. These results are consistent with findings from other paradigms suggesting that schizophrenia may be associated with overselection. We propose that failure to distribute attention broadly may underlie WM impairment in schizophrenia. More generally, these findings speak to the important link between WM and attentional processes.

Friday Evening Abstracts

Neural mechanisms underlying perceptual integration in object perception
Anastasia V. Flevaris, Antígona Martínez, & Steven Hillyard
University of California San Diego

Object perception depends not only on physical stimulus properties but also on internal factors including the observer's perceptual state. We compared neural activity elicited by varying perceptions of the same physical image – a bistable moving image in which perception spontaneously alternates between dissociated fragments and a single, unified object. A time-frequency analysis of EEG changes associated with the perceptual switch from object to fragment and vice versa revealed greater alpha reduction accompanying the switch to object-percept than to fragment-percept. Recordings of event-related potentials elicited by irrelevant probes superimposed on the image revealed enhanced sensory processing of these probes when they appeared to be contained within the perceived unitary object. These data support the hypothesis that objects attract attention and enhance the representation of elements within their boundaries. Importantly, the perceptual "object" in this case emerged as a function of the perceptual state of the viewer.

ERPs and gamma oscillations modulated by visual awareness and task-relevance
Michael Pitts, Antígona Martínez, & Steve Hillyard
Reed College; University of California San Diego

A primary challenge in identifying neural correlates of visual awareness is to isolate neural activity associated with awareness from activity associated with preconscious and post-perceptual processing. Here, we adapted an inattentional blindness paradigm to allow concurrent recording of the EEG. Event-related potentials (ERPs) and gamma oscillations were compared across three conditions: Stimuli were task-irrelevant and not-perceived, task-irrelevant but perceived, or task-relevant and perceived. A negative amplitude shift in ERPs from ~200-300ms was uniquely associated with awareness. An earlier ERP negativity was present in all conditions, including inattentional blindness, thus indexing a preconscious stage of visual processing. P3-like components, as well as induced gamma oscillations, were only evident when stimuli were relevant to the task, therefore suggesting that these patterns of activity reflect post-perceptual stages of processing as opposed to awareness per se. Results will be discussed in the context of the search for neural signatures of conscious perception.

Oscillatory mechanisms underlying the VSTM capacity limit

Edward K. Vogel & Keisuke Fukuda
University of Oregon

Visual short term memory (VSTM) enables us to hold a limited amount of information online. While ERP studies have characterized sustained slow waves (e.g., CDA) during VSTM tasks, the oscillatory activity that underlies the capacity limitation is not well understood. We analyzed the EEG time frequency signals from participants performing a whole field VSTM task. Participants were presented with 1-8 colored squares for 150ms and remembered them over a 1300ms interval. Power in the alpha and beta frequency band (8~22hz) during the retention interval showed a linear reduction from 1 to 3 items, reaching asymptote for larger array sizes. Furthermore, this power reduction predicted both inter-individual differences and intra-individual differences in VSTM performance. Thus, this power reduction appears to reflect the number of successful representations in VSTM on a given trial irrespective of the number of items that were presented in the memory display.

Beta-band oscillatory activity in the human brain related to perception, attention, memory, and action: Is beta the new gamma?

Pierre Jolicoeur, Stephan Grimault, Ulysse Fortier-Gauthier, Christine Lefebvre, Shannon O'Malley, & Roberto Dell'Acqua
University of Montreal; University of Padova, Italy

Oscillatory activity in the neighbourhood of 23 Hz, in the so-called beta-band, has been found to reflect various perceptual, cognitive, and response functions. In this talk we review recent results from our laboratory suggesting that a greater decrease in beta-band amplitude tends to be associated with a greater engagement of processing capacity. Our findings suggest some general principles that could enable the field to interpret changes in beta-band activity across a variety of paradigms and tasks and relate them to underlying cognitive function including perception, attention, memory, and action.

Saturday Morning Abstracts

A coding transformation within auditory cortical neurons
Mike Wehr
University of Oregon

Although the coding transformation between the visual thalamus and cortex has been known for over 50 years, whether a similar transformation occurs between auditory thalamus and cortex has remained elusive. Such a transformation may occur for time-varying sounds, such as music or speech. Most subcortical neurons explicitly encode the temporal structure of sounds with the temporal structure of their activity, but many auditory cortical neurons instead encode temporal structure with a rate code. The mechanisms for this thalamocortical transformation from temporal code to rate code have remained unknown. Here we report that the membrane potential of rat auditory cortical neurons can show stimulus synchronization up to rates as high as 500 Hz, even when the spiking output does not. Synaptic inputs to rate-coding neurons arose in part from temporal-coding neurons but were transformed by voltage-dependent properties and push-pull excitatory-inhibitory interactions. Thus the transformation from a temporal code into a rate code can be observed within individual cortical neurons.

Neural circuits underlying modulation of visual response gain by behavioral state
Andrew M. Lee, Antonello Bonci, Michael P. Stryker, Linda Wilbrecht, Jennifer L. Hoy, & Cristopher M. Niell
University of California San Francisco; University of Oregon

Behavioral state is known to affect sensory processing, from gating of input during sleep/wake to enhancement with selective attention. Our previous study in mice demonstrated that locomotion induces a change in cortical state, resulting in a doubling of visual response gain, as well as an increase in LFP gamma power, suggesting an alert state. To investigate the source of this modulation, we performed optogenetic stimulation in the vicinity of the PPTg, a cholinergic brainstem region. Because the PPTg is at the intersection of motor and neuromodulatory pathways, we hypothesized that it may initiate both locomotion and cortical gain effects. Above a certain threshold, stimulation robustly induced locomotion, accompanied by the same effects in visual cortex as for spontaneous locomotion. Surprisingly, stimulation below the threshold for locomotion also induced an increase in response gain and LFP gamma, suggesting that this region can modulate cortical responsiveness via a pathway independent of locomotion. These results demonstrate that a brainstem cholinergic region can mediate the effects of behavioral state on primary visual cortex.

Extracting Visuo-spatial Working Memory Processes from Rats' Target Object Recognition Performance in a Foraging Task

Jerome Cohen, Varakini Parameswaran, Marium Arain, & Corrine Keshen
University of Windsor

We describe three studies from our laboratory that examine rats' object recognition performance within a foraging context that reveal their underlying visuo-spatial working memory processes. In all three studies, rats must first sample three of four experimenter-selected objects before being allowed to find the fourth, target object within the array (patch). By manipulating the location of the test array and objects within the array and of the relevance of objects' non-spatial attributes in probe trials, we were able to determine how rats process and represent a target object's various features in their working memory. Our findings more clearly demonstrate the limited capacity aspect of rats' visuo-working memory and how rats retrieve different information of a missing object. We discuss how this more naturalistic, free-ranging foraging preparation may allow for more reliable and valid comparisons of visuo-spatial working memory processes between different animal species.

Saturday Evening Abstracts

Spatial attention induces bilateral representations in right but not left topographic parietal cortex

Summer L. Sheremata & Michael A. Silver
University of California Berkeley, Helen Wills Neuroscience Institute

Hemispatial neglect is characterized by spatial attention deficits in the contralesional visual field but rarely occurs after left hemisphere damage. While this asymmetry suggests that the right hemisphere represents both visual hemifields, topographic maps of spatial attention in parietal cortex show a contralateral preference in both hemispheres. One explanation of this apparent discrepancy is that attention modulates parietal representations of visual space. We used fMRI to compare visually-evoked responses in parietal cortex in neurologically intact human subjects while they either covertly directed attention toward a moving visual stimulus or maintained attention at fixation. We employed the population receptive field (pRF) method to characterize the effects of spatial attention on visual field representations. Attending to the stimulus increased pRF size in topographically-organized parietal cortex in both hemispheres. In the left hemisphere, attention also shifted pRFs toward the periphery, thereby maintaining their contralateral representation. In contrast, attention did not shift pRF locations in the right hemisphere, so the increased pRF size resulted in more bilateral representations. These results show that spatial attention can induce bilateral representations in right parietal cortex and offer a new approach for investigating visual attention deficits in hemispatial neglect.

Cholinergic enhancement improves visual short-term memory performance
Sahar M. Yousef, Summer L. Sheremata**,** Rachel K. Kaneta, & Michael A. Silver
University of California Berkeley, Helen Wills Neuroscience Institute

Visual short-term memory (VSTM) has a capacity of 4 ± 1 objects, and previous studies have shown that consolidation takes approximately 50 ms/item. In patients with mild cognitive impairment, pharmacologically increasing synaptic levels of acetylcholine (ACh) facilitates VSTM by boosting the rate of information processing (Bublak et al., 2011). We therefore hypothesized that cholinergic enhancement would improve VSTM performance in healthy subjects. We increased synaptic ACh levels by administering the cholinesterase inhibitor donepezil in a placebo-controlled, double blind crossover design. Subjects performed a change-detection task with colored squares, and consolidation was disrupted by subsequent presentation of a visual mask. The effects of donepezil were assessed for set sizes based upon each subject's measured VSTM capacity (K). We found that cholinergic enhancement improved VSTM performance. Our results are consistent with a role of ACh in regulating VSTM.

Stability of visual working memory representations across changes in eye position
Brittany J. Dungan & Edward K. Vogel
University of Oregon

One theory of how we perceive a stable visual world despite changes in eye position is that we use visual working memory (VWM) to integrate object information from across fixations. However, given the contralateral organization of VWM in the brain, it's unclear how eye position changes that cause remembered objects to shift across visual fields would affect which hemisphere will continue to maintain the object representation. Either the objects in VWM would initially be represented in the contralateral hemisphere, but would then shift to the opposite hemisphere following the change in eye position, or continue to be represented in the initial contralateral hemisphere despite the change in eye position. To test this, we recorded event related potentials while subjects performed a change detection task. Subjects fixated a central cross prior to the memory array onset and either maintained central fixation throughout the trial or were cued to refixate a new position to the left or right of central fixation during the retention period, thus bringing the objects into a new visual field. The results showed a sustained contralateral delay activity (CDA) that persisted in the original contralateral hemisphere even after the subjects had refixated.

A Neurocomputational Theory of Attentional Selection in Multielement Displays
Philip L. Smith & David K. Sewell
The University of Melbourne

We generalize the integrated system model of Smith and Ratcliff (Psychological Review, 2009) to obtain a new theory of attentional selection in multielement visual displays. The theory proposes that attentional selection occurs via competitive interactions among detectors that signal the presence of task-relevant features at particular display locations. The outcome of the competition, together with attention, determines which stimuli are selected into visual short-term memory (VSTM). Decisions about the contents of VSTM are made by a diffusion-process decision stage. The selection process is modeled by coupled systems of shunting equations, which perform gated where-on-what pathway VSTM selection. The theory provides a neurocomputational account of key findings from attention tasks with near-threshold stimuli. These are: (1) the success of the MAX model of visual search and spatial cuing; (2) the double-target detection deficit; (3) redundancy costs in the post-stimulus probe task; (4) the joint item and information capacity limits of VSTM, and (5) the object-based nature of attentional selection. We argue that these phenomena are all manifestations of an underlying competitive VSTM selection process, which arise as a natural consequence of our theory.

Sunday Morning Abstracts

Quantitative theory of human color similarity relations
Kimberly A. Jameson & Natalia L. Komarova
University of California Irvine

The system for colorimetry adopted by the *Commission Internationale de l'Eclairage* (CIE) in 1931, along with its subsequent improvements, represents a family of light mixture models that has served well for many decades for stimulus specification and reproduction when highly controlled color standards are important. Still, with regard to *color appearance* many perceptual and cognitive factors are known to contribute to color similarity, and, in general, to all cognitive judgments of color. Using experimentally obtained odd-one-out triad similarity judgments from 52 observers, we demonstrate that CIE-based models can explain a good portion (but not all) of the color similarity data. We subsequently propose that distance in a CIE model is the first of several layers in a hierarchy of influences that shape triad choices. Other mitigating influences come from language, stimulus set effects, and color preference bias. We create a quantitative model of a lexicographic semiorder type, which shows how different perceptual and cognitive influences can trade-off when making color similarity judgments. We discuss universal and cultural aspects of the model as well as non-uniformity of the color space with respect to different cultural biases.

Why is it hard to read Arabic?
Zohar Eviatar, Raphiq Ibrahim, & Hanaan Asad
University of Haifa

Previous research has shown that reading in Arabic is slower than reading in other languages, even among skilled native Arabic speakers. In addition, the process of reading acquisition by beginning readers is slower than in other languages. We present three possible sources of these phenomena from both a psycholinguistic and a neuropsychological perspective. We examine the effects of diglossia (the fact that children learn to read a language in which they are not fluent), and the visual characteristics of Arabic orthography on reading acquisition, and suggest that the particular combination of grapheme-phoneme relations and visual characteristics of Arabic orthography result in a specific reading strategy among skilled readers that involves the cerebral hemispheres differently in Arabic than in Hebrew or English.

Multi-model Utility Theory
Louis Narens
University of California Irvine

A new theory of decision-making is presented for probabilistic situations involving catastrophic events and outcomes and for situations where emotions such as fear and hope can influence decisions. It is based on the idea that human judgments are based on subjective interpretations that often vary with the mode the decision maker is in. This can result in same event having multiple interpretations that depend on the mode of the decision maker. An event's multiple interpretations are modeled in a manner so that they are related semantically. This is done in a way that allows for systems of probabilities and decision making for lotteries that are rational from a psychological perspective, i.e., they are *subjectively coherent*. They are not, however, necessarily *behaviorally coherent*, that is, they may fail a critical test of rationality used by economists and philosophers. The conflict between the simultaneous holding of subjective coherence and the failure of behavioral coherence poses interesting rationality questions that are discussed in the talk, e.g., Which coherence concepts should rationality be based on? Are people much more rational than models of behavioral economics indicate? Are the primitive concepts used in rational economic modeling (i.e., the subjective expected utility model) too impoverished to provide a reasonably realistic theory for rational human decision-making?

Sunday Evening Abstracts

Zombies, Predators, and Pleasantness! Can Survival Processing Effects be Attributed to Arousal?
Lucy J. Troup, Nicholas C. Soderstrom, Maia Nguyen, & Jerimiah Lujan
Colorado State University; Dickinson College

Recall is improved when items are processed in terms of their survival utility, known as the survival processing effect (Nairne & Pandeirada; 2010). This has been linked to evolutionary theory, Weinstein, Bugg, and Roediger, (2008). Soderstrom and McCabe (2011) showed that problems never faced by our ancestors (i.e., evading zombies) showed better recall compared to the standard ancestral scenario. A replication of Soderstrom and McCabe (2011) using a within-subjects design, was conducted with measures to determine if general survival processing effect is mediated by arousal. Results supported the general survival processing effect, both zombie condition and standard survival scenario increased recall compared to rating words form pleasantness. This further challenges the specificity of the ancestral priorities framework, suggesting that the evolutionary basis for memory may not provide an accurate account of elevated recall effects. Explanations of the zombie effect include "bizarreness". This characteristic of studied materials is known to boost memory performance, particularly when using within-subjects designs (McDaniel & Einstein, 1986). Trends found in biophysical data point to arousal in the survival processing effect.

Comprehension of expository text by returning veterans with mild head injury and psychological distress
Michael P. Sullivan, Gina Griffiths, Mckay Sohlberg, & Steve Fickas
Portland VA Medical Center, Oregon Health & Science University; University of Oregon

An estimated 15-20% of veterans from recent conflicts have suffered mild cognitive impairment and psychological distress sufficient to affect academic performance. In the present study, we investigated whether the cognitive impairment associated with mTBI and mild to moderate post-traumatic stress symptoms, depression, and insomnia contribute to the text level reading comprehension ability of veterans of the Iraq and Afghanistan conflicts. Based on previous research, we first administered a neuropsychological battery and measures of psychological distress that are sensitive to cognitive impairment to a group of veterans (mTBI-MH) with a history of mTBI and current psychological distress, and a control group matched for age, education, and premorbid IQ. This was followed by a standardized test of expository reading, and an experimental task designed to measure four main components of text level reading comprehension. The results showed both significant cognitive impairment and psychological distress in the mTBI-MH group. Here, none of the measures of psychological distress correlated with performance on the cognitive measures. The results showed that the main components underlying text comprehension were intact. However, reduced processing speed and attention to task contributed to impaired text comprehension. In addition, post-traumatic stress may have a mediating role with regard to vocabulary access. If given sufficient time to encode, individuals with mTBI can compensate for the above deficits.

Long-term consequences of multiple sports concussions: Evidence from electric brain activity.
Pierre Jolicoeur & Louis De Beaumont University of Montreal

About 5% of high school and collegiate football players sustain one or more concussions during a single season, making sport injuries the most prevalent cause of mild traumatic brain injury (mTBI) among youth in the USA. Multiple sports concussions are not benign, as was once believed, and the development of biomarkers of diffuse axonal injury that are both sensitive and specific, so as to predict accurately when it is safe to return to competition, is of the utmost importance. In this talk we will discuss a number of electric brain responses estimated from the electroencephalogram (EEG), that are more sensitive to long-term consequences of concussions than the best traditional neuropsychological testing.

Monday Abstracts

Response suppression by automatic retrieval of stimulus-stop association: evidence from Transcranial Magnetic Stimulation
Yu-Chin Chiu, Adam Aron, & Frederick Verbruggen
University of California San Diego; University of Exeter, UK

Behavioral studies show that subjects respond more slowly to stimuli to which they previously stopped, due to 'automatic inhibition.' We used TMS to test whether this involves a re-instantiation of motor suppression. In Experiment 1, participants were trained to go/nogo to stimuli. Then, in a test phase, we compared the corticospinal excitability for go stimuli that were previously associated with stopping (nogo) vs. going. Excitability was reduced for nogo_then_go compared with go_then_go at a mere 100 ms post-stimulus. Surprisingly, there was no suppression for nogo_then_nogo stimuli. We speculated that the emergence of automatic inhibition requires 'executive setting.' Consistent with this, in Experiment 2, we demonstrated reduced excitability for nogo stimuli most prominently in the mid phase of training, but that it wears off as performance asymptotes. We thus provide neurophysiological evidence for an inhibition mechanism that is automatically re-instantiated, but only in an executive context where active suppression is required.

Re-evaluating explanations of Stroop interference: evidence from nonverbal measures
Christopher Koch & Josiah Hotevec
George Fox University

Stroop interference is usually explained in regard to differential processing of color and word information (Posner and Snyder, 1975; Shiffrin and Schneider, 1977; Cohen, Dunbar, and McClelland, 1990). While these explanations provide an account for the color-word task, they fail to explain Stroop interference obtained from nonverbal measures. Nonverbal Stroop tasks provide problems for word-based explanations of Stroop processing because they do not require a verbal response or reading. In this presentation, traditional explanations of Stroop interference are evaluated according to typical Stroop findings (MacLeod, 1991). Modified versions of the Stroop task are also presented along with implications of these tasks for traditional explanations of Stroop interference. Two alternative explanations are considered. One explanation is based on temporal and spatial contiguity and suggests that interference occurs whenever two competing stimuli appear together within time and space. The other explanation suggests that interference occurs on both perceptual and cognitive levels.

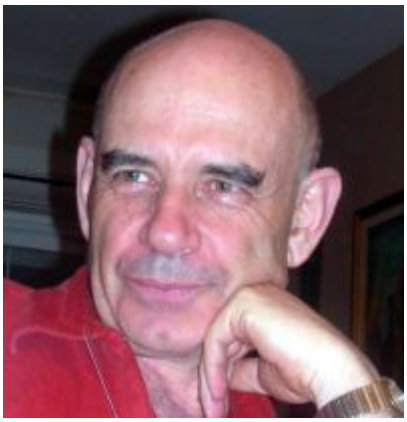
Saving Free Will From Science
Eve A. Isham, William P. Banks, & Joy J. Geng
University of California Davis; Pomona College

The classic experiment by Libet showed that the readiness potential (RP) preceded the moments of intention (W) and action (M). These findings deny conscious intention and free will as the cause of action. But is this claim truly valid? We approached this question by testing the authenticity of M and W. In Exp1, participants pressed a button that elicited a delayed tone. Here M and W shifted systematically with the time of the tone rather than remaining constant. In Exp2, the tone was used to falsely inform the participants of their speeded performance. M shifted in accordance with the false feedback. In Exp3, M and W varied when using different timing instruments or parameters. In Exp4, M varied across subpopulations. Our results suggest that the moments of intention and action are retrospectively inferred and cannot be bound to the RP. Thus, Libet's findings cannot invalidate the existence of free will.

In Memorium

Shlomo Bentin 1946-2012

Shlomo Bentin died in a traffic accident on July 13th 2012. Shlomo was an amazing man and had a great impact not only on psychological and brain science but also directly on the lives of so many people. He had a unique passion for life and for scientific discovery. He was a strong man with a soft heart and his exuberant presence was always felt and admired.



http://shlomobentin.blogspot.com/

This blog is a place where people can share their experiences and memories of Shlomo. He was an extremely lively man who cherished his family, friends, work and academic accomplishments and we hope this blog will help to celebrate his life as he always did. To contribute, please send your text to Ani Flevaris and Ayelet Landau directly or at remembering.shlomo@ gmail.com

CSAIL 2012 Abstract:

Transfer of categorical visual information
Shlomo Bentin
The Hebrew University of Jerusalem

Stimuli presented in one visual hemifield are usually transferred from the contralateral to the ipsilateral hemisphere. However, it is not evident that such transfer always occurs and, if it does, what is the kind of information that is transferred. Presenting faces and chairs randomly in the right or in the left visual hemifield while healthy participants monitored the screen for occasionally appearing flowers elicited a robust bilateral N170-effect (N170 elicited by faces was larger than that elicited by watches), regardless where the stimuli were presented. The latency of the N170 was faster by about 10 ms in the hemisphere contralateral to the stimulus location. When the N170 elicited by two faces presented simultaneously one in the left and one in the right visual field were compared with two simultaneously presented chairs, the bilateral N170 effect occurred at the same latency in each hemisphere. However, when a face and a chair were simultaneously presented one in the left and the other in the right visual field, comparing such pairs with stimuli composed of two chairs yielded an N170-effect only in the hemisphere contralateral to the location of the face. In the hemisphere contralateral to the chair, an N1 emerged, which did not distinguish the chair-face pair from the chair-chair pair. This pattern suggests that when each hemisphere receives different information and the task requires only a shallow categorization, there is no transfer of categorical information from one hemisphere to another. By contrast, when the task required individual face recognition and identification, bilateral face-chair stimuli elicited bilateral N170-effects. It is assumed that when the task involves deeper levels of analysis (such as person identification) the hemispheres should cooperate and categorical information would be transferred even with bilateral stimulation.

Presenter	Affiliation	Email
Anastasia V. Flevaris	University of California, San Diego	ani.flevaris@gmail.com
Atsushi Kikumoto	University of Oregon	kikumoto@uoregon.edu
Bill Prinzmetal	University of California, Berkeley	wprinz@berkeley.edu
Brittany J. Dungan	University of Oregon	bdungan@uoregon.edu
Carly J. Leonard	University of California, Davis	cjleonard@ucdavis.edu
Chris Koch	George Fox University	ckoch@georgefox.edu
Christina M Karns	University of Oregon	ckarns@uoregon.edu
Cristopher Niell	University of Oregon	cniell@uoregon.edu
Edward Vogel	University of Oregon	vogeledward@gmail.com
Emily Martin	Institute for the History of Production of Knowledge	emilymartin@nyu.edu
Enriqueta Canseco	Reed College	ecanseco@reed.edu
Eve Isham	University of California, Davis	eaisham@ucdavis.edu
Greg Christie	Simon Fraser	greg.christie@gmail.com
Irida Mance	University of Oregon	iridam@uoregon.edu
Jerome Cohen	University of Windsor	jcohen@uwindsor.ca
John Dewey	Michigan State University	deweyjoh@msu.edu
John J. McDonald	Simon Fraser University	jmcd@sfu.ca
John M. Gaspar	Simon Fraser University	jmg2@sfu.ca
Kimberly Jameson	University of California, Irvine	kjameson@uci.edu
Louis Narens	University of California, Irvine	lnarens@uci.edu
Lucy J. Troup	Colorado State Universty	Lucy.Troup@ColoState.edu
Michael Pitts	Reed College	mpitts@reed.edu
Michael Sullivan	Portland VA Medical Center Oregon Health & Science University	sullivan@ohsu.edu
Mike Wehr	University of Oregon	wehr@uoregon.edu
Philip Smith	University of Melbourne	philipls@unimelb.edu.au
Pierre Jolicoeur	University of Montreal	pierre.jolicoeur@umontreal.ca
Rachel Kaneta	University of California, Berkeley	rkaneta10@gmail.com
Sahar Yousef	University of California, Berkeley	sahar.m.yousef@gmail.com
Summer Sheremata	University of California, Berkeley	ssheremata@berkeley.edu
Yu-Chin Chiu	University of California, San Diego	chiu.yuchin@gmail.com
Zohar Eviatar	University of Haifa	zohare@research.haifa.ac.il