17th Annual Conference
Object Perception, Attention, & Memory
November 19, 2009 - Boston, MA

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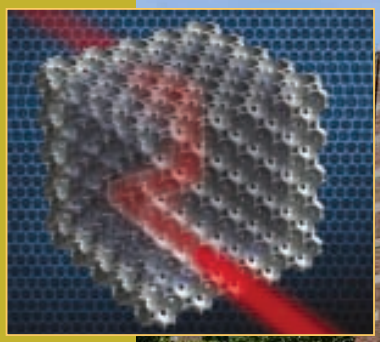

The Beckman Institute is also home to two strategic initiatives that seek to unify campus activities in their respective areas:

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More than 600 researchers from more than 40 University of Illinois departments as diverse as psychology, computer science, electrical and computer engineering, and biochemistry, comprising 14 research groups and two strategic initiatives, work within and across these overlapping areas. The 313,000 square foot building offers more than 200 offices; specialized, state-of-the-art laboratories and other facilities; and meeting areas.

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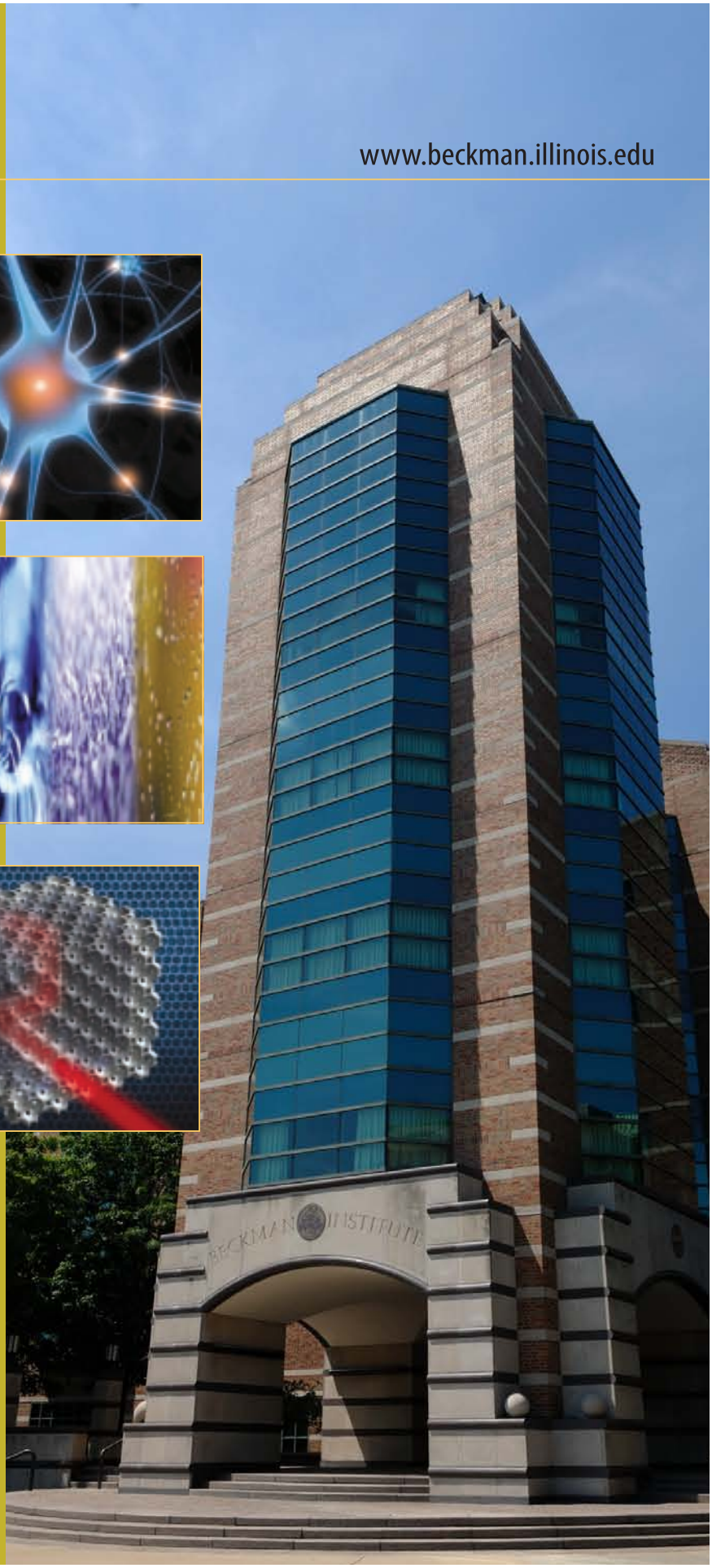

OPAM 2009 Talk Session
Constitution Ballroom A, Boston Sheraton Hotel

7:30	Registration	
7:55	Opening Remarks	
	Chair: Melanie Palomares	**Faces and Scenes**
8:00	Kirsten Dalrymple, Walter Bischof, Elina Birmingham, Jason Barton & Alan Kingstone	The look of recovery: Opening a window on simultanagnosia
8:15	Nicolas Davidenko & Kalanit Grill-Spector	Controlling stimulus variability reveals exemplar-based neural face representations
8:30	Melissa L.-H. Vo & John M. Henderson	The Time Course of Initial Scene Processing
8:45	Valerie Morash, Tharian Cherian & Pawan Sinha	Using Latency to Link Behavioral Skills with Neural Correlates: Face Recognition and the M170
9:00	---------- BREAK ----------	
	Chair: Artem Belopolsky	**Attention and Object-Tracking**
9:15	Matthew Doran & James Hoffman	Target Enhancement and Distractor Suppression in Multiple Object Tracking
9:30	Caglar Tas, Michael D. Dodd & Andrew Hollingworth	The interaction of surface feature and spatiotemporal continuity in object-based inhibition of return
9:45	Brian A. Anderson & Charles L. Folk	Variations in the Magnitude of Attentional Capture: Testing a Two-Process Model
10:00	Edward Vul, Michael Frank, George Alvarez & Josh Tenenbaum	Modeling and quantifying tradeoffs in multiple object tracking
10:15	---------- BREAK ----------	
	Chair: Joseph Brooks	**Organization, Integration & Consciousness**
10:30	Joshua Cosman & Shaun Vecera	Action influences figure-ground assignment
10:45	Timothy Vickery & Marvin Chun	The perception of space is warped by objects
11:00	Kyle Mathewson, Monica Fabiani, Gabriele Gratton, Diane Beck & Alejandro Lleras	Making waves in the stream of consciousness: Eliciting predictable oscillations in visual awareness with pre-target entrainment at 12 Hz
11:15	Elena Makovac & Walter Gerbino	Sound-shape congruency affects the multisensory response enhancement
	---------- LUNCH (On your Own) ----------	
	Chair: Michi Matsukura	**Visual Working Memory**
12:15	Keisuke Fukuda & Edward Vogel	Human Variation in Overriding Attentional Capture
12:30	Lingling Wang, Steven B. Most & James H. Hoffman	The Contralateral Delay Activity component of the ERP reflects the number of locations but not the number of objects in visual short-term memory
12:45	Timothy F. Brady & George A. Alvarez	Ensemble statistics of a display influence the representation of items in visual working memory
1:00	**Keynote Speaker: Marlene Behrmann**	**Psychological and neural systems supporting face recognition**
2:00	Closing Remarks	
2:15-3:30	**Poster Session - Hynes Convention Center, Ballrooms A, B, and C**	

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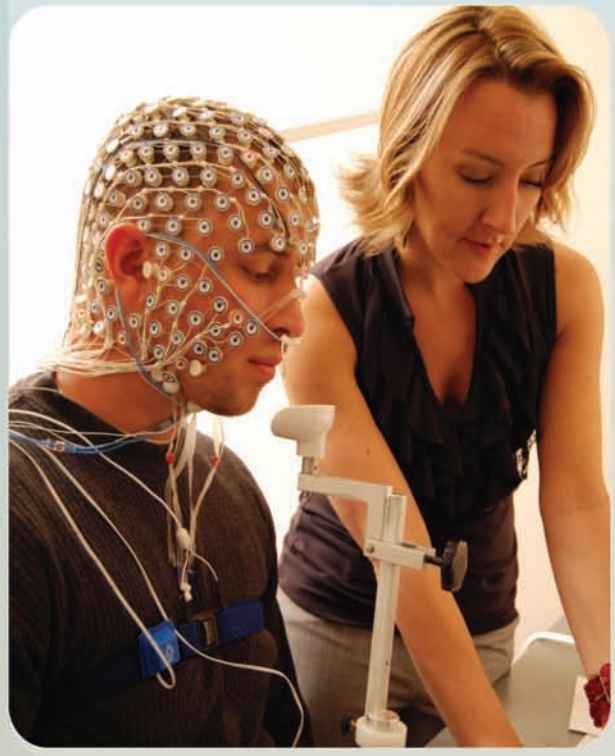

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OPAM 2009 Keynote Address

Constitution Ballroom A
Boston Sheraton Hotel
1:00 p.m.

Professor Marlene Behrman
Department of Psychology, Carnegie Mellon University
and the Center for the Neural Basis of Cognition

Psychological and neural systems supporting face recognition

The functional organization of the occipito-temporal visual pathway remains highly controversial. Data from three neuropsychological populations (acquired prosopagnosia, congenital prosopagnosia, and autism), who evince a disproportionate impairment in face processing, are presented, although the impairment implicates other object classes, too, when task demands are equated. These individuals also reveal difficulties in deriving holistic and configural relationships between elemental visual components. Imaging (structural, functional, DTI) studies map out an underlying neural circuit, including core regions such as the fusiform gyrus, as well as more distal regions, such as anterior temporal lobe, whose integrity is critical for computing the fine-grained configural information. A disruption in the integrity of this circuit may account for the perceptual deficits in these impaired individuals.

OPAM 2009 POSTER SESSION
Hynes Convention Center, Ballrooms A, B, and C

(1) **Unconscious recognition memory is enhanced by target identification**
Jeffrey Lin, Scott Murray & Geoffrey Boynton

(2) **Dynamics of the Bottleneck**
Kristy Snyder-Tapp & Rick Dale

(3) **Attentional selection of spatial frequencies as a medium for binding shapes to hierarchical levels**
Anastasia Flevaris, Shlomo Bentin & Lynn Robertson

(4) **In search of memory effect during perception process.**
Benoit Riou & Rémy Versace

(5) **Global versus local object focus during periods of physiological arousal**
Tad Brunye, Caroline Mahoney, Harris Lieberman & Holly Taylor

(6) **Temporal gap disrupts attentional state in rapid serial visual presentation**
Atsunori Ariga, Jun-ichiro Kawahara & Katsumi Watanabe

(7) **Psychophysics of recall: What does a memory look like?**
Jie Huang, Jie Huang & Robert Sekuler

(8) **Visual attention and the observation of human bodies**
Christina Joseph, Maggie Shiffrar & Sarah Savoy

(9) **Audio-visual localization and identification processes interact to solve incongruent information**
Shoko Kanaya & Kazuhiko Yokosawa

(10) **Does scene context always facilitate the retrievals of representations?**
Ryoichi Nakashima & Kazuhiko Yokosawa

(11) **Synesthetic colors for phonetic Japanese characters depend on sound qualities**
Michiko Asano & Kazuhiko Yokosawa

(12) **Dual processes in recognition memory of a pre-change object**
Yu-Chen Tseng, Cheng-Ta Yang & Yei-Yu Yeh

(13) **The nature of the central capacity limit in human information processing: Serial bottleneck or graded capacity sharing?**
Suk Won Han & René Marois

(14) **Optimal integration of surface and contour information in visual shape detection**
Bart Machilsen & Johan Wagemans

(15) **Effect of object history on stationary target detection among moving stimuli**
Lyndsey K. Lanagan-Leitzel

(16) **How does the perception of ambiguous images develop?: a neuro-computational model with a dynamic feedback system.**
Naoki Kogo, Alessandra Galli, Luc Van Gool & Johan Wagemans

(17) **The development of part-based and configural object recognition in adolescence**
Elley Wakui, Dean Petters, Jules Davidoff & Martin Jüttner

(18) **Referential Coding Contributes to the SMARC effect**
Gi Yeul Bae, Yu Mi Kim & Yang Seok Cho

(19) **Visual disorder of central origin in developing age: a computerized rehabilitation training using tridimensional moving objects**
Ilaria De Meis, Francesca Romana Cappelli, Anahita Mobarhan & Enrico Castelli

(20) **Visual disorder of central origin in developing age: evaluation of real objects matching, recognition and naming.**
Ilaria Lijoi, Francesca Romana Cappelli, Laura Barca & Enrico Castelli

(21) **How quickly we forget: Targets and distractors from visual search are retained at different rates**
Karla Antonelli & Carrick Williams

(22) **The Role of Attention in the Visual Attractor Illusion**
Tal Makovski, Khena Swallow & Yuhong Jiang

(23) **Effects of scene contents on change detection in children**
Lisa Maccari, Diana Martella, Assunta Muggianu, Mariagrazia Anolfo & Maria Casagrande

(24) **Distractor inhibition during the attentional blink: Evidence from distractor devaluation effect**
Ken Kihara, Yoshihiko Yagi, Yuji Takeda & Jun Kawahara

(25) **The Processing of Task-Irrelevant Natural Scenes in Social Anxiety in a Perceptual Load Task**
Jun Moriya & Yoshihiko Tanno

(26) **The diagnosticity of color for emotional objects**
Brenton W. McMenamin, Chad J. Marsolek & Daniel J. Kersten

(27) **Salience Influence Top-Down Strategy and Capture Effects**
Adam Biggs & Brad Gibson

(28) **Hemispheric Asymmetries in the lexical and idiomatic ambiguity**
Gisoon Yu & Kichun Nam

(29) **Interactions Between Task Switching and Prospective Memory: Strategic Monitoring and Task Set Configuration**
Ashley Scolaro, Kira Bailey & Robert West

(30) **Strategic control through speed grouping in multiple object tracking**
Pei-Chen Chiu, Yu-Wei Liao, Cheng-Ta Yang & Yei-Yu Yeh

(31) **Do different processing strategies (serial vs. parallel) operate on first and last memorized items?**
Mario Fific & James Townsend

(32) **Effect of Spatial Information and Target-Distractor Similarity in Visual Search with Irrelevant Singleton**
Kao Yamaoka deWitt & Chikashi Michimata

(33) **Recalling a Memory could facilitate recovering irrelevant memories.**
Toshihiro Wakebe, Eiichiro Watamura, Tomomi Sato & Yohtaro Takano

(34) **Activation Domain in Cued Recall**
Eiichiro Watamura, Toshihiro Wakebe & Tomomi Sato

(35) **Third-Person Perception: A New Way to Explore Inner Cognition**
Allison Brennan & James Enns

(36) **Visual Object Cognition Precedes and Temporally Overlaps Mental Rotation**
Lisa Lucia & Haline Schendan

(37) **Dissociable effects of repetition lag on priming of structurally possible and impossible objects**
Anja Soldan, John Paul Sheehy & Yaakov Stern

(38) **Apparent Scene Rotation in Updating Locations of Invisible Moving Objects**
Markus Huff, Georg Jahn, Frank Papenmeier & Hauke Meyerhoff

(39) **Matching Gaze Data with Static and Dynamic Objects using the tool DynAOI**
Frank Papenmeier & Markus Huff

(40) **Polysemy Across Two Languages: Eveidence From Word Recognition and Picture Naming.**
Olga Boukrina, Stephen Jose Hanson & Catherine Hanson

(41) **Connectedness determines the canonical view for objects and scenes independent of task requirements.**
J. Stephen Higgins & Ranxaio Frances Wang

(42) **Stroop effects in patients with traumatic brain injury: Selective attention or speed of processing? A review.**
Boaz M. Ben-David & Linh LeTruc Nguyen

(43) **Visual masking in prolonged wakefulness**
Stefania Mereu, Diana Martella & Maria Casagrande

(44) **Stitching memories together: How long-term visual memory is updated to compensate for occlusion**
Jordan McGuire & Carrick Williams

(45) **WITHDRAWN**

(46) **Selecting a fixation position within objects, within scenes:Optimal and preferred eye landing positions in naturalistic stimuli**
Tom Foulsham & Alan Kingstone

(47) **Effects of Object Manipulability on Speeded Categorization and Object Naming**
Joshua Salmon & Patricia McMullen

(48) **Temporal structure: A specialized role in visual grouping?**
Jeremy Hays & Sharon Guttman

(49) **Properties of spatial attention in conscious and nonconscious visual information processing**
Evelina Tapia, Bruno G. Breitmeyer & Elizabeth C. Broyles

(50) **A direct comparison between 2nd order relational face processing across manipulations of Ethnicity and Polarity**
Heath Matheson & Patricia McMullen

(51) **The role of spatial organization in multiple task performance with complex, dynamic visual scenes.**
Noah Sulman & Thomas Sanocki

(52) **A Quarter of a Century of Emotional Stroop Studies: Effects of Design and Type of Population**
Amanda J. Dydynski & Boaz B. Ben-David

(53) **The Role of Mask Heterogeneity in Motion-induced Blindness**
Erika Wells, Andrew Leber & John Sparrow

(54) **Looking back at Waldo: Inhibition of Return does not function as a foraging facilitator during scene search.**
Tim J. Smith & John M. Henderson

(55) **One is more simultaneous than two: perception of simultaneity is affected by holistic processing**
Ekaterina Pechenkova & Maria Sinitsyna

(56) **Shifting attention in visual short-term memory: testing bottom-up and top-down accounts**
Marian Berryhill, Cara Shay & Ingrid Olson

(57) **A Dynamic Neural Field Model of Temporal Order Judgments for Figures and Grounds**
Lauren Hecht, John Spencer & Shaun Vecera

(58) **Object-based Attention: Mapping the Time Course of Attentional Prioritization**
Leslie Drummond & Sarah Shomstein

(59) **Musical training improves auditory memory in general (but not visual memory)**
Michael Cohen, Todd Horowitz & Jeremy Wolfe

(60) **Enumerating by location increases the subitizing limit**
Harry Haladjian, Harry Haladjian, Zenon Pylyshyn & Charles Gallistel

(61) **Video game players excel at change detection**
Kait Clark, Mathias Fleck & Stephen Mitroff

(62) **Visual Sensitivity to Point-Light Actors Varies with the Observed Action**
Adam Doerrfeld, Kent Harber & Maggie Shiffrar

(63) **Short-term masked antipriming between visually similar objects**
Rebecca G. Deason & Chad J. Marsolek

(64) **The role of face shape and pigmentation in modulating neural and behavioral responses to other-race faces**
Benjamin Balas & Charles Nelson

(65) **A Contextual Modulation of Object-Based Selection**
Ellen MacLellan & Bruce Milliken

(66) **Working memory guidance of attention is flexible**
Nancy Carlisle & Geoffrey Woodman

(67) **Tunnel effect with amodally completed targets can elicit curved motion paths behind an occluder**
Sung-Ho Kim, Jacob Feldman & Manish Singh

(68) **The Effects of Multiple-Feature Priming on Identifying Visual Targets**
Kenneth Hailston

(69) **Variability in Axis-Aligned Motion Bias Magnitude due to Context and Task Parameters.**
Igor Dolgov, Ellen Campana & Michael McBeath

(70) **Cueing of visual attention by eyes and arrows: What moves matters.**
Samantha Culpeck, Samantha Culpeck, Samuel Hutton & Beena Khurana

(71) **Action Video Game Experience Reduces the Cost of Switching Tasks**
Matthew S. Cain, Ayelet N. Landau & Arthur P. Shimamura

(72) **Estimating Sensory Gain During the Maintenance Period of Visual Working Memory**
Miranda Scolari, Laura Torres & John Serences

(73) **Influence of appropriateness of action on affordance.**
Michitaka Iida & Chikasi Michimata

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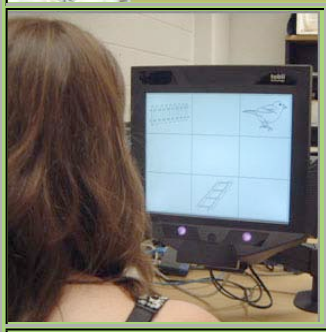

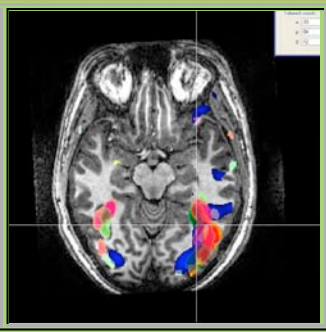

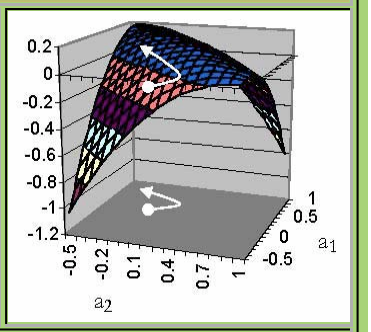

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Michael McCloskey: Cognitive neuropsychology, spatial and lexical representation, foundations of cognitive science.

Brenda Rapp: Cognitive neuropsychology, written and spoke word processing, cross-modal attention, somatosensory representation, spatial frames of reference, functional neuroimaging of language recovery subsequent to neural injury.

Kyle Rawlins: Formal semantics, pragmatics, syntax, and the interfaces of these fields, mathematical linguistics, philosophy of language (mainly philosophical semantics), computational semantics.

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Faces and Scenes
8:00 – 9:00 AM

Session Chair:
Melanie Palomares
University of South Carolina

8:00 The look of recovery: Opening a window on simultanagnosia

Kirsten Dalrymple[1], Walter Bischof[2], Elina Birmingham[3], Jason Barton[1] & Alan Kingstone[1]
[1]University of British Columbia
[2]University of Alberta
[3]California Institute of Technology

Simultanagnosia is a disorder sometimes characterized as a restriction of the visual-attentional window. We report that when scanning social scenes, simultanagnosic patients produce an abnormally low number of fixations to the eyes of others. This number increases with recovery. Importantly, we were able to model this transition with healthy participants who viewed scenes through a restricted viewing window. Participants controlling a large window fixated eyes more than those using a small window. These data demonstrate that a restricted window of visual attention contributes to reduced fixations to eyes. The degree of the restriction dictates the degree of reduction.

8:15 Controlling stimulus variability reveals exemplar-based neural face representations

Nicolas Davidenko & Kalanit Grill-Spector
Stanford University

Face-selective regions have been identified in the human ventral stream, but how these regions represent different faces is highly debated. Two competing views suggest that responses either increase (norm-based model) or decrease (exemplar-based model) as faces deviate from the average face. Here we use high-resolution fMRI to measure responses in face- and object-selective regions as we parametrically manipulate faces' distance from the average. After accounting for substantial effects of stimulus variability, we find that responses in face-selective regions are strongest to faces near the average, consistent with an exemplar-based model of face representation.

8:30 The Time Course of Initial Scene Processing

Melissa L. H. Vo & John M. Henderson
Visual Cognition Unit, University of Edinburgh

We have a surprising ability to extract the gist of a scene from only a brief glimpse. However, we usually do not stop at the point of gist identification, but rather use the information extracted from the first glimpse of a scene to plan subsequent actions including eye movements. By manipulating both scene presentation duration and integration time, we were able to show that as little as 50 ms scene preview is sufficient to facilitate eye movement guidance during subsequent search as long as enough time is available to integrate the initial scene representation.

8:45 Using Latency to Link Behavioral Skills with Neural Correlates: Face Recognition and the M170

Valerie Morash[1], Tharian Cherian2 & Pawan Sinha[2]
[1]Psychology, University of California, Berkeley
[2]Brain and Cognitive Sciences, MIT

Although previous research has indicated that the M170, a putative neural marker of face perception, occurs between face detection and face recognition, investigators have yet to determine whether the M170 is closer to face detection or recognition. We compared the amount of time image blur delayed the M170 to the amount of time it delayed behavioral face detection and recognition tasks. To our knowledge, this is the first study to directly compare behavioral and neural latencies in this way. Our comparison revealed that the M170 occurs during or shortly after face detection, and much earlier than face recognition.

Attention and Object-Tracking
9:15 – 10:15 AM

Session Chair:
Artem Belopolsky
Vrije Universiteit Amsterdam

9:15 **Target Enhancement and Distractor Suppression in Multiple Object Tracking**
Matthew Doran & James Hoffman
Psychology, University of Delaware

We examined the role of visual attention in multiple object tracking (MOT) by measuring the amplitude of the N1 component of the event-related potential (ERP) to probe flashes presented on targets, nearby distractors, or distant distractors. We found evidence that visual attention enhances targets and suppresses nearby distractors. However, target enhancement and distractor suppression were evident in separate versions of the N1; the anterior N1 showed only enhancement and the posterior N1 showed only suppression. These data suggest that the processes of attentional enhancement and suppression may be performed by separable subsystems reflected in the posterior and anterior N1s.

9:30 **The interaction of surface feature and spatiotemporal continuity in object-based inhibition of return**
Caglar Tas[1], Michael D. Dodd[2] & Andrew Hollingworth[1]
[1]University of Iowa
[2]University of Nebraska - Lincoln

We examined the perceptual features functional in defining object persistence in object-based inhibition of return (IOR). One of two array objects was cued, they moved to new locations, and participants executed a saccade to either the previously attended or unattended object. Object-based IOR was observed on saccade latency, but IOR was eliminated if there was a visible discontinuity in either the surface feature (color) or spatiotemporal properties of the objects. These data indicate that object persistence in dynamic displays is computed not just on the basis of spatiotemporal continuity but also on the basis of surface feature continuity.

9:45 **Variations in the Magnitude of Attentional Capture: Testing a Two-Process Model**
Brian A. Anderson & Charles L. Folk
Villanova University

The literature on attentional capture reveals substantial variations in the magnitude of capture as measured in paradigms such as the modified spatial cuing task. The present studies addressed two issues with respect to these variations. The first experiment explored whether the magnitude of attentional capture varies systematically as a function of cue-target similarity. As predicted, cue validity effects varied directly with cue-target similarity. The second experiment explored whether these similarity effects reflect a mixture of "fully captured" trials "no capture" trials. A mixture analysis conducted on obtained reaction time distributions proved inconsistent with a mixture model.

10:00 **Modeling and quantifying tradeoffs in multiple object tracking.**
Edward Vul[1], Michael Frank[1], George Alvarez[2] & Josh Tenenbaum[1]
[1]Brain and Cognitive Sciences, MIT
[2]Psychology, Harvard University

Multiple object tracking is used to study the limits of visual attention, but how can we determine which tracking failures reflect cognitive limitations, and which reflect the information available in the task? We define an ideal observer for MOT and design novel experiments to compare it to human performance. Tradeoffs between object speed, spacing, and the presence of additional features reflect the computational problem posed by the task. In contrast, tradeoffs between the number tracked and their speed must reflect a resource limitation. Thus, MOT performance can be described by an ideal observer model with limited measurement or memory fidelity.

Organization, Integration & Consciousness
10:30 – 11:30 AM

Session Chair:
Joseph Brooks
University College London

10:30 Action influences figure-ground assignment
Joshua Cosman[1] & Shaun Vecera[1,2]
[1]Neuroscience, University of Iowa
[2]Psychology, University of Iowa

Figure-ground assignment is central to our ability to segregate objects from one another in a scene. Although hierarchical models of vision posit that early visual processes such as figure-ground assignment occur prior to higher-level processing, recent studies have demonstrated that figure-ground assignment can be influenced by top-down factors. Here, we show that objects of action are more likely to be assigned as figures. Participants were more likely to assign regions that contained their hand as figure in figurally ambiguous and unambiguous displays. This suggests that action can act as a cue to figure-ground assignment.

10:45 The perception of space is warped by objects
Timothy Vickery & Marvin Chun
Yale University

We discovered a spatial warping illusion in which the distance between two points is overestimated when they appear within an object. Two dots placed inside an object appeared farther apart than two equally spaced dots that were outside the object. To quantify the spatial bias, participants adjusted reference dots to match the spacing between dots placed on or around objects, or in empty space. Observers showed perceptual distortions that were greatest within objects, but also occurred in the space near objects. Space in and around a figure is not represented veridically; it is expanded relative to ground regions.

11:00 Making waves in the stream of consciousness: Eliciting predictable oscillations in visual awareness with pre-target entrainment at 12 Hz
Kyle Mathewson, Monica Fabiani, Gabriele Gratton, Diane Beck & Alejandro Lleras
University of Illinois at Urbana-Champaign

Can we control which stimuli reach consciousness? Here, consciousness of near-threshold stimuli was experimentally induced by sensory entrainment of brain rhythms. We preceded the stimuli with periodic visual events at 12 Hz. The brain became synchronized to these entraining events and produced temporally precise peaks in visual sensitivity. The likelihood of observers becoming aware of identical targets was modulated by factors as large as 450%. These data confirm that awareness of near-threshold stimuli is dependent on the state of excitability of the visual system, that this excitability is sensitive to rhythmic environmental events, and thus subject to manipulation.

11:15 Sound-shape congruency affects the multisensory response enhancement
Elena Makovac & Walter Gerbino
Psychology, University of Trieste and B.R.A.I.N. Interdepartmental Center for Neuroscience

A sound-shape congruency effect related the takete/maluma phenomenon (Köhler, 1929) has been demonstrated in a go/no-go task in which participants should respond to visual stimuli while ignoring sounds. Visual (spiky and curvy shapes) and auditory (spiky and soft sounds) stimuli were presented to participants in congruent vs. incongruent conditions. Color was used to contrast weak vs. strong visual stimuli. Response enhancement was maximal for weak visual stimuli in the multisensory congruent condition. Our results, obtained in an implicit association task, support conclusions from explicit paradigms involving crossmodal correspondences (Gallace & Spence 2006).

Visual Working Memory
12:15 – 1:00 PM

Session Chair:
Michi Matsukura
University of Iowa

12:15 Human Variation in Overriding Attentional Capture

Keisuke Fukuda & Edward Vogel
University of Oregon

The attentional control account of working memory capacity (WMC) argues that the individual differences in WMC stem from the ability to control attention that governs access to WM. More specifically, low capacity individuals are inefficient at selectively attending to task-relevant information. However, it was unclear whether such inability stems from deficit in top-down control of attention or inability to override involuntary attentional capture from distractors. In this study, we found electrophysiological and behavioral evidence that deficits in attentional control for low capacity individuals are driven by susceptibility to involuntary capture of attention by task-irrelevant distractors.

12:30 The Contralateral Delay Activity component of the ERP reflects the number of locations but not the number of objects in visual short-term memory

Lingling Wang, Steven B. Most & James H. Hoffman
University of Delaware

Using ERP, we examined whether contralateral delay activity (CDA) – previously found sensitive to the number of objects in visual short-term memory (VSTM) – reflects the number of objects or the number of locations occupied by those objects. We presented VSTM objects sequentially, at either the same or different locations. CDA amplitude was highest for two objects appearing at different locations, while a single object and two objects appearing at a single location resulted in smaller, equivalent CDA amplitudes. This suggests that CDA amplitude may reflect the number of locations attended in VSTM rather than the number of objects.

12:45 Ensemble statistics of a display influence the representation of items in visual working memory

Timothy F. Brady[1] & George A. Alvarez[2]
[1]Brain & Cognitive Sciences, MIT
[2]Psychology, Harvard University

Influential models of visual working memory treat each item to be recalled as an independent unit and assume there are no interactions between items. However, real world displays have structure, providing constraints on the items to be remembered. To examine this scenario, we looked at the influence of an ensemble statistic - the mean size of a set of items- on visual working memory. We find evidence that the remembered size of each individual item is biased toward the mean size of the set. This suggests items in visual working memory are not recalled merely as independent units.

POSTER SESSION
2:15 – 3:30 PM

Hynes Convention Center
Ballrooms A, B, and C

(1) **Unconscious recognition memory is enhanced by target identification**

Jeffrey Lin, Scott Murray & Geoffrey Boynton
University of Washington

Considerable evidence suggests that spatial attention is fundamental for the transfer of visual input into memory; however, if there is a specific behaviorally relevant point in time, we reasoned that the visual system should encode as much information as possible regardless of the spatial focus of attention. Here, we show that behaviorally relevant moments in time automatically enhance the encoding of the entire visual field into memory, overriding attentional bottlenecks and memory capacity limits.

(2) **Dynamics of the Bottleneck**

Kristy Snyder-Tapp & Rick Dale
University of Memphis

A series of four modified psychological refractory period experiments were conducted using a novel action dynamics methodology. In two experiments, S1 was displayed throughout each trial, while in the other two S1 disappeared after 125 ms. The trajectories of the response movements were then compared. Results reveal that the trajectories in both conditions deviate toward a correct S2 response at shorter SOAs and inhibit the S2 response at longer SOAs. Additionally, deviations are reduced when S1 disappears reflecting cognitive competition due to taxed working memory.

(3) **Attentional selection of spatial frequencies as a medium for binding shapes to hierarchical levels**

Anastasia Flevaris[1,2], Shlomo Bentin[3] & Lynn Robertson[1,2]
[1]University of California, Berkeley
[2]Veterans Administration, Martinez
[3]Hebrew University, Jerusalem

A recent theory proposes that shape identity and hierarchical level (local/global) are initially represented separately. Furthermore, the right hemisphere is biased towards binding shapes to the global level while the left hemisphere is biased towards binding shapes to the local level (hierarchical "integration theory", Hübner & Volberg, 2005). However, the basis of the binding mechanism is unknown. We provide evidence implicating attention to spatial frequency (SF) as the medium for shape-level binding by demonstrating that attention to the higher or lower SFs in a compound grating modulates shape-level binding in a subsequently presented hierarchical stimulus.

(4) **In search of memory effect during perception process.**

Benoit Riou & Rémy Versace
Laboratoire EMC

This study examine the relationship between memory and perception. We manipulate the memorized size in a visual-search task. Participants have to determinate if a picture was presented larger than others. We observed that the research time decreased when non-targets have smaller memorized size than the target. When memorized size of non-target was smaller than that of the target, participants tended to respond "present" even if the target was absent or present (same or larger perceptual size than non targets). Our results reveal the intervention of memory in perceptual processing and the inseparability of these two cognitive functions.

(5) **Global versus local object focus during periods of physiological arousal**

Tad Brunye[1,2], Caroline Mahoney[1,2], Harris Lieberman[3] & Holly Taylor[1]
[1]Tufts University
[2]U.S. Army NSRDEC
[3]US Army Research Institute of Environmental Medicine

We examined the effects of physiological arousal on the perceptual analysis of global versus local object features using hierarchical letter and pattern tasks. Participants completed the tasks following caffeine consumption in a double-blind repeated-measures dose-response design (0,100,200,400mg). The letter task showed a pronounced global processing bias following as little as 100 mg of caffeine, with caffeine producing faster response times when volunteers are given a global versus local goal. The pattern task revealed a main effect of dose, with volunteers showing a significant global bias starting at 100mg and asymptoting at 200mg.

(6) Temporal gap disrupts attentional state in rapid serial visual presentation

Atsunori Ariga[1], Jun-ichiro Kawahara[2] & Katsumi Watanabe[3]
[1]University of Illinois
[2]AIST
[3]University of Tokyo; JST; AIST

Observers miss a target more frequently when it appears early in a rapid sequence of nontargets than when it appears later. This is likely because the visual system modulates attention for rapid presentation. This study examined temporal characteristics of the modulated state of attention. We inserted a temporal gap (0-1000 ms) in the sequence and investigated which length of the gap disrupts the maintenance of the attentional state. The identifications of the post-gap target were more deteriorated as the gap became longer. The results suggest that the attentional state could be maintained based on a single visual event.

(7) Psychophysics of recall: What does a memory look like?

Jie Huang & Robert Sekuler
Psychology and Volen Center for Complex Systems, Brandeis University

A matching procedure generated sensitive, analogue measures of short-term memory for spatial frequency. When only one study stimulus was presented, a brief retention interval substantially increased the noisiness of memory. With two stimuli presented on a trial, memory for one of them was biased toward (i) the spatial frequency of the irrelevant stimulus, and toward (ii) the prototypical spatial frequency from other trials. With a timely pre-cue, selective attention diminished, but did not eliminate the influence of an irrelevant stimulus. The prototypical stimulus seems to provide a useful gist signal that can supplement a more detailed item memory.

(8) Visual attention and the observation of human bodies

Christina Joseph, Maggie Shiffrar & Sarah Savoy
Rutgers University

A psychophysical study evaluated how male and female observers spontaneously direct their attention to male and female bodies of varying sizes. Relationships with body dissatisfaction were also investigated. Participants completed an attention bias task and body dissatisfaction surveys. The results replicate past findings that observers tend to direct their attention to thin bodies. But this effect was gender dependent and related to the observer's satisfaction with his or her own body.

(9) Audio-visual localization and identification processes interact to solve incongruent information

Shoko Kanaya & Kazuhiko Yokosawa
Psychology, The University of Tokyo

Simultaneous recognition of location and identity of a sound can engage audio-visual perception. In this, two mechanisms, reflected in ventriloquism and McGurk effects, are often assumed to operate independently. We used two talking faces, arranged horizontally,with a single sound source located under either face. Auditory and visual expressions of a syllable were congruent or incongruent. Participants judged localization and identity of the sound. Results indicated vague localization and occasional illusory fused audio-visual integration in the incongruent condition. They demonstrate dependence between two mechanisms and imply that selective recognition, associated with the cocktail party effect, involves multimodal structure.

(10) Does scene context always facilitate the retrievals of representations?

Ryoichi Nakashima & Kazuhiko Yokosawa
Psychology, The University of Tokyo

This study assesses whether the hypothesis that object representations are bound in memory to a scene context (Hollingworth, 2006) is applicable to representations formed in a flickering change detection task. In this experiment, the flickering change detection task was supplemented with a memory task. Contrary to Hollingworth (2006), memory performance revealed that scene context biased participants to falsely report that certain target objects were previously seen even though they had not been presented. This effect may be specific to incidental memory because change detection in a flicker paradigm rests heavily upon serial search.

(11) Synesthetic colors for phonetic Japanese characters depend on sound qualities

Michiko Asano & Kazuhiko Yokosawa
Psychology, The University of Tokyo

Determinants of synesthetic color choice for Japanese phonetic characters were studied in two Japanese synesthetes. The study used Hiragana and Katakana characters which represent the same set of syllables although their visual forms and character frequencies are dissimilar. From palette of 138 colors, the synesthetes selected a color corresponding to each character. Results revealed similar and stable tendencies in color selections of both synesthetes. Color selec-

tion depended on character sounds, not on visual form or character frequency, particularly for consonants (versus vowels). These findings were remarkably consistent for Hiragana and Katakana characters.

(12) Dual processes in recognition memory of a pre-change object

Yu-Chen Tseng[1], Cheng-Ta Yang[1,2] & Yei-Yu Yeh[1]
[1]Psychology, National Taiwan University
[2]Institute of Cognitive Science, National Cheng-Kong University

Previous studies showed intact implicit memory and above-chance recognition of pre-change objects even under change blindness. It remains unclear whether the automatic familiarity process supports both findings under change blindness. Thus, the process dissociation procedure (PDP) was used in this study to investigate familiarity and recollection processes related to change detection. Results showed that the recollection process was engaged to a greater extent under correct detection whereas the familiarity process was involved equally between correct and incorrect detection. Although subjects may have some general memory strength under change blindness, the conscious recollection is crucial for successful change detection.

(13) The nature of the central capacity limit in human information processing: Serial bottleneck or graded capacity sharing?

Suk Won Han & René Marois
Vanderbilt University

The current study sought to resolve the controversy about what is causing the PRP; a serial bottleneck, or graded capacity sharing. Experiment 1 showed that the primary empirical evidence for graded sharing - increased reaction time of the first task at short SOA - may not be diagnostic of the presence of graded sharing. In Experiment 2, we show that even when parallel processing was more efficient and financially incentivized, participants still failed to share resources between tasks. Based upon these results, we conclude that central information processing is limited by a serial bottleneck.

(14) Optimal integration of surface and contour information in visual shape detection

Bart Machilsen & Johan Wagemans
Laboratory of Experimental Psychology, University of Leuven, Belgium

We investigated how human observers combine surface and contour information in a shape detection task. We used arrays of oriented Gabor elements with an embedded shape. The shape was defined by collinearity of contour elements, isolinearity of surface elements, or a combination of both. In three experiments we matched detection performance on surface and contour cues. Performance on the combined cue arrays was compared with performance on the single cue arrays, and with the prediction of an ideal observer model. Detection performance was significantly better when the two cues were present, and did not differ from the ideal observer prediction.

(15) Effect of object history on stationary target detection among moving stimuli

Lyndsey K. Lanagan-Leitzel
Eastern Connecticut State University

To determine whether people can, in principle, use object history to locate a target, participants monitored "beetles" (moving half-circles) and pressed a button when one was discovered "dead" (flipped upside down, stationary for 3 seconds). On some trials, the beetle changed speed (increase/decrease) for 2.5 seconds prior to stopping. Each trial lasted approximately 5 minutes, containing 15 separate instances of "dead beetles". RTs were fastest with 12 beetles and longest with 4 beetles. RTs were fastest when the target beetle did not change its speed, and slowest when the beetle sped up. Implications for lifeguarding are discussed.

(16) How does the perception of ambiguous images develop?: a neuro-computational model with a dynamic feedback system.

Naoki Kogo[1], Alessandra Galli[1], Luc Van Gool[2] & Johan Wagemans[1]
[1]Laboratory of Experimental Psychology, Katholieke Universiteit Leuven
[2]ESAT/PSI/VISICS, Katholieke Universiteit Leuven

The processes involved in the perception of ambiguous images are investigated with a neurocomputational model including a feedback system. Multistable perception is examined using "face or vase" stimuli. Feedback influences the border-ownership computation so that the figure-ground segregation is enhanced, and adaptation and its recovery determine the temporal aspects of the response. The model is tested with intermittent presentation as well as with disambiguated images. This model is then extended and applied to morphed images in a priming paradigm. The model predicts the responses to ambiguous target images with congruent, incongruent and neutral primes at different time courses.

(17) The development of part-based and configural object recognition in adolescence

Elley Wakui[1], Dean Petters[2], Jules Davidoff[1] & Martin Jüttner[2]
[1]Goldsmiths, University of London
[2]Aston University

Three experiments (familiar animals; familiar artefacts; newly learned but previously novel objects) investigated developmental trajectories for part-based and configural object processing between 7-16yrs. The 3-AFC task required selecting the correct appearance from individual part or part-relational manipulated versions. In all experiments, even the youngest children showed adult-like performance on part changes. However, for animals and artefacts similar levels were only reached by 11-12yrs for relational changes. Interestingly, for novel objects relational- and part-change performance was equivalent throughout the age range. These results suggest an unexpected complex trajectory of configural object recognition into adolescence.

(18) Referential Coding Contributes to the SMARC effect

Gi Yeul Bae, Yu Mi Kim & Yang Seok Cho
Korea University

When left-right responses are made to high-low pitched tones, performance is better with high-right/low-left mapping than the alternative mapping. However, this SMARC effect is not evident for non-musicians when pitch-height is task-irrelevant. The present study had non-musicians perform a timbre- or color-judgment task to see whether a reference tone plays a role in the SMARC effect. The results showed a SMARC effect when a referential tone was presented but no effect when it was absent. These findings imply that the referential codes of pitch height contribute to the SMARC effect.

(19) Visual disorder of central origin in developing age: a computerized rehabilitation training using tridimensional moving objects

Ilaria De Meis[1], Francesca Romana[2], Cappelli, Anahita Mobarhan[3] & Enrico Castelli[2]
[1]Tor Vergata University, Rome
[2]Pediatric Rehabilitation Department, Children's Hospital Bambino Gesù, Rome
[3]American Academiy of Art, Chicago.

The object of the study is a children population affected by cerebral visual impairment associated with cerebral palsy. For the rehabilitation and neuropsychological evaluation of these children, conventional tools are often inappropriate as they require adequate processing of visual information. The study first-step data presented refer to the administration of a computerized training involving shape matching of moving tridimensional objects to a sample group of 54 Italian children with typical development, aged 49 to 76 month. The results suggest the possible use of all spherical and parallelepiped training objects, while cylinder shapes require further investigation.

(20) Visual disorder of central origin in developing age: evaluation of real objects matching, recognition and naming.

Ilaria Lijoi, Francesca Romana Cappelli, Laura Barca & Enrico Castelli
Pediatric Rehabilitation Department, Children's Hospital Bambino Gesù, Rome

The research focuses on children with cerebral visual impairment associated with cerebral palsy. Many of them present a risk of agnosia that could compromise their cognitive-linguistic development. For their rehabilitation and neuropsychological evaluation, conventional tools are often inappropriate as they require adequate processing of visual information. The data presented refer to the evaluation of matching, recognition and naming of 78 real objects sorted by their typical shape, by a sample group of 55 Italian children with typical development, aged 49 to 76 month. The results suggest the possible use of 20 objects for evaluation and of 30 for rehabilitation.

(21) How quickly we forget: Targets and distractors from visual search are retained at different rates

Karla Antonelli & Carrick Williams
Mississippi State University

Target and distractor memories are differently impacted by several factors (e.g., aging, viewing behavior), indicating differences in visual memory processing. The current study manipulated memory retention to explore these differences. We tested visual memory immediately following visual search and again after a 30-minute delay to compare retention rates for targets and distractors. Target memory declined significantly from immediate to delayed testing, whereas distractor memory did not. This finding indicates that target objects could have episodic components that distractors lack, benefiting initial target memory, but leading to a decline in visual memory for targets but not distractors.

(22) The Role of Attention in the Visual Attractor Illusion

Tal Makovski, Khena Swallow & Yuhong Jiang
University of Minnesota

We recently discovered a novel surrounding effect, the visual attractor illusion (VAI), in which the perceived location of an object, rather than a nonspatial feature, is shifted toward a co-occurring item (the "attractor"). This study explores the role of top-down and bottom-up attention in modulating this illusion. Experiment 1 showed that the illusion was stronger when the upcoming attractor was task relevant rather than irrelevant. Experiment 2 showed that only new object-onsets, but not motion-onsets, of the attractor induced the illusion. These results suggest that the VAI is a unique spatial illusion modulated by attention.

(23) Effects of scene contents on change detection in children

Lisa Maccari, Diana Martella, Assunta Muggianu, Mariagrazia Anolfo & Maria Casagrande
Dipartimento di Psicologia, Università Sapienza, Rome

Abstract Children are better able to detect changes in photographs than in line drawings (Shore et al, 2006), but the reasons for this advantage are unclear. One explanation is that the photographs were more interesting. If so, children could detect better changes to interesting images than boring ones. To test this hypothesis, we manipulated the semantic content of pictures in a flicker change detection task. Our results contradicted this prediction: marginal changes to images containing more interesting subject matter were detected more slowly than changes to boring content. Interesting content made it harder for children to find the changes.

(24) Distractor inhibition during the attentional blink: Evidence from distractor devaluation effect

Ken Kihara[1], Yoshihiko Yagi[2], Yuji Takeda[1] & Jun Kawahara[1]
[1]National Institute of Advanced Industrial Science and Technology
[2]School of Psychology, Bangor University

When two targets (T1 and T2) are embedded in a rapid stream of distractors, T2 is often misidentified (attentional blink: AB) if T2 follows T1 by less than 500 ms. Some have proposed that inhibition of a distractor following T1 contribute to the AB, but no direct evidence supports this proposal. This study examined distractor inhibition by assessing a distractor devaluation effect where inhibited items were evaluated less positively than controls. Five experiments revealed a relationship between the devaluation of distractors following T1 and the AB, providing the first evidence of the distractor inhibition during the AB.

(25) The Processing of Task-Irrelevant Natural Scenes in Social Anxiety in a Perceptual Load Task

Jun Moriya & Yoshihiko Tanno
Cognitive Behavioural Science, University of Tokyo

The processing of task-irrelevant stimuli is enhanced in anxious people. We investigated whether socially anxious people processed the task-irrelevant natural scenes in a perceptual load task. The recognition of task-irrelevant natural scenes was observed with repetition priming effects in both high and low socially anxious people in the case of low perceptual load. In the case of high perceptual load, repetition priming effects were reduced in low socially anxious people but not reduced in high socially anxious people. High socially anxious people processed the task-irrelevant natural scenes even in the high perceptual load task.

(26) The diagnosticity of color for emotional objects

Brenton W. McMenamin, Chad J. Marsolek & Daniel J. Kersten
University of Minnesota

Regularities in images can be exploited to optimize image processing. Organisms emphasize the detection of emotional objects, so features diagnostic of emotional content may receive privileged processing. Analysis of the International Affective Picture System (IAPS) image set revealed more reddish-yellow hues in positive images compared to non-emotional images. Using an exogenous cueing paradigm, we found that reddish-yellow cues resulted in a broadening of attention relative to other hues. Moreover, consistent with left-hemisphere (LH) advantages in approach-related processing, individuals with greater trait impulsivity had stronger broadening effects for that hue when presented directly to the LH.

(27) Salience Influence Top-Down Strategy and Capture Effects

Adam Biggs & Brad Gibson
University of Notre Dame du Lac

Existing research debates whether capture occurs in a top-down or bottom-up fashion. Theeuwes (1991) argues for bottom-up capture by salient items, but evidence from Todd & Kramer (1994) suggests participants intentionally direct attention to salient items as an anchor for search. The present study examines the issue of strategies

influencing attentional capture by manipulating distractor salience and presenting relevant display items as potential search anchors. Our evidence shows that apparent capture by salient distractors is dependent on how the participant engages the display, but the strategy of anchoring in serial search depends upon the uniqueness of the item.

(28) Hemispheric Asymmetries in the lexical and idiomatic ambiguity

Gisoon Yu & Kichun Nam
Korea University

The present study was conducted to reveal whether hemispheric difference exists in relation to the type of ambiguity: lexical and idiomatic. The results showed that, although dominant meanings in both types of ambiguity gave rise to both visual fields, subordinate meanings evoked facilitated responses only in the left visual field. In addition, such a tendency was more evident in the idiomatic ambiguity than lexical ambiguity. These results reflect the right hemisphere plays a supportive role by resolving subordinate meaning of ambiguous word and also assists idiomatic ambiguity process.

(29) Interactions Between Task Switching and Prospective Memory: Strategic Monitoring and Task Set Configuration

Ashley Scolaro, Kira Bailey & Robert West
Iowa State University

This study was designed to examine the neural correlates of strategic monitoring in prospective memory (PM) and to consider the effects of task switching on the efficiency of strategic monitoring. Participants performed a hybrid PM-task switching paradigm. Examination of the ERP data offers support for the gateway hypothesis. Specifically, the distribution of slow wave activity related to strategic monitoring was maximal over the left lateral frontal region for pure blocks and over the medial frontal region for mixed blocks. Strategic monitoring effected task set configuration (parietal slow wave) but not stimulus encoding (P3 component) related to task switching.

(30) Strategic control through speed grouping in multiple object tracking

Pei-Chen Chiu[1], Yu-Wei Liao[1], Cheng-Ta Yang[2] & Yei-Yu Yeh[1]
[1]Psychology, National Taiwan University
[2]Psychology and Institute of Cognitive Science, National Cheng-Kong University

This study investigated whether grouping targets with nontargets by velocity affect multiple-object-tracking performance. In Experiment 1, five nontargets moved in one speed, one target moved faster than nontargets, and four targets moved at a speed similar to nontargets'. The results showed a bias toward losing one of the four synchronized targets perhaps because of perceptual grouping or confusion with the nontargets. When grouping was prevented in Experiment 2 by moving nontargets in different speeds, the bias shifted to the synchronized targets as the grouped unit became more distinctive. The results highlight strategic control in MOT through speed grouping.

(31) Do different processing strategies (serial vs. parallel) operate on first and last memorized items?

Mario Fific[1] & James Townsend[2]
[1]Max Planck Institute for Human Development, Center for Adaptive Behavior and Cognition
[2]Indiana University

A growing methodology, known as systems factorial technology (SFT), is being developed to diagnose whether processes are organized in serial or parallel mental architectures, and whether a stopping rule is exhaustive or self-terminating. Diagnostic power is achieved by utilization of the survivor interaction contrast function (SIC) which analyze distributions of choice reaction times, in a parameter-free manner. Using SFT we challenged the old idea that different architectures (serial/parallel) operate on different items in the memorized set. The results revealed parallel processing that is more frequently associated with old than with new items in the list.

(32) Effect of Spatial Information and Target-Distractor Similarity in Visual Search with Irrelevant Singleton

Kao Yamaoka deWitt & Chikashi Michimata
Sophia University

Participants searched for a low-saliency target (a square) among diamond distractors positioned around the fixation, and responded to the direction of the line inside. The distractors consisted of one irrelevant singleton. On 8045f the trials, target appeared on the expected side of the display. Our previous study (2008) showed that spatial expectation facilitated the search for salient targets (a circle among diamonds). In contrast, our present results showed that response times did not differ between the expected and non-expected sides, suggesting that effect of spatial expectation was overridden by stimulus-driven influences when target saliency was low.

(33) Recalling a Memory could facilitate recovering irrelevant memories.

Toshihiro Wakebe[1], Eiichiro Watamura[1], Tomomi Sato[2] & Yohtaro Takano[1]
[1]The University of Tokyo
[2]Ochanomizu University

This research scrutinized effects of recalling a target on unassociated memories with the target. After retrieving pictorial stimuli (Pretest), some participants recalled verbal stimuli (Retrieval Group) and the others conducted an arithmetic task (Calculation Group). Finally, both groups re-retrieved pictorial stimuli (Posttest). The Retrieval Group could recall more pictorial stimuli on the Posttest. This group showed larger memory recoveries (item unrecalled on the Pretest and recalled on the Posttest), whereas there was no difference in memory loss (item recalled on the Pretest and unrecalled on the Posttest). These results suggest that recalling a target facilitates recovering unassociated memories.

(34) Activation Domain in Cued Recall

Eiichiro Watamura[1], Toshihiro Wakebe[1] & Tomomi Sato[2]
[1]The University of Tokyo
[2]Ochanomizu University

Previous studies have assumed that when recalling a target, unassociated memories with the target would not become activated. The present research investigated this assumption. After learning verbal stimuli, participants learned pictorial stimuli in different contexts. Next, some participants recalled verbal stimuli and other conducted an arithmetic task. Finally, all of the participants retrieved pictorial stimuli. If memories for pictorial stimuli would become activated during recalling verbal stimuli, this recall would facilitate the subsequent retrieval of pictorial stimuli. This prediction was supported, suggesting that recall of a memory could activate unassociated memories with the target.

(35) Third-Person Perception: A New Way to Explore Inner Cognition

Allison Brennan & James Enns
University of British Columbia

Cognitive psychologists typically gauge the experiences of study participants with key presses or speeded vocal responses. However, new technologies such as computer webcams offer the possibility of a richer understanding of participant experience. We report two studies where participants are video-recorded and then rated by a second round of participants blind to the hypotheses: Study 1 examines whole body activity during a real-world search task; Study 2 explores spontaneous facial expressions made in response to emotional pictures. We argue that these third-person ratings convey more of the underlying cognition than is evident in first-person key presses.

(36) Visual Object Cognition Precedes and Temporally Overlaps Mental Rotation

Lisa Lucia & Haline Schendan
Tufts University

The time course of in-depth, mental rotation of Shepard-Metzler objects was investigated using event-related potentials. Linear rotation effects were found on performance and parietal negativity after 500 ms, as found previously for in-plane rotation of alphanumeric characters. However, earlier anterior negativity ~200 ms increased linearly with increasing rotation at frontopolar sites until 700 ms, reflecting computation of the spatial relations among parts to resolve differences between visual object representations, and at centrofrontal sites between 400 and 500 ms, reflecting object working memory. These visual object cognition processes precede and overlap the initial phase of mental rotation.

(37) Dissociable effects of repetition lag on priming of structurally possible and impossible objects

Anja Soldan[1], John Paul Sheehy[2] & Yaakov Stern[2]
[1]The Johns Hopkins University Medical Center
[2]Columbia University Medical Center

We examined priming for structurally possible and impossible objects as a function of the number of stimuli that intervened between repetitions. We found that whereas priming for possible objects did not decrease as the lag between repetitions increased, priming for impossible objects was no longer significant at the longest lag (27 to 41 intervening items, or ~1.5 min). This suggests that local feature information that supports priming of impossible objects degrades relatively quickly over time due to memory decay and/or interference, whereas global structural information that supports priming of possible objects is more robust to these effects.

(38) Apparent Scene Rotation in Updating Locations of Invisible Moving Objects

Markus Huff[1], Georg Jahn[2], Frank Papenmeier[1] & Hauke Meyerhoff[1]
[1]Knowledge Media Research Center
[2]University of Greifswald

We examined spatial updating of temporarily invisible objects across viewpoint changes in multiple object tracking. Recently, it was shown that continuous information about the changing

scene supported in updating retained object locations. In this study, we examined the influence of continuous and abrupt rotations on this updating process varying whether abrupt rotations were perceived as apparent rotations. Abrupt rotations inducing apparent rotation may provide similar information for updating the locations of temporarily invisible objects as continuous rotations.

(39) Matching Gaze Data with Static and Dynamic Objects using the tool DynAOI

Frank Papenmeier & Markus Huff
Knowledge Media Research Center

Analyzing eye movements towards moving objects in dynamic scenes promises further insights into attentional and cognitive processes. However, there is a lack of efficient tools dealing with moving objects. We present DynAOI, a tool for defining dynamic areas of interest. It works automatically and is therefore very efficient with animations that are based on virtual three-dimensional models. Eye movement data is matched with objects in the model thus creating static and dynamic areas of interest. A validation study asking participants to track particular objects demonstrated that DynAOI is an efficient tool for handling dynamic areas of interest.

(40) Polysemy Across Two Languages: Eveidence From Word Recognition and Picture Naming.

Olga Boukrina, Stephen Jose Hanson & Catherine Hanson
Rutgers, The State University of New Jersey

Polysemous words have multiple related memory representations. In bilingual speakers, polysemy within a single language and across two languages may influence word retrieval. In two experiments, we investigated how polysemy influences bilingual language comprehension and production. Polysemy slowed recognition and naming within one language and influenced word activation across languages.

(41) Connectedness determines the canonical view for objects and scenes independent of task requirements.

J. Stephen Higgins & Ranxaio Frances Wang
University of Illinois

Previous research showed that people prefer oblique views for objects and head-on views for scenes. Here we examined whether this differential view preference depends on task demands. Participants explored, by free rotation, connected (objects) or non-connected (scenes) symmetrical arrays of poles, then either took a snapshot, made a relative distance judgment, or performed an object recognition task. In all tasks participants spent more time exploring the oblique view for objects than scenes, and the reverse for the central view. These results suggest a differential view preference between objects and scenes despite identical task requirements on the information needed.

(42) Stroop effects in patients with traumatic brain injury: Selective attention or speed of processing? A review.

Boaz M. Ben-David[1] & Linh LeTruc Nguyen[2]
[1]Oral Dynamics Lab, Department of Speech-Language Pathology, University of Toronto & Toronto Rehab
[2]Psychology, University of Toronto Mississauga

Traumatic Brain Injury (TBI) has devastating cognitive and social consequences; correctly assessing the consequences of TBI is crucial. The Stroop test is the standard measure of selective attention for TBI patients, however, evidence from the literature is mixed. In a review of 12 Stroop and TBI studies, we found larger effects with TBI patients. This was commonly interpreted as reflecting a decrease in selective attention. However, we found support for an alternative model, attributing this increase in Stroop effects to a general decrease in the speed of processing that resulted from the brain injury.

(43) Visual Masking in prolonged wakefulness

Stefania Mereu[1], Diana Martella[2] & Maria Casagrande[2]
[1]University of Illinois at Urbana-Champaign
[2]Dipartimento di Psicologia - Sapienza, Università di Roma

The aim of the present study was to evaluate the effect of sleep deprivation on object substitution masking (OSM). Since both automatic and voluntary shifts of attention toward the mask are involved in OSM, and sleep loss affects voluntary spatial orienting, we expected OSM to be affected by moderate (24h) sleep deprivation. Results showed a small but robust reduction of OSM confirming the involvement of voluntary attention in OSM, but suggesting that it is mainly due to automatic attention. Results also confirmed that sleep-deprived individuals may adopt an automatic, instead of voluntary, modality of control.

(44) Stitching memories together: How long-term visual memory is updated to compensate for occlusion

Jordan McGuire & Carrick Williams
Mississippi State University

We examined the impact of occlusion during encoding of visual memories and the process of updating visual memories with new informa-

tion not previously available. In Experiment 1, we manipulated levels of occlusion at encoding and found more occlusion led to worse memory. More importantly, in Experiment 2, we compared memory for objects fully revealed either all-at-once or across multiple partially-occluded presentations. Partially-occluded objects revealed across presentations were remembered as well as fully visible objects. However, this ability to piece together memories appears to be limited by the amount of overlap of visual information in successive presentations.

(45) WITHDRAWN

(46) Selecting a fixation position within objects, within scenes:Optimal and preferred eye landing positions in naturalistic stimuli
Tom Foulsham & Alan Kingstone
Psychology, University of British Columbia

Viewing position effects are commonly observed in reading, but they have rarely been investigated in object perception. We explored where people fixate within photorealistic objects, and the effects of this landing position on recognition and subsequent eye movements. The results demonstrate an optimal viewing position—objects are recognized quicker and more accurately when fixation is on the object centre. Viewers also prefer to saccade to the centre of objects within a natural scene. These results suggest that saccades within scenes are systematic, close to optimal, and made with reference to an early parsing of the scene into constituent objects.

(47) Effects of Object Manipulability on Speeded Categorization and Object Naming
Joshua Salmon & Patricia McMullen
Dalhousie University

The goal of the current research was to investigate the role of manipulability (the extent to which an object can be picked up or grasped and then used) on object identification. Two experiments were conducted on the same objects in a brief exposure masked paradigm. Experiment #1 involved a task tapping early visual processing of objects: object categorization. Experiment #2 aimed to tap later, deeper, more semantic processing: object naming. The result was opposing effects in the two experiments. In Experiment #1 non-manipulable objects were named more quickly, and in Experiment #2 manipulable objects were named more quickly.

(48) Temporal structure: A specialized role in visual grouping?
Jeremy Hays & Sharon Guttman
Middle Tennessee State University

Does sensitivity to temporal structure—the "rhythm" of changes in a scene—exist for the sole purpose of binding image features into coherent objects? The current study investigated whether temporal structure information can be used to make explicit judgments regarding synchrony of change as efficiently as implicit judgments regarding the grouping of local elements into a global form. The data indicates that temporal structure can support explicit timing judgments, but to a significantly lesser extent than implicit grouping judgments. This finding suggests that the visual system's sensitivity to rapid visual changes may have evolved specifically to promote visual binding.

(49) Properties of spatial attention in conscious and nonconscious visual information processing
Evelina Tapia, Bruno G. Breitmeyer & Elizabeth C. Broyles
University of Houston

A flanker task was used to assess the effects of spatial attention during conscious and nonconscious processing. We demonstrated that increasing spatial separation between the flankers and probes diminished the differences between RTs to the incongruent and congruent probe-flanker pairs. This trend occurred even when the flankers were rendered invisible by a metacontrast mask, indicating that spatial attention effects are expressed at the nonconscious level of processing. Finally, we demonstrated that attention deployed at nonconscious levels of processing is characterized by a spatial gradient found at the conscious level.

(50) A direct comparison between 2nd order relational face processing across manipulations of Ethnicity and Polarity
Heath Matheson & Patricia McMullen
Dalhousie University

It is unclear whether impairments in other-race face perception and the perception of contrast reversed faces is a consequence of decreased sensitivity to the 2nd order relations in a face. Here we explored the interaction between face inversion and Ethnicity and Contrast. Our main finding is that, in a task of 2nd order relational processing, inversion impairs performance regardless of face ethnicity or contrast polarity. Because inversion affected the analysis of 2nd order

information regardless of Ethnicity or Polarity, it is argued that 2nd order relational processing is applied efficiently across these critical manipulations in upright faces.

(51) The role of spatial organization in multiple task performance with complex, dynamic visual scenes.

Noah Sulman & Thomas Sanocki
Psychology, University of South Florida

To what extent is the perception of evolving and continuous visual events limited by task set? The relationship between task switching, extended scene perception, and event perception was investigated by presenting observers with multiple target event animations defined in terms of their color, shape, location, or motion. Observers responded to events defined in terms of just one or multiple dimensions. While there was a cost for multiple task performance, the costs were much smaller when task regions were separated and organized. When tokens from each task were commingled, multiple task performance suffered.

(52) A Quarter of a Century of Emotional Stroop Studies: Effects of Design and Type of Population

Amanda J. Dydynski[1] & Boaz B. Ben-David[2]
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The emotional Stroop Effect (ESE) is the slowdown in color-naming emotional threat words over neutral ones. In a review of 201 experiments in 64 studies we found that when emotional words were presented in a blocked design (separate from neutral ones), the ESE was significant and robust. In contrast, when emotional and neutral words were presented together, in a mixed design the ESE decreased substantially. This supports the threat account of the ESE, which suggests that threat generates a sustained cognitive freeze. We further found that the ESE for patients was substantially larger than for healthy controls.

(53) The Role of Mask Heterogeneity in Motion-induced Blindness

Erika Wells[1], Andrew Leber[1] & John Sparrow[2]
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Motion-induced blindness (MIB) is an illusion characterized by the disappearance of a peripheral target when surrounded by a "mask" of moving objects. While previous studies have mainly focused on how properties of the target influence MIB, we explored how mask properties affect disappearance. We found that reducing the motion coherency of the mask dramatically increased rates of MIB. We also found that heterogeneity in the color, shape, and size of the mask elements did not affect disappearance. These results show that mask heterogeneity, when dynamic in nature, exerts a key role in the phenomenon of MIB

(54) Looking back at Waldo: Inhibition of Return does not function as a foraging facilitator during scene search.

Tim J. Smith & John M. Henderson
University of Edinburgh

The function of Inhibition of Return (IOR) during scene viewing is under debate. Saccades returning to the previous fixation location experience delay due to IOR yet such return saccades occur frequently during a scene memorisation task. However, a memorisation task may not require IOR to function as a 'foraging facilitator'. In this study a replication of Klein and MacInnes' (1999) Where's Waldo search task revealed that refixation is as common as fixations at other distance-matched locations even though refixations experience delay. IOR exists during Where's Waldo search but it does not function as a foraging facilitator.

(55) One is more simultaneous than two: perception of simultaneity is affected by holistic processing

Ekaterina Pechenkova & Maria Sinitsyna
Lomonosov Moscow State University

In three experiments, it was shown that asynchronously presented images are perceived as simultaneous more often if they compose a whole object rather than a set of unrelated elements. Each experiment addressed a different type of visual object (silhouettes, illusory contours and words). Results for the word stimuli imply that the obtained effect can be evoked by pure top-down grouping based on familiarity.

(56) Shifting attention in visual short-term memory: testing bottom-up and top-down accounts

Marian Berryhill[1,2], Cara Shay[1] & Ingrid Olson[1]
[1]Temple University
[2]University of Pennsylvania

It is well known that visual short-term memory (VSTM) performance can be modulated by attentional cues during encoding. Interestingly, more recent studies show that attentional

cues occurring after encoding, but prior to the test phase also improve performance. In six studies we further explored this and found that the retro-cue benefit is (a) modulated by the retrieval task; (b) enhanced when cues are more automatically processed; and (c) occurred implicitly as measured by confidence ratings. These findings support a bottom-up mechanism in which the retro-cue automatically shifts internal attention to target items held in VSTM.

(57) A Dynamic Neural Field Model of Temporal Order Judgments for Figures and Grounds

Lauren Hecht, John Spencer & Shaun Vecera
University of Iowa

Recently, researchers have demonstrated that figure-ground assignment impacts temporal processing. Foreground figures are available to perceptual level processes sooner than grounds (i.e., prior entry effect) and are afforded extended processing durations relative to grounds (i.e., temporal extension effect). We present a dynamic neural field model that captures the neural dynamics giving rise to these effects. The model posits that neural populations processing the figure are more active, resulting in activation that quickly surpasses threshold, generating the earlier detection of target onsets. However, this same enhanced activation prolongs perceptual processing, degrading the detection of the target's offset.

(58) Object-based Attention: Mapping the Time Course of Attentional Prioritization

Leslie Drummond & Sarah Shomstein
The George Washington University

Certainty about the cue-target relationship allows for prioritization of the target location, thus eliminating object-based effects (Drummond & Shomstein, 2008, 2009). Currently unclear is whether spatial locations or objects are prioritized since their reference frames overlap. We examined which reference frame receives attentional priority by employing dynamic displays and manipulating certainty. Additionally, we investigated the temporal profile of prioritization by varying SOA. Results indicate objects and spatial locations guide attention with uncertainty, with the space-based influence weakening as SOA increases. With certainty, highest priority is assigned to the target location, resulting in a benefit for that location only.

(59) Musical training improves auditory memory in general (but not visual memory)

Michael Cohen[1], Todd Horowitz[2] & Jeremy Wolfe[2]
[1]Harvard University
[2]Harvard Medical School/Brigham and Women's Hospital

Previously (1), we have shown that auditory recognition memory is inferior to visual recognition memory. We hypothesized that individuals who use the auditory modality more frequently should have superior auditory memory abilities. We tested trained musicians and non-musicians on three recognition memory tasks: natural sounds, music clips, and visual images. Musicians were better than non-musicians at recalling both music clips and natural sounds. However, musicians still showed better recall for visual I mages than for sounds. Here, musicians and non-musicians performed equivalently. Musical training appears to improve auditory memory without changing visual memory.

(60) Enumerating by location increases the subitizing limit

Harry Haladjian, Harry Haladjian, Zenon Pylyshyn & Charles Gallistel
Center for Cognitive Science, Rutgers University

This study investigates the enumeration of small sets using a novel subitizing task. Observers viewed brief displays (50 or 200 ms) of 2-9 small black discs on a gray background. Numerosity and location information were obtained by requiring observers to mark the perceived locations of the discs, which allowed for a nonverbal report of numerosity. In the location-marking condition, observers accurately reported higher numerosities (6 items) than in the control condition (4 items) where numerosity was reported conventionally. Additionally, location accuracy benefited from increased display durations. These results give new insights to subitizing, spatial perception, and numerical cognition.

(61) Video game players excel at change detection

Kait Clark[1], Mathias Fleck[1,2] & Stephen Mitroff[1,2]
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[2]Psychology, Duke University

Action video game players demonstrate enhanced performance on perceptual tasks, but the underlying mechanisms of their benefits remain unclear. We examined gamers and non-gamers using a modified change-detection flicker paradigm in which image pairs were presented in individuated cycles (original image, blank screen, changed image). Participants were given up to 15 cycles to find the change, and localization responses were collected

each cycle. Gamers found the changes more quickly and accurately than non-gamers. Analysis of search patterns revealed strategy differences (e.g., gamers tended to be broader searchers) that may reveal the causal mechanisms of their benefits.

(62) Visual Sensitivity to Point-Light Actors Varies with the Observed Action

Adam Doerrfeld, Kent Harber & Maggie Shiffrar
Rutgers, the State University of New Jersey - Newark

Is visual sensitivity to human movement action independent, as many theories implicitly assume? Exp. 1 examined whether the detection of a moving point-light person varies depending on the action observed (lifting, running, throwing or walking). Exp. 2 examined whether person-detection varies as a function of observers' expectancies about upcoming actions. Similar patterns emerged from both experiments: visual sensitivity was action dependent, being greatest for walkers and worst for lifters. Interestingly, differences in person detection cannot be attributed to expectancies. Later experiments will look at the role of dynamic symmetry as well as motor or visual familiarity.

(63) Short-term masked antipriming between visually similar objects

Rebecca G. Deason[1] & Chad J. Marsolek[2]
[1]Center for Translational Cognitive Neuroscience, GRECC, Bedford VA Hospital
[2]University of Minnesota

In long-term memory, antipriming is impaired identification of objects following encoding of other objects. To test a previous concern that baseline and antiprimed trials took place in separate blocks, we intermixed them in a short-term-memory masked priming study. Masked cues appeared immediately before identification of target objects. A cue could prime (e.g., piano) or antiprime (e.g., desk) the target object (e.g., piano) relative to a baseline condition (e.g., scrambled object cue). In two experiments, antiprimed objects were identified less accurately than baseline, in an antipriming effect enhanced when different objects are visually similar.

(64) The role of face shape and pigmentation in modulating neural and behavioral responses to other-race faces

Benjamin Balas & Charles Nelson
Children's Hospital Boston

The "Other-Race Effect" refers to the finding that recognizing faces outside your own racial group is particularly difficult. This selective impairment likely results from "tuning" of the underlying representation of facial appearance, leading to efficient processing of commonly-seen faces at the expense of poor generalization to other categories. The current study examined the specificity of the representation of facial appearance by asking how race-specific face shape and pigmentation modulated neural responses implicated in face processing. We used event-related potentials and behavioral measures to characterize performance in racial categories defined by dissociable shape and pigmentation information.

(65) A Contextual Modulation of Object-Based Selection

Ellen MacLellan & Bruce Milliken
McMaster University

This research examines processes that control object-based selection. Following the idea that breadth of attentional focus may be critical (Goldsmith & Yeari, 2003), we used a color singleton rather than an abrupt onset to cue attention, with the idea that changes in the proportion of color singleton cued trials would affect search strategy, and that different search strategies may hinge on changes in the breadth of spatial focus. Object-based cuing effects were observed only when a high proportion of the targets were cued. These results implicate breadth of spatial focus as a mediating factor in object-based selection.

(66) Working memory guidance of attention is flexible

Nancy Carlisle & Geoffrey Woodman
Vanderbilt University

Theories of attention suggest working memory representations guide attention toward memory-matching items in the visual field. Recent evidence suggests individuals can control whether working memory representations are used to guide visual attention. However, it has not been determined whether prior probability influences this guidance. In two experiments, we show that altering the likelihood of matches between memory representations and visual search targets systematically modulates the probability of attentional deployments to memory matches during search. These findings suggest that the control of attention by working memory is flexible and can be optimized for a given task.

(67) Tunnel effect with amodally completed targets can elicit curved motion paths behind an occluder

Sung-Ho Kim, Jacob Feldman & Manish Singh
Rutgers University

Amodal completion, completion of partially occluded objects, is known to change motion correspondence in apparent motion (Shimojo & Nakayama, 1990). We examined whether amodal completion can also change perceived motion path. Observers viewed motion sequences of two small targets occluded by a curved occluder with varied inter-stimulus interval (ISI). With short ISIs, observers tended to report the straight path motion, but with longer ISIs they became likely to report the curved path motion behind the occluder. It suggests that the amodal representation of a fully hidden object bridges the gap between two partly occluded targets with a curved motion trajectory.

(68) The Effects of Multiple-Feature Priming on Identifying Visual Targets

Kenneth Hailston
Georgia Institute of Technology

Past research has demonstrated that priming single features affects search performance (e.g., Huang & Pashler, 2005). But, what happens when multiple features are primed? Do the effects on performance increase as the number of features primed increases? To address these questions twenty-four undergraduate students participated in a visual search experiment, comparing the effects of priming 0, 1, 2, and 3 features simultaneously. Data revealed that valid primes improved search performance, and this effect increased as the number of features primed increased. Moreover, there were no effects of invalid primes. Finally, color resulted in the largest effects on search accuracy.

(69) Variability in Axis-Aligned Motion Bias Magnitude due to Context and Task Parameters.

Igor Dolgov[1], Ellen Campana[2] & Michael McBeath[2]
[1]New Mexico State University
[2]Arizona State University

Axis-aligned motion (AAM) bias is a tendency for observers to assume symmetric moving objects maintain axis-trajectory alignment and bias their judgments of trajectory toward the axis when this alignment is broken. Three experiments, based on Morikawa (1999), examined observers' judgments of moving triangles and rectangles on a computer screen. Participants showed AAM bias consistent with the angle of axial deviation from trajectory for intermediate angles (-30°–30°), but not at the extremes (±45°). Although data mirrored prior research, the magnitude of the observed AAM bias was an order of magnitude smaller and there was no effect of elongation.

(70) Cueing of visual attention by eyes and arrows: What moves matters.

Samantha Culpeck, Samuel Hutton & Beena Khurana
University of Sussex

The ability to determine other people's gaze direction is key to comprehending the social world. Previous studies found that static and dynamic gaze cues orient visual attention. The present investigation compared central cueing by static and dynamic eyes and arrows, to determine whether movement onset alone sufficiently accounts for the greater orienting effect of dynamic gaze. The magnitude of orienting (incongruent – congruent responses) was greater for dynamic versus static gaze, but not for dynamic versus static arrows. These results demonstrate that the engagement of perceivers' visual attention, by dynamic gaze, is not based on movement onset alone.

(71) Action Video Game Experience Reduces the Cost of Switching Tasks

Matthew S. Cain[1], Ayelet N. Landau[2] & Arthur P. Shimamura[2]
[1]Duke University
[2]University of California, Berkeley

While experience playing action video games has been shown to have beneficial effects for visual attention processes, little work has examined possible effects on executive functions. In this study, video game players (VGPs) and non-players (NVGPs) switched between two tasks of unequal familiarity in a manual anti-response task. NVGPs had large switching costs for the familiar task condition and small switching costs for the novel task condition. Compared to the NVGPs, VGPs produced an overall smaller and more symmetric pattern of task switching costs, suggesting that experience with action video games may produce marked improvements in executive functioning.

(72) Estimating Sensory Gain During the Maintenance Period of Visual Working Memory

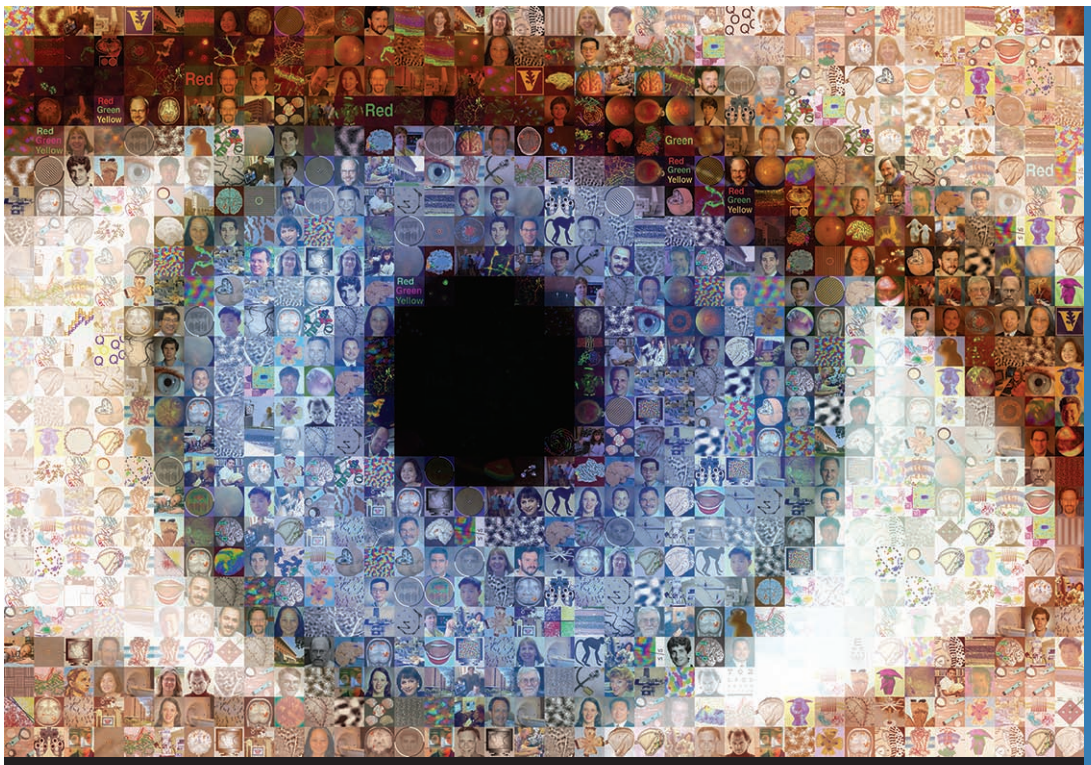
Miranda Scolari, Laura Torres & John Serences
University of California, San Diego

Recent neuroimaging evidence suggests that early visual cortex plays a key role in supporting working memory (WM) representations; however, these studies do not specify how activity in early visual cortex is modulated. Psychophysical methods were used to investigate how the gain of sensory neurons is modulated during WM tasks requiring either fine orientation discrimination or recall. A computational model was used to show that the best performing subjects applied gain to the most informative sensory neurons, which were not always tuned to the to-be-remembered stimulus. This suggests that WM representations are not simply sustained copies of sensory input.

(73) Influence of appropriateness of action on affordance.

Michitaka Iida & Chikasi Michimata
Sophia University

A spherical object was visually presented and participants executed a grasping response depending on the shape of the object. The size of object was either large (graspable) or small (non-graspable). In the half of the trials the object had sharp stings. Grasping graspable object with stings would afford grasp but not be appropriate, because it hurts. The results showed that RT was longer for the objects with stings than without stings when the objects were graspable. It was discussed that inappropriate object restrained grasping responses when the object was graspable.



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