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Object Perception, Attention, & Memory
November 13, 2008

CHICAGO

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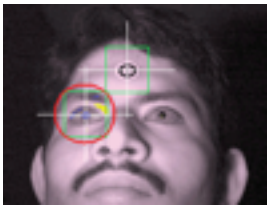

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OPAM 2008 Talk Session
Continental A, Hilton Hotel Chicago

7:30	Registration	
8:10	Opening Remarks	
	Chair: Joseph Brooks	**Organization, Emotion, & Multisensory Perception**
8:15	Erik Van der Burg, Christian N.L. Olivers, Adelbert W. Bronkhorst, Durk Talsma & Jan Theeuwes	Multisensory synchrony guides attention in dynamic cluttered environments
8:30	Martha Kaiser & Maggie Shiffrar	Individual differences in perceptual sensitivity to emotional human movement.
8:45	Mitsouko van Assche, Pierre Gos & Anne Giersch	Perceptual organization across hemispheres
9:00	---------- BREAK ----------	
	Chair: Kim Curby	**Faces, Objects, & Scenes**
9:15	Michael L. Mack & Thomas J. Palmeri	Objects in scenes: Is one system enough?
9:30	Rama Amishav & Ruth Kimchi	Perceptual Interactions Between Facial Properties
9:45	Tim Smith & John Henderson	Facilitation of return during scene viewing
10:00	Ming Meng, Sharon Gilad & Pawan Sinha	Face Recognition with Contrast Chimeras
10:15-11:45	**Poster Session – Northwest Hall, Lower Level Hilton Hotel**	
	---------- LUNCH (On your Own) ----------	
	Chair: Artem Belopolsky	**Working Memory**
12:45	Benoit Brisson & Pierre Jolicoeur	Express re-engagement of attention but delayed entry into visual short-term memory following invalid spatial cueing
1:00	Mariko Yamaguchi & Lisa Feigenson	Selective attention of working memory contents by 11 month-old infants
1:15	Stephenie Harrison & Frank Tong	Decoding reveals the contents of working memory in human visual cortex
1:30	Nancy Carlisle, Leanne Boucher & Geoff Woodman	The influence of strategy on the interaction of working memory guidance of attention
1:45	---------- BREAK ----------	
	Chair: Sarah Shomstein	**Objects and Attention**
2:00	Lauren Hecht, Brandon Abbs & Shaun Vecera	Auditory object-based attention
2:15	Brian Levinthal & Alejandro Lleras	Context-free inhibition: attentional biases transfer strongly across temporal and spatial search tasks
2:30	Louis K. H. Chan & William G. Hayward	Object-based attention is “turned off” by top-down control
2:45	Ana Torralbo & Diane Beck	Perceptual load-induced selection as a consequence of local spatial interactions
3:00	**Keynote Speaker: Glyn Humphreys**	**Attention and action - an intimate coupling**
4:00	Closing Remarks	

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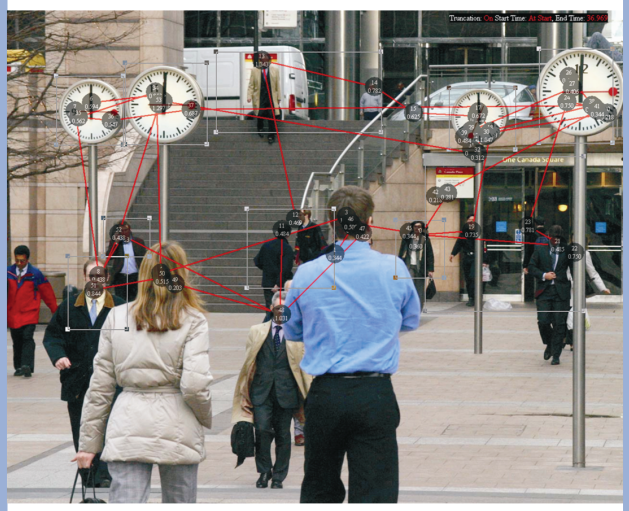

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OPAM 2008 Keynote Address
Continental A
3:00 p.m.

Glyn Humphreys
Behavioural Brain Sciences, School of Psychology
University of Birmingham

Attention and action - an intimate coupling

Over the past ten years one influential view of visual information processing is that action and perception can be de-coupled. In this paper, however, I will argue that action and perception can be intimately related through the operation of visual attention, with attention being (i) directed to the locations where stimuli will appear, and (ii) to action relations between stimuli. I will present examples of the inter-dependency between attention and action using behavioural data from normal participants and neuropsychological patients, as well as physiological data from ERP and from fMRI. The results suggest that visuo-motor responses can be evoked rapidly and direct attention to locations and properties of stimuli that match an intention for action.

OPAM 2008 POSTER SESSION
10:15-11:45
Northwest Hall, Lower Level Hilton Hotel

(1) **Scene-Motion Thresholds as a Function of Head Motion**
Jason Jerald, Frank Steinicke & Mary Whitton

(2) **The role of sex differences and sensation seeking in spatial orienting of attention**
Yukihisa Matsuda & Shoichi Iwasaki

(3) **Is inhibition of return blind to stimulus value?**
Helena Rutherford & Jane Raymond

(4) **Tracking invisible objects across viewpoint changes**
Markus Huff, Hauke S. Meyerhoff, Georg Jahn & Stephan Schwan

(5) **Context influences 2nd order relational processing of non-face objects**
Heath Matheson & Patricia McMullen

(6) **Perceptual Load and Working Memory Load on Attentional Capture**
Bryan Burnham, Gia Pittaluga, Joe Mertens & Lindsay Greiner

(7) **Object recall as a function of spatial context and subject's intention to learn**
Anna Manelis, Catherine Hanson & Stephen Jose Hanson

(8) **Pupillometry and Translators' Translation Directionality**
Chieh-Ying Chang, Fabiana Gordon & Gabriela Saldanha

(9) **Individual Differences in Eye Movement Patterns during Encoding and Retrieval of Own- and Other-Race Faces**
A. Caglar TAS & Aysecan Boduroglu

(10) **Is that you? Observer's own actions impact their visual perception of human action.**
Ekaterina Dobryakova & Maggie Shiffrar

(11) **Put Down the Controller!: A Negative Effect of Playing Video Games on Proactive Cognitive Control**
Kira Bailey, Robert West & Craig Anderson

(12) **Goldie Locks was right: ERP correlates of control processes associated with variation in response time**
Zachary Roper, Courtney Varley & Robert West

(13) **Unique surface features are held in visual working memory to facilitate attentive tracking**
Tal Makovski & Yuhong Jiang

(14) **The influence of task demands on ERP correlates of face processing after controlling for interstimulus perceptual variance**
Jonathan Kahl, Robert West, Eric Cooper & Ashley Scolaro

(15) **The neural correlates of interacting objects.**
Jiye G. Kim & Irving Biederman

(16) **The Effect of Heat and Discomfort on Slope Perception**
Alex Essenmacher & Ranxiao Wang

(17) **The Attentional Boost Effect in Scene Perception**
Khena Swallow & Yuhong Jiang

(18) **Frequent Shifts of a Scene Interrupt Change Detection**
Ryoichi Nakashima & Kazuhiko Yokosawa

(19) **Influences of Rule-Based and Information-Integrated Category Learning on Similarity Space.**
Takashi Suegami & Chikashi Michimata

(20) **Object-based Attention Selection of Non-uniform Objects with Changing Surfaces**
Wah Pheow Tan & Veronica J. Dark

(21) **Influences of spatial and nonspatial contextual information on visual object memory**
Hsin-Mei Sun & Robert D. Gordon

(22) **The Time-Course of Holistic Processing of Faces**
Jennifer Richler, Michael Mack, Isabel Gauthier & Thomas Palmeri

(23) **How Stroop-Like is Stroop-Like?**
Chris Koch & Jennifer Brogan

(24) **The Impact of Object Motion on Perceptual Categorization**
Olga Falmier & Michael Young

(25) **Screen versus hard copy: Reading faster from an LCD monitor than from Paper**
Leanne Stefano & Andrew Herbert

(26) **Global form sensitivity in 4-6 month old infants depends on local processing**
Melanie Palomares, Anthony Norcia & Mark Pettet

(27) **Aesthetics and Object Perception: Experiments in Spatial Composition**
Jonathan Gardner & Stephen Palmer

(28) **Is Prosopagnosia a Deficit in Computing Within Object Distances?**
Ashley Scolaro, Eric Cooper & Jonathan Kahl

(29) **Spatially Selective Attention to Impossible Locations**
Cassidy Sterling & Bruce Bridgeman

(30) **Do visual and auditory working memory share the same capacity limit? A potential resolution to the debate**
Daryl Fougnie & René Marois

(31) **The occlusion illusion: Stereoscopic evidence of partial modal completion**
Karen B. Schloss & Stephen E. Palmer

(32) **How is quantity bound to specific objects?**
Liat Goldfarb & Anne Treisman

(33) **Detecting changes in a multi-element display**
Cheng-Ta Yang, Cheng-Ta Yang, Yung-Fong Hsu & Yei-Yu yeh

(34) **Tracking objects and actions through codes of conflict**
Michiel Spapé & Bernhard Hommel

(35) **The role of executive working memory in visual search: What difference does high load make?**
Jibo He & Jason McCarley

(36) **Study of the short-term memory capacity through the attentional blink paradigm**
Ljubisa Placé & Christophe Boujon

(37) **Unseen objects can contribute to visual size averaging**
Heeyoung Choo & Steven Franconeri

(38) **The congruency sequence effect in the face-name Stroop task**
Yang Seok Cho, Jong Moon Choi, Jaeyong Lee & Yu Mi Kim

(39) **Anatomical and Attentional Effects in Bimanual Simple Reaction Times**
Antonello Pellicano, Valeria Barna, Sandro Rubichi & Roberto Nicoletti

(40) **When does the visual attention shrink toward object?**
Ryosuke Niimi & Manabu Tanifuji

(41) **Spatial and Organizational Aspects of Hierarchical Attentional Focusing**
Menahem Yeari & Morris Goldsmith

(42) **Encoding the shape of holes in visual working memory**
Sung-Ho Kim

(43) **Auditory information affects visual sensitivity to biological motion**
James Thomas & Maggie Shiffrar

(44) **Do Canonical Views of Objects and Scenes Differ?**
J. Stephen Higgins & Ranxiao Frances Wang

(45) **Aging effects on the processing and the integration of redundant visual signals**
Boaz M. Ben-David, Ami Eidels & Wu Yan Lulu Li

(46) **Processing of briefly presented natural scenes: are people bound to the chairs they are sitting on?**
Ekaterina Pechenkova, Mary Potter & Bradley Wyble

(47) **Target memory superiority in undefined visual search**
Mark Thomas & Carrick Williams

(48) **Attentional Uncertainty in the Stroop Priming Task**
Brandy Johnson & Sharon Mutter

(49) **The Crossed-Uncrossed Difference in normal and callosotomized individuals**
Catherine Ouimet, Pierre Jolicoeur, Jeff Miller, Alexia Ptito & Lassonde Maryse

(50) **Object-based Attention in Dynamic Displays**
Leslie Drummond & Sarah Shomstein

(51) **Dissociating cognitive operations in working memory**
Benjamin Rosenau & Steven Yantis

(52) **Comparing Salience and Perceptual Load in Visual Selective Attention**
Adam Biggs & Brad Gibson

(53) **The time course of neural activity in object-based visual attention**
Linda Moya, Sarah Shomstein, Anto Bagic & Marlene Behrmann

(54) **Shapes and Spaces: How Do Adults and Children Perceive Spatial Arrays?**
Amy Clements-Stephens, Gisselle McKell-Jeffers, Jean-Marie Maddux & Amy Shelton

(55) **Perceptual Load Modulates Attention Capture By Dynamic Stimuli**
Joshua Cosman & Shaun Vecera

(56) **The Capacity for Spatial Updating in Visual Short-term Memory**
Ian Rasmussen & Andrew Hollingworth

(57) **Dense Regions of View-Invariant Features Promote Object Recognition**
Jeremiah Still, Veronica Dark & Derrick Parkhurst

(58) **Attentional competition modulates parallel visual processing capacity**
Kelly Steelman-Allen & Jason McCarley

(59) **Attentional limitations in a dynamic but gradual multiple-display surveillance task**
Noah Sulman, Thomas Sanocki, Dmitry Goldgof & Rangachar Kasturi

(60) **Looking at oddballs: Target absence influences attention and eye movements in pop-out search**
Eamon Caddigan & Alejandro Lleras

(61) **Partially independent shape processing capacity across visual hemifields**
Yusuke Yamani, Jeffrey Mounts & Jason McCarley

(62) **Assessing Information Processing in the Two Pathways of the Human Visual System**
Steve Holloway, Igor Dolgov & Michael McBeath

(63) **Differential effects of graphics quality on verbal and walking distance judgments in a virtual environment**
Benjamin R. Kunz, Sarah H. Creem-Regehr & William B. Thompson

(64) **Neural dynamics of object perception, attention, and memory during view-invariant object category learning**
Arash Fazl, Stephen Grossberg & Ennio Mingolla

(65) **Illusory Figures in Multiple Object Tracking**
Ryan McKendrick, Harry Haladijian & Zenon Pylyshyn

(66) **Configural Asymmetries in a Visual Search Task**
Mouna Attarha, David Birks & Patrick Monnier

(67) **Uncertainty in visual selective attention**
Edward Vul

(68) **Linguistic control of selective attention: Investigating the Persistence of the Cued Location Effect**
Gregory Davis & Bradley Gibson

(69) **Rapid visual perception of material properties**
Lavanya Sharan, Ruth Rosenholtz & Edward H. Adelson

(70) **Objects Look Lighter when Intending to Lift with a Healthy, not Injured, Co-Actor**
Adam Doerrfeld, Natalie Sebanz & Maggie Shiffrar

(71) **Working Memory and Hierarchical Perception**
Jeong-Im Kim & Glyn Humphreys

Organization, Emotion, & Multisensory Perception 8:15 – 9:00 AM

Session Chair: Joseph L. Brooks, University College London

8:15 **Multisensory synchrony guides attention in dynamic cluttered environments**
Erik Van der Burg[1], Christian N.L. Olivers[1], Adelbert W. Bronkhorst[2], Durk Talsma[1] & Jan Theeuwes[1]
[1]Vrije Universiteit, Amsterdam, The Netherlands
[2]TNO Human Factors, Soesterberg, The Netherlands

Recently, we have shown that a spatially uninformative tone makes a synchronized visual event pop out in visual search. We further investigated this "pip and pop" effect using different methodologies (ERPs, Accuracy, RTs, Temporal Order Judgments). Here we present the results, which suggest that synchronized audiovisual events guide attention due to early integration, and that this effect occurs even when the audiovisual events are irrelevant to the task. Moreover, we show that tactile-visual synchrony too leads to more efficient search. We conclude that multisensory synchrony guides attention in a stimulus-driven fashion.

8:30 **Individual differences in perceptual sensitivity to emotional human movement.**
Martha Kaiser & Maggie Shiffrar
Rutgers University - Newark Campus

Emotion modulates the visual analysis of human action. Specifically, point-light walker detection is enhanced when walkers express anger. This anger-superiority effect is consistent with the neural connections between areas involved in action detection (pSTS) and emotion recognition (amygdala). These areas show dysfunction in autism. We therefore investigated whether the anger-superiority effect varies with the magnitude of observers' autistic traits. Performance in a point-light walker detection task was found to correlate with observers' social abilities such that observers with more autistic traits failed to demonstrate the anger-superiority effect. Thus, visual sensitivity to human action reflects observers' social capabilities.

8:45 **Perceptual organization across hemispheres**
Mitsouko van Assche[1], Pierre Gos[2] & Anne Giersch[1]
[1]Inserm Unit 666, Psychiatry Dpt. of the Civil Hospital, Strasbourg, France
[2]Ecole Normale Supérieure, Lyon, France

Behavioural evidence of a visual interhemispheric transfer cost and possible compensation mechanisms is little described in healthy observers. Using a modified version of the Repetition Discrimination Task (Beck & Palmer; JEP:HPP, 2002) and checking that subjects fixate a central point by means of continuous eyetracking, we show a large slowing down when information has to be compared across rather than within hemifield. This cost is erased by a grouping factor by connectors but not by attentional modulations, or global configuration manipulations. This suggests that the interhemispheric cost is larger than previously thought but incompressible unless structural grouping cues are provided.

Faces, Objects & Scenes 9:15 – 10:15 AM

Session Chair: Kim Curby, Temple University

9:15 **Objects in scenes: Is one system enough?**
Michael L. Mack & Thomas J. Palmeri
Vanderbilt University

The category of objects found within a scene influences both the speed and accuracy of categorizing that scene at a superordinate level (Joubert et al., 2007). One explanation for this result is a two-system account of distinct scene and object processing mechanisms that are in conflict. We explored the simpler alternative of a single-system, scene-perception model. Our results suggest that the effects of object category on scene categorization can be explained by a single scene-perception system that processes the global statistics found in natural scenes.

9:30 **Perceptual Interactions Between Facial Properties**
Rama Amishav & Ruth Kimchi
University of Haifa

We examined the perceptual interactions between facial properties, using Garner's speeded classification paradigm. When upright faces varied on components (eyes, nose, mouth) and configural properties (inter-eyes distance, nose-

mouth distance), participants were unable to selectively attend to components while ignoring irrelevant configural variation, and vice versa. Performance with inverted faces showed asymmetric interference from components to configural properties. When faces varied on only components or only configural properties selective attention to different components or to different configural properties was possible. These results provide strong evidence for mutual perceptual interaction between components and configural properties in upright face perception.

9:45 Facilitation of return during scene viewing
Tim Smith & John Henderson
University of Edinburgh

Inhibition of Return (IOR) is believed to facilitate attentional exploration of a scene. However, evidence for IOR during scene viewing is inconclusive. In this study IOR during scene memorisation and in response to sudden onsets was measured. The results indicate that, contrary to the 'foraging facilitator' hypothesis, saccades to the previous fixation location occur more often than saccades elsewhere, especially in response to an onset. Voluntary refixations experience temporal delay but this does not affect the likelihood of refixation. These results suggest that temporal IOR does exist during scene memorization but functionally it is overridden by facilitation of return.

10:00 Face Recognition with Contrast Chimeras
Ming Meng[1], Sharon Gilad[2] & Pawan Sinha[1]
[1]Massachusetts Institute of Technology
[2]Weizmann Institute of Science

A very robust finding regarding face perception is that contrast negation severely compromises facial recognizability. The causes of this recognition impairment are unclear. Here we propose an account based on behavioral and neuroimaging experiments with 'contrast chimeras', a novel set of facial stimuli that incorporate both positive and negative contrast. We find that 2D ordinal relationships which encode local contrast polarity around the eyes are major determinants of facial recognizability. Destruction of these relationships in negatives may underlie the observed facial processing impairments. More generally, these relationships appear important for enabling identity processing and for eliciting neural activation to faces.

Working Memory
12:45 – 1:45 PM

Session Chair: Artem Belopolsky, Vrije Universiteit Amsterdam

12:45 Express re-engagement of attention but delayed entry into visual short-term memory following invalid spatial cueing: Evidence from the N2pc and SPCN.
Benoit Brisson & Pierre Jolicoeur
Université de Montréal

In predictive spatial cueing studies, response times (RT) are shorter for targets that appear at cued locations (valid trials) than at other locations (invalid trials). Here, we measured the latency of two ERP components: the N2pc, an index of visual selective attention, and the SPCN, an index of visual short-term memory. N2pc latency was unaffected by cue validity whereas SPCN latency was shorter for valid than invalid trials, and this effect was correlated with the RT cueing effect. Results suggest that predictive cueing accelerated the transfer of information into visual short-term memory, but did not accelerate visual selection.

1:00 Selective attention of working memory contents by 11 month-old infants
Mariko Yamaguchi & Lisa Feigenson
Johns Hopkins University

Recent work with adults suggests the existence of a mechanism for selection within working memory. What are the developmental origins of this internal "focus of attention?" We explored 11 month-old infants' ability to remember hidden objects and to update their representations across a series of events. We found that although infants can create new WM items while maintaining others, they fail to update existing WM items once their attention has shifted to other items also being held in WM. This striking limitation may shed light on the early origins of an internal focus of attention.

1:15 Decoding reveals the contents of working memory in human visual cortex
Stephenie Harrison & Frank Tong
Vanderbilt University

A single visual feature such as orientation can be precisely maintained in working memory for many seconds. The extent to which this form of memory relies on abstract representations versus those of a more perceptual nature is unclear. We used fMRI decoding methods to examine percep-

tual contributions, investigating whether activity in early visual areas (V1 – V4) contains information specific to orientations held in working memory. Activity patterns in these areas could reliably predict which of two oriented patterns was maintained in working memory, providing novel evidence that early visual areas store information about the contents of working memory.

1:30 The influence of strategy on working memory guidance of attention
Nancy Carlisle, Leanne Boucher & Geoff Woodman
Vanderbilt University

This study addresses the proposal that working memory guides attention. The current literature in this area has shown disparate results, leading to the proposal that participants' strategies influence whether attention is guided by objects in working memory. In two experiments, we look for individual differences between participants and give instructions designed to manipulate strategy. The results show that there are individual differences in whether attention is guided by working memory, and that instructions can alter the guidance of attention by working memory. These findings suggest strategy is an important factor in the relationship between object based attention and working memory.

Objects & Attention
2:00 – 3:00 PM

Session Chair: Sarah Shomstein, George Washington University

2:00 Auditory object-based attention
Lauren Hecht[1], Brandon Abbs[2] & Shaun Vecera[1]
[1]University of Iowa
[2]Harvard Medical School

Attention can select relevant information based on the objects present in the visual input (ie., object-based attention), but how does attention select information from auditory input? We examined whether auditory attention is also object-based. Participants listened to two simultaneous, spatially superimposed auditory objects and reported two features, either both from the same object or one from each object. Despite being equally accurate for reports on the same object, participants were significantly worse when reporting features from different objects (ie., an object-based effect). Thus, attention is sensitive to not only visual objects but also to auditory objects.

2:15 Context-free inhibition: attentional biases transfer strongly across temporal and spatial search tasks.
Brian Levinthal & Alejandro Lleras
University of Illinois at Urbana-Champaign

The distractor previewing effect (DPE) refers to the finding that, in oddball search tasks, selection of the oddball is impaired when the target belongs to the same visual category as the distractors on the preceding trial. Recently, an analogous effect was observed in temporal search tasks. We studied the extent to which these attentional biases are task-specific and found complete transfer across tasks: attentional biases created during spatial search tasks affect selection in temporal search tasks, and vice-versa, and in equal amounts to biases created within the same search context.

2:30 Object-based attention is "turned off" by top-down control
Louis K. H. Chan & William G. Hayward
University of Hong Kong

This study investigated whether object-based attention could be overridden by top-down control. In the first experiment, we replicated the same-object advantage by a modified "two-rectangle" method. In the second experiment, the target occurred at either of the cued- or uncued- object positions, equidistant to the cue. When the target occurred more at the cued object (80%), a same-object advantage was resulted; when the target occurred less at the cued object (20%), the effect disappeared. This suggests that object-based attention is a flexible mechanism that is modifiable by top-down knowledge.

2:45 Perceptual load-induced selection as a consequence of local spatial interactions
Ana Torralbo & Diane Beck
University of Illinois at Urbana-Champaign

Perceptual load has been proposed as a determining factor in the degree to which unattended information is processed. Although there is considerable support for this theory, there is currently no a priori definition of what constitutes high or low perceptual load. We propose that local competitive interactions in visual cortex determine the perceptual load of the task. Two variables that affect the degree of spatial interactions in visual cortex are manipulated, showing a pattern of results akin to that of perceptual load. Results are discussed in the context of a neural framework of perceptual resources.

POSTER SESSION
10:15 – 11:45

(1) **Scene-Motion Thresholds as a Function of Head Motion**

Jason Jerald[1], Frank Steinicke[2] & Mary Whitton[1]
[1]UNC-Chapel Hill
[2]University of Münster

We determined scene-velocity thresholds as subjects yawed their heads. Stimuli were presented during four visibility conditions: visible during the beginning, center, end of the head turn, and during the entire head turn. Psychometric surfaces, from which thresholds were extracted, were created as functions of scene velocity and 1) peak angular head velocity and 2) peak angular head acceleration. We found that scene-velocity thresholds increased as head motion increased for all tested conditions.

(2) **The role of sex differences and sensation seeking in spatial orienting of attention**

Yukihisa Matsuda & Shoichi Iwasaki
Graduate school of Information Sciences, Tohoku University

We investigated sex differences in the relationship between two types of attention and individual differences in novelty seeking. Exogenous and endogenous attention were examined in 66 undergraduates using two types of Posner's cueing method. All of them completed the Sensation Seeking Style scales (Zuckerman, 1979). The results suggested that high sensation seekers showed strong attentional capture compared with low sensation seekers in males. In contrast, intriguingly, this relationship was reversed in females. According to dopaminergic neurotransmission study, the difference of dopamine release between male and female may play a role in the present results.

(3) **Is inhibition of return blind to stimulus value?**

Helena Rutherford & Jane Raymond
Bangor University

Inhibition of return (IOR) describes slower responding to visual targets presented at previously attended versus unattended locations. Here we investigated whether IOR is sensitive to the emotional value of target stimuli. Using a spatial cuing paradigm, participants localized negative (spiders, angry faces) and neutral (objects, neutral faces) targets. IOR was reduced after successive trials responding to negative targets, but was restored after responding to neutral targets. By comparing results from mixed and blocked experiments, we found that, once initiated, IOR mechanisms are 'blind' to target content, but are sensitive to current affective states induced by sustained exposure to threatening stimuli.

(4) **Tracking invisible objects across viewpoint changes**

Markus Huff[1], Hauke S. Meyerhoff[1], Georg Jahn[2] & Stephan Schwan[1]
[1]Knowledge Media Research Center
[2]University of Greifswald

Research on multiple object tracking recently questioned whether tracking mechanisms predominantly use retinocentric or allocentric coordinates. We conducted an experiment varying the visibility of moving objects during viewpoint changes. Abrupt viewpoint changes strongly impaired tracking with visible and invisible objects. However, smooth viewpoint changes did not impair tracking of visible objects and even tracking of invisible objects was only slightly impaired. These results are consistent with either an updating process that tracks retinocentric indices on visibly moving background patterns or an allocentric mechanism using scene coordinates which are unaffected by viewpoint changes. Further research should differentiate between these processes.

(5) **Context influences 2nd order relational processing of non-face objects**

Heath Matheson & Patricia McMullen
Dalhousie University

The present study investigated observer sensitivity to the 2nd order configural relations of features (distances between features) within face and non-face stimuli using Just Noticeable Differences (JNDs). Contrary to existing theories, inverting both faces and houses reduced sensitivity to 2nd order relational information when they were presented within the same task. However, when the house stimuli were presented separately inversion failed to reduce sensitivity to 2nd order relational information in them. Together these results suggest that 2nd order relational processing can be flexibly applied to non-face objects when they are presented in the context of faces.

(6) **Perceptual Load and Working Memory Load on Attentional Capture**

Bryan Burnham, Gia Pittaluga, Joe Mertens & Lindsay Greiner
University of Scranton

The load theory of attention proposes that perceptual characteristics of the visual field mediate attending to items and working memory load mediates top-down attentional control. The pre-

dictions of the load theory were tested using an attentional capture paradigm. Observers located a visual target while ignoring a color-singleton. Across three experiments the perceptual characteristics of the target display were varied and in each experiment the observers' working memory load was varied. Attentional capture decreased when the perceptual characteristics of the display decreased the color singleton's salience; however, increasing working memory load had negligible effects on attentional control.

(7) Object recall as a function of spatial context and subject's intention to learn.
Anna Manelis, Catherine Hanson & Stephen Jose Hanson
Rutgers, The State University of New Jersey

We examined incidental and intentional learning of objects that appeared in a single location (constant objects) or in variable locations (variable objects). In the incidental learning condition, subjects recalled more variable objects compared to constant objects. In the intentional learning condition, subjects recalled more constant objects compared to variable objects. Intentional learning was beneficial only for recall of constant objects, but not for recall of variable objects. Our findings suggest that 1) variability of spatial information facilitates incidental learning by making neural representations of the object more distributed and 2) incidental learning takes over when working memory capacity is overloaded.

(8) Pupillometry and Translators' Translation Directionality
Chieh-Ying Chang[1,2], Fabiana Gordon[2] & Gabriela Saldanha[3]
[1]Harvard University
[2]Imperial College London
[3]University of Birmingham

It has been posited that translating into a second language (A>B) is cognitively more demanding than into a first language (B>A), a phenomenon called 'translation asymmetry', and that this phenomenon was less prominent as second language competence improves. The study aimed to test this phenomenon in bilingual, trained translators to see if the phenomenon was less prominent in these highly proficient bilinguals. Results demonstrated that, regardless of their high second-language capacity, A>B translation was still cognitively more demanding than B>A translation, based on such ocular measures as pupillometry or pupil size and fixation numbers.

(9) Individual Differences in Eye Movement Patterns during Encoding and Retrieval of Own- and Other-Race Faces
A. Caglar Tas & Aysecan Boduroglu
Bogazici University, Istanbul, TURKEY

Eye-movement data was collected during a face recognition task to investigate where people direct attention while learning and recognizing own- and other-race faces. Individuals using identical face processing strategies during encoding and recognition were more likely to be correct in the recognition task. Also, we found that in the recognition task, participants used different processing strategies for photographs judged as previously seen versus unseen, independent of whether these photographs were actually old or new. Contrary to claims that people process own-race faces holistically, and other-race faces analytically, we found no evidence for such differences.

(10) Is that you? Observer's own actions impact their visual perception of human action.
Ekaterina Dobryakova & Maggie Shiffrar
Rutgers University - Newark

Perception-action coupling theories posit that action perception involves the covert simulation of observed actions and further, that visual sensitivity to an observed action depends upon the similarity between observed and simulated actions. To test this assumption, participants rowed or marched while viewing life-size point-light videos of rowing or marching actions. Each video depicted either the participant or another person. On each trial, observers reported whether or not they were depicted in that video. Identity discrimination performance was best when observers simultaneously performed and observed the same action. This supports the link between action perception and action production.

(11) Put Down the Controller!: A Negative Effect of Playing Video Games on Proactive Cognitive Control
Kira Bailey, Robert West & Craig Anderson
Iowa State University

Playing video games represents a popular source of entertainment for children and young adults in industrialized nations. Prior research has demonstrated a beneficial effect of video game experience on visuospatial cognition. Here we demonstrate that video game experience has a disruptive effect on proactive cognitive control in selective attention and affective processing

tasks. These data reveal that all effects of video game experience may not be beneficial, cautioning the use of these media as tools for training and remediation.

(12) Goldie Locks was right: ERP correlates of control processes associated with variation in response time
Zachary Roper, Courtney Varley & Robert West
Iowa State University

In two experiments we used event-related brain potentials to examine the neural correlates of variation in response time. The amplitude of the CNV increased from the slowest to the fastest trials and the distribution of this effect was sensitive to the congruity of the upcoming trial. The amplitude of the N2 increased from the slowest to the fastest trials, revealing an effect of preparatory processing on early visual processing. In contrast, later slow wave activity distinguished the fastest and slowest trials from the intermediate trials, possibly revealing a neural system that serves to maintain optimal task performance over time.

(13) Unique surface features are held in visual working memory to facilitate attentive tracking
Tal Makovski & Yuhong Jiang
University of Minnesota

To what extent do surface features assist attentive tracking? We asked participants to track identical or uniquely-colored objects. Tracking was enhanced when objects were all unique. The benefit was greater when the distances between distractors and targets were smaller, but was eliminated when the objects constantly changed color, even though they were always uniquely colored. Additionally, tracking uniquely-colored objects impaired a secondary color-memory task more than tracking identical objects. Contrary to previous studies showing that feature information is poorly retained during tracking, these findings indicate that surface properties are stored in visual working memory to facilitate tracking.

(14) The influence of task demands on ERP correlates of face processing after controlling for interstimulus perceptual variance.
Jonathan Kahl, Robert West, Eric Cooper & Ashley Scolaro
Iowa State University

A number of ERP components appear to be specific to face processing. Nonetheless, researchers have provided evidence that questions the selectivity of some of the face processing components. The current study examined the selectivity of face processing components by having participants perform two tasks (a categorical task and a coordinate task) on two classes of stimuli (faces and animals) while controlling for the ISPV for each class of stimuli. The N170 was selective to faces and was insensitive to task. The N250r and P600 distinguished abnormal from normal faces. We also observed a posterior positivity that distinguished animals from faces.

(15) The neural correlates of interacting objects
Jiye G. Kim & Irving Biederman
University of Southern California

A pair of objects can be depicted side-by-side or interacting. Epstein et al. (1960) showed that the depiction of interacting objects (e.g., a pipe on a clock) facilitated cued recall than when the same images were shown side-by-side. The saliency of object interactions, readily described by prepositions or gerunds, is immediately appreciated. What are the neural correlates of these interactions? Does familiarity of the interaction matter? Interactions produced greater BOLD activity both in the LOC and PHC. Novelty of the interactions magnified this gain, an effect that was absent in the side-by-side depictions.

(16) The Effect of Heat and Discomfort on Slope Perception
Alex Essenmacher & Ranxiao Wang
University of Illinois at Urbana-Champaign

Visual judgment of slope steepness can be overestimated and affected by one's physical conditions (e.g., exercise and heavy weight). We examined the effect of psychological factors on slope perception in tabletop scale. Participants judged the slant of cardboard slopes either in normal or hot temperature conditions and rated their subjective stress, comfort, and tiredness. Results showed that systematic overestimation occurs and perceived discomfort increased the judgment bias. However, neither stress nor tiredness, which is an indication of physiological potential, affects the judgment. These results suggest the importance of psychological attributes, possibly induced by physical manipulations, on slope judgment.

(17) The Attentional Boost Effect in Scene Perception
Khena Swallow & Yuhong Jiang
University of Minnesota

Several theories of perception suggest that changes in task context (e.g., a stoplight changes from green to yellow) produce a brief increase in perceptual processing of the global scene. We used a dual-task design to evaluate whether

detecting white square targets among a stream of black squares can temporarily boost performance on a concurrent scene-encoding task. Despite the potential for target detection to interfere with encoding, scenes encoded when targets appeared were later better recognized than scenes encoded when distractors appeared. These data suggest that increasing attention to one task can facilitate scene perception and memory.

(18) Frequent Shifts of a Scene Interrupt Change Detection
Ryoichi Nakashima & Kazuhiko Yokosawa
The University of Tokyo

Coherence theory assumes that change blindness occurs because change detection is a serial process involving successive comparisons between local representations of a scene. In this study, we examined whether change detection in natural scenes depends on sequentially local processing (as in conventional visual search). We manipulated scene shift frequency and found, consistent with coherence theory, that performance was degraded with very frequent scene shifts, i. e., when available search time was short. This result reinforced the assumption that change detection entails serial search (Yokosawa & Mitsumatsu, 2003), even when the task involves a natural scene.

(19) Influences of Rule-Based and Information-Integrated Category Learning on Similarity Space.
Takashi Suegami & Chikashi Michimata
Sophia University

The effect of rule-based (RB) and information-integrated (II) category learning on the similarity space were assessed by comparing a 9-point similarity rating score between category learning group and no category learning group. The results showed that RB category learning increased the similarity for the within-category pair, but not affect the one for the between-category pair. II category leaning did not affect the similarity for both within- and between-category pairs. Our results suggest that only RB category leaning affects the similarity space. The relation between category learning and categorical perception was discussed.

(20) Object-based Attention Selection of Non-uniform Objects with Changing Surfaces
Wah Pheow Tan & Veronica J. Dark
Iowa State University

Previous studies suggested that surface uniformity is required for object-based attentional selection (Watson & Kramer, 1999) unless the surface changes of non-uniform objects occurred at part boundaries (Hecht & Vecera, 2007). We explored whether non-uniform objects with dynamic surface changes not at part boundaries could be selected by object-based attention. The surface color changed over 1000ms such that a uniform surface was demonstrated either at the beginning (Experiment 1) or the end (Experiment 2). An object-based effect was observed for the non-uniform objects with changing surfaces. This suggests that object-based attention could select non-uniform objects with changing surfaces.

(21) Influences of spatial and nonspatial contextual information on visual object memory
Hsin-Mei Sun & Robert D. Gordon
North Dakota State University

Two experiments examined the influence of spatial and nonspatial contextual information on visual object memory with a change detection task. Participants were asked to view images of object arrays and identify whether a target object's orientation was the same as it appeared during initial viewing or changed. Spatial and nonspatial properties of the array context were manipulated independently. We found that change detection performance was significantly better when either spatial or nonspatial contextual information remained the same in the test image. The results showed that both spatial and nonspatial contextual information affect visual object memory performance.

(22) The Time-Course of Holistic Processing of Faces
Jennifer Richler, Michael Mack, Isabel Gauthier & Thomas Palmeri
Vanderbilt University

We explored the time-course of failures of selective attention used to infer holistic processing (HP) of faces by manipulating the exposure duration of either the test (Experiment 1) or study (Experiment 2) face in a sequential matching task. HP was observed for exposure durations beginning at 50ms, remained stable in magnitude from 83-800ms, and was unaffected by whether exposure for the test or study face was limited. These results suggest that HP is does not arise during encoding and could be consistent with extant models of face and object processing, if these models include a temporal dimension.

(23) How Stroop-Like is Stroop-Like?

Chris Koch & Jennifer Brogan
George Fox University

In the color-word Stroop task, subjects identify the color print of a color word. Response times are longer when the color print and color word are incongruent. Therefore, the color word interferes with naming the color print. However, the color print does not slow reading color words unless subjects have extensive practice on the color naming task (Stroop, 1935). Modified Stroop tasks use a similar construction as the color-word task. These tasks are often referred to as being Stroop-like. This study examines patterns of Stroop and reverse Stroop interference using a facial-emotion Stroop-like task.

(24) The Impact of Object Motion on Perceptual Categorization

Olga Falmier[1] & Michael Young[2]
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This study examined the extent to which individuals integrated motion dimensions (motion path was compared to the deformation of an object and its changing speed). Experiment 1 equated the three motion dimensions with respect to discriminability. Experiment 2 compared the relative contribution of two equated dimensions in both clear and obscured viewing conditions with instructions either present or absent. Experiment 3 examined the attentional shift between two dimensions. The relative control depended on a combination of dimensions. Instructions affected the relative control. Categorization by motion was similarity- rather than rule-based thus suggesting that the motion dimensions tested were integral.

(25) Screen versus hard copy: Reading faster from an LCD monitor than from Paper

Leanne Stefano[1] & Andrew Herbert[2]
[1]Rochester Institute of Technology
[2]Department of Psychology, RIT

Previous research indicated reading speeds were faster for materials printed on paper as opposed to on a video display unit (VDU). These studies were conducted before WYSIWYG presentation of text was routine. This study compared speed in a proofreading task for text passages presented on paper and LCD. Text size, contrast, viewing distance, and stimulus orientation were constant for both media. In a within-subjects design reading speeds were significantly faster for LCD presentation than paper printout ($t24 = 2.421$, $p<.05$). Two possible explanations for this result include user experience with on screen text and higher quality, larger VDUs.

(26) Global form sensitivity in 4-6 month old infants depends on local processing

Melanie Palomares, Anthony Norcia & Mark Pettet
The Smith-Kettlewell Eye Research Institute

We evaluated the development of global integration by measuring Visual Evoked Potentials (VEPs) in young infants to Glass patterns, moirés created from a sparse random dot field paired with its rotated, expanded or translated copy. Infants showed sensitivity to the appearance of the local dots, but insensitivity to the global structure of the Glass patterns. Responses were significant only when the dot pairs were connected with lines (Expts. 1-2). Poor responses to Glass pattern structure were not simply due to poor contrast sensitivity (Expt. 3), but due to inefficient extraction of local orientation generated by the dot pairs.

(27) Aesthetics and Object Perception: Experiments in Spatial Composition

Jonathan Gardner & Stephen Palmer
University of California, Berkeley

An almost completely overlooked aspect of object and scene perception is the observer's aesthetic response to spatial composition. Our current psychophysical research on pictures of a single object shows that people prefer the object to be located toward the center of the frame and facing into, rather than out of, the frame (Palmer, Gardner, & Wickens, in press). Further experiments demonstrate that these effects are robust and systematic in both the horizontal and vertical dimensions. The notion that aesthetic judgments reflect "fluency," or ease of perception, and its implications for object and scene perception will be discussed.

(28) Is Prosopagnosia a Deficit in Computing Within Object Distances?

Ashley Scolaro, Eric Cooper & Jonathan Kahl
Iowa State University

Recent research shows that prosopagnosics have difficulty computing within but not between object distances, and it has been suggested that the inability to compute the distances of primitives within an object may prosopagnosic's face recognition deficits. We tested whether a prosopagnosic patient would show deficits in computing distances between and within both face and non-face objects while keeping the distances the prosopagnosic was required to discriminate constant across the between and within object tasks. The results provide no reason to suppose that prosopagnosics are different than controls on their ability to perform within and between object distance discriminations.

(29) Spatially Selective Attention to Impossible Locations

Cassidy Sterling & Bruce Bridgeman
University of California, Santa Cruz

Auditory attention can be directed to locations in the space surrounding an observer. However, sounds can also be perceived at physically impossible locations inside the head, when earphones suppress spatial filtering by the pinnas. We investigated attentional shifts to locations inside the head on the left or the right of the centerline by manipulating intensities of high-frequency tones presented through earphones. In a modified Posner paradigm, we found faster reaction times to tones in the same location as a cue than to tones in a different location, indicating that selective attention to particular locations inside the head is possible.

(30) Do visual and auditory working memory share the same capacity limit? A potential resolution to the debate.

Daryl Fougnie & René Marois
Vanderbilt University

Researchers disagree on whether working memory (WM) storage capacity is set by modality-specific stores (Baddeley, 1986) or by a domain-general storage system (Cowan, 2001). Recently, Saults & Cowan (2007) suggested that visual and auditory WM tasks share the same capacity limit because combined dual-task capacity was no greater than the higher single-task capacity. However, this comparison may over-estimate dual-task costs when there is a large disparity between the single-task capacities. Here we show that when single-task capacity is equated, the capacity limits of visual and auditory WM are partially distinct from one another.

(31) The occlusion illusion: Stereoscopic evidence of partial modal completion

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

In the occlusion illusion, the visible portion of a partly occluded "target" appears larger than a non-occluded, physically identical "standard" (Kanizsa, 1979). Previous work using flat displays suggested that partial modal completion provides a better explanation than apparent distance (Palmer, Brooks & Lai, 2007). The present studies using stereoscopic displays definitively rule out apparent distance explanations by showing that the illusion is robustly present even when the apparent distances of the target and standard are the same. We conclude that partial modal completion occurs, in addition to amodal completion, whenever an object is perceived as partly occluded.

(32) How is quantity bound to specific objects?

Liat Goldfarb & Anne Treisman
Princeton University

Recognizing objects' identities in the surroundings is important, but it is also important to identity the quantity of each object. We performed an fMRI-adaptation experiment and examined three hypotheses concerning the way feature quantity is represented (e.g.: how the number of each different letter is represented in the string "LTLL"). Hypothesis1: number areas represent it. Hypothesis2: the specific feature areas (e.g.: letter areas) represent it. Hypothesis3: feature quantity is unique-it is represented twice: once in the number and once in the specific feature areas (e.g.: the letter areas). The results best fit this last hypothesis.

(33) Detecting changes in a multi-element display

Cheng-Ta Yang, Cheng-Ta Yang, Yung-Fong Hsu & Yei-Yu yeh
National Taiwan University

We examined how observers detect changes in a multi-element display. A change detection task was performed. Four gabor patches were presented. Changes in luminance and orientation were independently manipulated with two levels of ambiguity. Moreover, the redundant signals may occur at either the same or separate two object locations. Results showed that the decision process was parallel self-terminating when signals occurred at the same object location. Conversely, decision process was either coactive with supercapacity or parallel exhaustive with limited capacity when signals occurred at different object locations. Individual differences were also observed.

(34) Tracking objects and actions through codes of conflict

Michiel Spapé & Bernhard Hommel
Leiden University Institute for Psychological Research

People are slower to respond with the right hand to left-appearing stimuli, and vice versa, than when location and response correspond. Like other conflict incurring phenomena, this Simon effect is known to drastically change or even reverse after non-corresponding trials, presumably due to control mechanisms that adapt to conflict. Several authors have pointed out that executive control may work by locally adapting to conflicting stimuli/responses. By rotating the Simon stimuli in between two trials, we go further, providing evidence that control parameters are integrated along with lower-level features that are retrieved when coping with current conflict.

(35) The role of executive working memory in visual search: What difference does high load make?
Jibo He & Jason McCarley
University of Illinois

Loading executive working memory with a secondary task slows visual search (Han & Kim, 2004). One possible account of this effect is that executive load hinders foveal object identification in the course of search (Peterson et al., 2008). We designed a dual-task experiment using a directed visual search task (Hooge & Erkelens, 1998, 1999) to test this hypothesis. In directed search conditions, distractors faced in the direction of the target, offering information to guide search. Data showed equal benefits of directed search under high and low load. Results imply that high executive load does not compromise foveal identification in visual search.

(36) Study of the short-term memory capacity through the attentional blink paradigm
Ljubisa Placé & Christophe Boujon
Laboratoire de Psychologie "Processus de Pensée et Interventions"

Through the attentional blink paradigm is studied the capacity of short-term memory. The attentional blink effect is an impaired detection of the second target (T2), during 500 msec after the identification of a first (T1). Two experiments were conducted. The number of T1 letters was manipulated: 1 to 5 letters T1 were to be identified simultaneously. Differences are obtained concerning identification of T1 and detection of T2, according to the number of letters T1 that must be identified. In accordance with Cowan (2001), these results reveal that the capacity of short-term memory is 3 or 4 elements maximum.

(37) Unseen objects can contribute to visual size averaging
Heeyoung Choo & Steven Franconeri
Northwestern University

People can rapidly extract average size information from a set of objects. Here we explored whether this average is computed using a late representation of the display that has undergone iterative processing, or an initial representation. Using object substitution masking we observed that masked circles strongly influenced size averages even though they were not consciously perceived. We also observed that the four-dot mask itself could also contribute to the size average, but only when it blocks conscious access to the masked objects. The results suggest that the average size information arises from the initial representation before conscious perception.

(38) The congruency sequence effect in the face-name Stroop task.
Yang Seok Cho, Jong Moon Choi, Jaeyong Lee & Yu Mi Kim
Korea University

The amount of interference caused by task-irrelevant information is smaller when it is incongruent on the previous trial than when it is congruent. Recently, it was proposed that this effect is due to integration of stimulus and response features, rather than to the conflict sequence. In this study, a face-name Stroop task was conducted to examine whether the congruency sequence effect is due to conflict adaptation or feature integration. The results showed that the congruency sequence effect was modulated by whether a relevant/irrelevant feature or none was repeated. These results are inconsistent with the two accounts' predictions.

(39) Anatomical and Attentional Effects in Bimanual Simple Reaction Times
Antonello Pellicano[1], Valeria Barna[2], Sandro Rubichi[3] & Roberto Nicoletti[1]
[1]Università di Bologna
[2]Università di Padova
[3]Università di Modena - Reggio Emilia

In simple reaction tasks, performance is faster with uncrossed than with crossed responding hand-stimulus position combinations. The difference between crossed and uncrossed responses (CUD) indicates callosal transfer-time. We investigated the role of anatomical and attentional factors on the CUD employing bimanual responses. In Experiment 1, a CUD based on anatomical factors was obtained with natural hands position. In Experiment 2, the CUD was eliminated with crossed hands suggesting that attention was allocated on the bimanual response favoring the coding of its left-right key components: the resulting stimulus-response spatial correspondence eliminated the effects of anatomical factors.

(40) When does the visual attention shrink toward object?
Ryosuke Niimi & Manabu Tanifuji
RIKEN BSI

Using a dual-task procedure in which participants detected the peripheral probe with their attention focused to the central object, the dynamic transformation of the spatial extent of visual attention was investigated. Results showed that the detection of peripheral probe was impaired when the probe appeared immediately after (~200 ms)

or late after (500~ ms) the onset of attended object. This finding suggests that the attention to object is set anew and narrowed gradually after every onset of the object to be attended.

(41) Spatial and Organizational Aspects of Hierarchical Attentional Focusing
Menahem Yeari & Morris Goldsmith
University of Haifa

Is the focusing of visual attention object based, space-based or both? We compared the identification of targets in hierarchical, compound-letter stimuli, orthogonally varying global size (large vs. small), and organizational complexity: 2-level structure (a global letter composed of local letters) versus 3-level structure (a global letter composed of squares composed of local letters). Participants successively identified the global and local letters in each same trial. Longer overall RT were observed for both large versus small and 3-level versus 2-level stimuli, indicating that attentional focusing are affected by both spatial and organizational factors.

(42) Encoding the shape of holes in visual working memory
Sung-Ho Kim
Rutgers University-New Brunswick

The present study examined how much memory load is required to encode the shape of holes in a change detection task. Compared to the conjunction display where orientation and color features to be remembered was assigned to different parts, in the hole display both features could be assigned to the same part, so change detection performance was expected to be better via object-based feature binding. However, the results revealed that performance in the hole display did not differ from that in the conjunction display, suggesting that the shape of holes is encoded with the same load as their complements.

(43) Auditory information affects visual sensitivity to biological motion
James Thomas & Maggie Shiffrar
Rutgers University

The Superior Temporal Sulcus is involved in the visual analysis of human action and multisensory integration. Two psychophysical studies tested whether visual sensitivity to human action increases when converging cues are available from another modality; namely, audition. Participants detected the presence of point-light walkers in a mask under unimodal (vision only) or bimodal (audiovisual) conditions. Auditory stimuli consisted of tone beeps (study 1), or veridical footfalls (study 2) coincident with the visible walkers' footsteps. Detection performance improved significantly only when visual footsteps were paired with auditory footfalls. Veridical and coincident auditory cues influence visual sensitivity to human movement.

(44) Do Canonical Views of Objects and Scenes Differ?
J. Stephen Higgins & Ranxiao Frances Wang
University of Illinois Urbana-Champaign

Some views are more special than others for both objects and scenes. Canonical views of objects are reported to be from an oblique angle while those from scenes are from a straight on view. In this study a direct comparison between canonical views of objects and scenes was performed by constructing a stimuli set that was identical except for a single difference between objects and scenes - connectedness. Results demonstrated that in a basic preference task observers chose oblique views for objects and straight on views for scenes. When task and stimuli were varied participants showed different preferences.

(45) Aging effects on the processing and the integration of redundant visual signals
Boaz M. Ben-David[1], Ami Eidels[2] & Wu Yan Lulu Li[1]
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We investigate the effect of aging on response times and on the processing capacity of redundant-visual signals. In the redundant target design, an observer detects the presence of a target. A trial can include two (redundant), single, or no-targets. A new approach to capacity (Townsend & Nozawa, 1995) compares the processing of single- and redundant-target trials to compute an index of workload capacity. We compared target-detection latencies and Townsend's capacity for younger- and older-adults and examined the effects of distractor presence and absence for both groups.

(46) Processing of briefly presented natural scenes: are people bound to the chairs they are sitting on?
Ekaterina Pechenkova[1,2], Mary Potter[2] & Bradley Wyble[2]
[1]Lomonosov Moscow State University
[2]Massachusetts Institute of Technology

For rapid serial visual presentation of images, we do not find evidence that elements of a natural scene are processed together as a holistic representation, even when those parts are tightly integrated in the scene, as when a person sits on a chair. The proportion of binding errors (when

objects from different frames are miscombined) is the same for natural scenes as for artificial alphanumerical combinations.

(47) Target memory superiority in undefined visual search

Mark Thomas & Carrick Williams
Mississippi State University

An undefined visual search task was used to determine if providing semantic labels prior to search helps to bolster visual memory for target objects compared to distractors. Participants determined if a singleton real-world object was present in a display or if all objects had an exact match. Although not defined prior to search, singleton targets were remembered better than all distractor types, suggesting that target objects are processed differently than distractors even when not defined prior to search. However, predefined conjunction targets from a second experiment were remembered better than singleton targets, indicating that semantic labels aid visual memory.

(48) Attentional Uncertainty in the Stroop Priming Task

Brandy Johnson & Sharon Mutter
Western Kentucky University

There is extensive evidence that structures in the dorsolateral prefrontal cortex (i.e. the anterior attentional system) are susceptible to normal aging processes, whereas structural changes in the posterior attentional system are minimal. Using the Stroop priming task, we investigated whether reducing the involvement of the anterior attentional system by pre-cuing the location of the target stimulus would eliminate age differences in interference. Older adults continued to be susceptible to interference when the location cue was ambiguous or invalid, but were less susceptible when the target location of a stimulus was presented with a valid cue.

(49) The Crossed-Uncrossed Difference in normal and callosotomized individuals

Catherine Ouimet[1], Pierre Jolicoeur[1], Jeff Miller[2], Alexia Ptito[1] & Lassonde Maryse[1]
[1]Université de Montréal
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The aim of this study was to investigate the Crossed-Uncrossed Difference (CUD) in normal and callosotomized individuals. The CUD refers to the subtraction of mean RTs of uncrossed hand-visual hemifield combination from crossed hand-visual hemifield combination. The CUD has traditionally been investigated with a paradigm consisting of the detection of lateralized stimuli using unimanual responses and has been approximated to 3 ms and 10-70 ms in normal and callosotomized individuals respectively. One of the contributions of the present study was to report a similar pattern of CUD for bimanual responses. Implications of our findings are discussed.

(50) Object-based Attention in Dynamic Displays

Leslie Drummond & Sarah Shomstein
The George Washington University

The use of dynamic displays to examine the interaction of space and object-based reference frames has focused almost exclusively on inhibition of return as a measure (Becker & Egeth, 2000). We used a modified two-rectangle paradigm to examine attentional benefits of spatial and object based reference frames. The two rectangle outlines rotated 90° clockwise/counter-clockwise resulting in non-matching space and object locations. Results suggest that in dynamic displays, space-based attention is inefficient for guiding attention, while the object-based reference frame becomes more stable and dominant thus guiding attentional selection (i.e., attention tracks rotated objects).

(51) Dissociating cognitive operations in working memory

Benjamin Rosenau & Steven Yantis
Johns Hopkins University

Working memory (WM) consists of both active storage and an executive mechanism for encoding, updating, flushing, or otherwise manipulating stored information. Though updating the contents of WM is often assumed to be a unitary process, different types of update operations may be distinguished. Two such operations are the replacement of one item with another, and the modification of an existing item. We required subjects to either replace or increment (modify) digits held in WM during rapid event-related fMRI. These operations yielded different patterns of both response time and brain activity, suggesting that they represent functionally distinct executive operations.

(52) Comparing Salience and Perceptual Load in Visual Selective Attention

Adam Biggs & Brad Gibson
University of Notre Dame

Perceptual load theory (Lavie, 1995) has been shown to explain interference in the presence of a singleton distractor (Gibson & Bryant, 2008). However, recent evidence suggests item salience better accounts for determining interference

than perceptual load (Eltiti, Wallace, & Fox, 2005). The present study directly compared these two claims by combining the methodology of Gibson and Bryant with the interference measure of Eltiti et al. Results show a reduction in interference between perceptual load conditions, but the interference in high perceptual load remained significant. This finding supports an interactive role of perceptual load and salience in visual selection.

(53) The time course of neural activity in object-based visual attention

Linda Moya[1,2], Sarah Shomstein[3], Anto Bagic[4] & Marlene Behrmann[1,2]
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Visual attention can select perceptual objects in their entirety for preferential processing. Behavioral studies have found an object-based attention (OBA) reaction time advantage for shifting attention within a perceptual object, versus between objects an equal distance. An fMRI study by Shomstein and Behrmann (2006) found that posterior parietal cortex (PPC) and early visual cortex were differentially sensitive to object-based properties of visual input. The present research explores the temporal dynamics of OBA with magnetoencephalography (MEG) neuroimaging. Findings provide temporal data that are compatible with the account that frontal/parietal areas modulate more posterior areas during OBA.

(54) Shapes and Spaces: How Do Adults and Children Perceive Spatial Arrays?

Amy Clements-Stephens, Gisselle McKell-Jeffers, Jean-Marie Maddux & Amy Shelton
Johns Hopkins University

To address the fundamental question of how humans perceive and organize spatial information, this study addressed whether features of to-be-reconstructed displays might invoke different organizational processes with different developmental timecourses. Children and adults were asked to reconstruct arrays of objects that varied in the uniformity of the elements. Our results showed differential performance depending on whether the displays were comprised of uniform elements or multi-colored elements that shifted with age. The results provide preliminary evidence for the use of different processes as a function of display elements.

(55) Perceptual Load Modulates Attention Capture By Dynamic Stimuli

Joshua Cosman & Shaun Vecera
University of Iowa

Dynamic stimuli such as abrupt onsets and motion onsets have been shown to capture attention even when they are task irrelevant, leading to the suggestion that such stimuli capture attention in a purely stimulus-driven manner. However, since attention is a limited capacity mechanism, there is a possibility that increasing the attentional demands (i.e., "perceptual load") of a search task may modulate attention capture by dynamic stimuli. Here we show that attention capture by dynamic stimuli is modulated by perceptual load, suggesting that such capture is not mandatory, but is contingent on the availability of attentional resources.

(56) The Capacity for Spatial Updating in Visual Short-term Memory

Ian Rasmussen & Andrew Hollingworth
University of Iowa

In MOT studies, people can track locations of 4-7 moving objects. Additionally, it has been hypothesized in the object-file literature that as an object moves, the association between object position and surface features is automatically updated. However, people are often poor at recalling non-spatial features associated with tracked objects. In the present study, we examined the capacity for updating the association between object location and surface features. Our results indicate that VSTM is used to update these bindings in an object-based manner. However, participants can update only a subset of objects in VSTM, approximately two.

(57) Dense Regions of View-Invariant Features Promote Object Recognition

Jeremiah Still, Veronica Dark & Derrick Parkhurst
Iowa State University

Using SIFT (Scale Invariant Feature Transform), a computer vision algorithm, Still, Dark, and Parkhurst (2007) showed that eye fixations are linked to regions containing high proportions of SIFT view-invariant features. We examined whether regions of invariance affect object naming accuracy. Participants named fragmented images displaying 20%, 40%, 60%, or 80% of the pixels of photographs of complex objects. Displayed pixels were chosen based either on random or view-invariant features. Object naming accuracy was better when regions of invariance were shown, especially with 40% or fewer pixels. Regions of invariance appear to play a role in human object recognition.

(58) Attentional competition modulates parallel visual processing capacity
Kelly Steelman-Allen & Jason McCarley
University of Illinois at Urbana-Champaign

Modern theories of attention view selection as a competition between objects for the control of visual receptive fields (RFs). Implicit in this framework is the possibility that spatially separated objects may be processed in parallel. Conversely, objects near one another may require serial attention. The present experiment used Bundesen et al.'s (2003) multifeature whole report paradigm to test this possibility. Data were well-fit by a model assuming independent parallel processing of attended objects at all target-target separations. Results suggest that attentional competition for RFs reduces parallel visual processing capacity.

(59) Attentional limitations in a dynamic but gradual multiple-display surveillance task
Noah Sulman, Thomas Sanocki, Dmitry Goldgof & Rangachar Kasturi
University of South Florida

Most investigations of visual attention fail to capture the evolving and continuous nature of visual events. The attentional demands of perceiving multiple, gradually evolving events was evaluated with manipulations of both the number of possible event locations and the timing of the events. Severe limitations obtained when target events could occur at 9, as opposed to 4, locations. Most interestingly, in the more difficult 9 location condition, participants failed to respond to targets that succeeded detected events despite the considerable duration of the events (> 1 sec) in a manner analogous to an attentional blink.

(60) Looking at oddballs: Target absence influences attention and eye movements in pop-out search
Eamon Caddigan & Alejandro Lleras
University of Illinois at Urbana-Champaign

The distractor-previewing effect (DPE) describes the influence of a target-absent trial on an observer's reaction time during a subsequent trial in an oddball search task. We recorded eye-movements while participants performed a color-oddball search and found a DPE in both response times and the time required to fixate targets for discrimination and detection tasks which required attentional selection of the target. However, no RT difference was found when the task instructions did not require that the target be attended. These results suggest that the DPE represents a bias affecting the attentional selection of targets.

(61) Partially independent shape processing capacity across visual hemifields
Yusuke Yamani[1], Jeffrey Mounts[2] & Jason McCarley[1]
[1]University of Illinois at Urbana-Champaign
[2]The State University of New York, Geneseo

An experiment compared processing capacity for shape perception with bilateral and unilateral stimulus presentation. Two shapes were presented each trial, either successively or simultaneously. The participants' task was to judge whether a probe shape presented at the end of the trial matched either of the earlier shapes. Performance was poorer with simultaneous than with successive stimulus presentation, indicating limited-capacity processing. The cost of simultaneous presentation, however, was more modest when stimulus presentation was bilateral rather than unilateral. Results imply partially independent processing capacity pools in the right and left visual hemifields.

(62) Assessing Information Processing in the Two Pathways of the Human Visual System
Steve Holloway, Igor Dolgov & Michael McBeath
Arizona State University

Anatomical specialization suggests that presenting precise stimuli should lead to behavioral changes that are related to the neural areas targeted. We predicted that, an apparent motion assessment would be correlated to critical flicker fusion (CFF) but with less variance. Moreover, we predicted that a serial shapes recognition measure, with minimal edges and contrast, would target the parvocellular system. A strong correlation between CFF thresholds and scores on the apparent motion test was observed. Moreover, thresholds for the shapes paradigm were markedly different from apparent motion and CFF; therefore, it is likely that the shapes assessment was measuring ventral stream processing.

(63) Differential effects of graphics quality on verbal and walking distance judgments in a virtual environment
Benjamin R. Kunz, Sarah H. Creem-Regehr & William B. Thompson
University of Utah

In immersive virtual environments, blind walking and verbal judgments of perceived egocentric distance are significantly underestimated, compared to the accuracy of real-world performance on the same tasks. We tested whether the quality of graphics rendered in the virtual environment would have differential effects on these two measures of

distance perception. Blind walking indications of distance were underestimated but were unaffected by the quality of graphics. Verbal reports of distance were also underestimated but were more accurate in a high-quality versus low-quality graphics environment. Accounts for the greater malleability of verbal reports in this context will be discussed.

(64) Neural dynamics of object perception, attention, and memory during view-invariant object category learning
Arash Fazl, Stephen Grossberg & Ennio Mingolla
Boston University

How does the brain learn to recognize an object from multiple viewpoints while scanning a scene? ARTSCAN neural model predicts how surface representations of different objects compete for spatial attention and how spatial and object attention interact. The winning object generates a form-fitting distribution of spatial attention, or attentional shroud. A sustained shroud maintains activity of an emerging view-invariant object category while multiple view-specific categories are associated with it. The shroud also restricts saccades to salient features on the attended object. Shroud collapse releases a reset signal that enables attention and learning to shift to another object.

(65) Illusory Figures in Multiple Object Tracking
Ryan McKendrick, Harry Haladijian & Zenon Pylyshyn
Rutgers University

In Multiple Object Tracking (MOT), task-relevant objects (targets) are ordinarily well-defined shapes. We tested whether an illusory figure can act as a trackable object within MOT by testing for inhibition of nontargets with a probe-dot detection task. Both tracking and probe-dot detection results in this experiments support our hypothesis: figures with illusory contours are treated the same as figures with drawn contours by early vision. Probe-dot detection on nontargets was significantly worse than targets for trials with illusory contours and drawn contours, suggesting inhibition. No target-nontarget differences were observed in the anti-illusory control.

(66) Configural Asymmetries in a Visual Search Task
Mouna Attarha[1], David Birks[2] & Patrick Monnier[2]
[1]Goucher College
[2]Colorado State University

Search asymmetries (performance differences for target A among distractors B vs target B among distractors A) are well documented. Here, we consider configural asymmetries in which the orientation of search elements caused the performance asymmetry. Using a latency visual search task, observers searched for bicolor elements, split either horizontally or vertically. Horizontally split elements were searched more quickly than vertically split elements. An account based on different eye movement strategies was eliminated by presenting the search displays as brief flashes. The configural asymmetry suggests a fundamental difference in the ability to make visual judgments along the horizontal vs vertical dimension.

(67) Uncertainty in visual selective attention
Edward Vul
Massachusetts Institute of Technology

In 'selective attention' tasks subjects must select one item based on its spatiotemporal co-occurrence with a cue, while uncertainty about spatiotemporal locations of cues and items limits performance. We frame these tasks as inferences under uncertainty which have probability distributions over items as solutions. Do people represent these probability distributions? We asked subjects to make multiple responses on every trial and analyzed the conditional report distributions. Multiple responses about one target on one trial had independent and identically distributed errors: equivalent to samples from a probability distribution. We describe implications for crowding, binding, and selective attention broadly construed.

(68) Linguistic control of selective attention: Investigating the Persistence of the Cued Location Effect.
Gregory Davis & Bradley Gibson
University of Notre Dame

Gibson & Kingstone (2006) recently demonstrated that spatial word cues produce a cued location effect (faster RTs in response to "above/below" than "left/right") that persists across cue-target SOAs up to 500 ms. Two experiments are presented demonstrating that the persistence of the cued location effect cannot be accounted for by (i) increased comprehension times for linguistic cues, (ii) a need to visually index a target whose presentation is delayed, or (iii) distraction caused by abruptly onsetting non-targets. The implications of these findings for space-based and object-based theories of attention are discussed.

(69) Rapid visual perception of material properties

Lavanya Sharan, Ruth Rosenholtz & Edward H. Adelson
Massachusetts Institute of Technology

The world around us is made of objects as well as materials. We can easily tell a plastic spoon from a wooden spoon. This ability, known as material perception, is useful and ubiquitous. What aspects of material appearance can be perceived in a brief glance? We showed photographs of real and fake objects (e.g. genuine fruit, plastic fruit) to observers at 40 msec, 320 msec and 2.56 sec. Observers can reliably estimate color, shininess, translucency, rigidity and even subtle properties like real-or-fake. Observer performance is quite good at 40 msec and improves with longer viewing times.

(70) Objects look lighter when intending to lift with a healthy, not injured, co-actor

Adam Doerrfeld[1], Natalie Sebanz[2] & Maggie Shiffrar[1]
[1]Rutgers, The State University of New Jersey
[2]University of Birmingham, UK

Three experiments examined how weight judgments are affected by one's action plans in combination with those of a partner. Participants judged how heavy they perceived boxes to be while expecting to lift them either alone or with a partner. The partner was healthy or injured. Results show those intending to lift a box with a partner perceive the box as lighter than those intending to lift the same box alone, only when the co-actor was healthy and capable of helping. These findings suggest that the perception of object affordances and object properties is modulated by shared action plans.

(71) Working Memory and Hierarchical Perception

Jeong-Im Kim & Glyn Humphreys
University of Birmingham

Visual selection emerges from the competition between endogenous control processes and exogenous cues. Amongst possible factors that influence the endogenous control system is working memory. Using Navon letters, we explored if and how items in working memory affect the perception of visual targets at local and global levels in compound letters. 25 participants looked for a target letter presented at local or global level while holding a regular block letter as a memory item. An effect of validity was found – when memory items and targets were same, performance was better than when they were different. Although the effect of level (global precedent effect) was not found in the baseline condition, under memory load condition a global bias tended to emerge suggesting that attention tends to be biased to the global level of form when working memory is loaded. Interestingly, in no-memory priming condition, target perception was faster when a memory item matched the letter of the distractor level in a compound stimulus than it was in the memory condition. The relations between working memory and hierarchical coding of visual forms are discussed.

NOTES

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