2010 Organizers

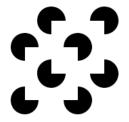
Michi Matsukura University of Iowa

Melanie Palomares University of South Carolina

Brian Levinthal Northwestern University

Timothy Vickery Yale University Object Perception, Attention, & Memory November 18, 2010 - St. Louis, MO





# Harvard Vision Sciences Laboratory Salutes OPAM on Its 18th Anniversary

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### OPAM 2010 Talk Session Mississippi Room, The Millenium Hotel St. Louis

8:20	Registration	
8:30	Opening Remarks	
8:40	Lead: Tim Vickery	Perception & Attention
8:45	Attarha & Moore	Testing capacity limitations of surface completion using the simultaneous- sequential method
9:00	Xu & Franconeri	Changes in ambiguous object structure are associated with shifts of attention
9:15	Cosman & Vecera	Perceptual grouping determines the locus of attentional selection
9:30		BREAK
9:40	Lead: Michi Matsukura	Attention & Memory
9:45	Beck, Luck, & Hollingworth	Whatever you do, don't look at the Exploring the parameters of an exclusionary attentional template
10:00	Moher & Egeth	Search and destroy: Observers use an inefficient explicit feature-based inhibition strategy in visual search
10:15	Leonard & Luck	Temporal dynamics of the allocation of spatial attention
10:30	Mack, Richler, Polyn, & Palmeri	Modeling effects of object naming on long-term object recognition memory
10:45		BREAK
10:55	Lead: Melanie Palomares	Ecological Factors & Object Processing
11:00	Blacker & Curby	The attentional blink is attenuated for objects of expertise
11:15	Caddigan, Walther, Fei-Fei, & Beck	Perceptual differences between natural scene categories
11:30	Kim, Feldman, & Singh	Launching curved apparent motion: a motion interpolation study
11:45	Gao, New, & Scholl	Perceived intentionality controls attentional tracking
12:00	LUNCH BREAK/PUT-UP POSTERS (at around 12:45)	
1:00-2:00	Poster Session - Jefferson Room	
2:00		BREAK
2:10	Lead: Brian Levinthal	Attention: Distribution
2:15	Jefferies & Yantis	Unitary vs. multiple attentional loci reflect space-based vs. object-based modes of attention
2:30	Vo & Wolfe	The role of incidental object fixations in repeated search: Looking AT versus looking FOR an object in a scene
2:45	Cain, Vul, Clark, & Mitroff	Human search strategies are informed by complex target distribution statistics
3:00	Lechak & Leber	Temporal oscillations in attention capture by moving stimuli as revealed by fMRI
3:15		BREAK
3:25-4:30	Keynote Address: Dr. Cathleen Moore	The function of perceptual organization in the dynamic updating of visual representations
4:40	Closing Remarks	



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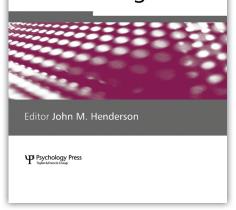
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- SYMPOSIUM II: Using ERPs to Track Visuospatial Cognition As It Happens
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#### **OPAM 2010 Keynote Address**

Mississippi Room
The Millennium Hotel St. Louis
3:25 p.m.



**Dr. Cathleen Moore**Department of Psychology, The University of Iowa

## The function of perceptual organization in the dynamic updating of visual representations

Processes of perceptual organization, such as those that result in phenomena like grouping, surface completion, and figure-ground segregation, have been a central focus in vision research since at least the 19th century. One reason for this focus—besides the appeal of the phenomenology—is that perceptual organization is considered foundational; it yields the building blocks out of which more complex visual representations are built. Research has focused on understanding the rules of organization, such as "similarly colored items tend to be grouped together", "aligned edges tend to be represented as continuous" and "surrounded regions tend to be represented as figure rather than ground." In this talk, I will consider the function of perceptual organization rather than the rules by which it works; what role does it play within the visual information processing stream. Specifically, I will suggest that perceptual organization processes serve to establish changeable information "channels" that guide the updating of existing visual representations on the basis of newly sampled visual information. While not directly conflicting with more traditional treatments of perceptual organization, this view seeks to emphasize the functional role that perceptual organization plays in dynamic visual processing.

#### OPAM 2010 POSTER SESSION 1:00-2:00 p.m. - Jefferson Room

#### Perception: Grouping

- (1) Perceptual organization and gestalt formation: Emergent features in two-line stimuli Anna Stupina & James Pomerantz
- (2) Mirror symmetry influences perception

  Joshua Edler & Patrick Monnier
- (3) Contour and surface processing of texture-defined second-order stimuli in the human visual system Evelina Tapia, Bruno Breitmeyer & Jane Jacob

#### **Perception-Scenes**

(4) Canonical views of scenes depend on the shape of the space Krista A. Ehinger, Ken M. Haggerty, & Aude Oliva

#### Perception- Motion

- You spin me 'round: Do people curve when exiting a spiral maze?

  Sara Brimhall, Michael McBeath, Ellen Campana, Steve Holloway, & Vanessa Cottingham
- (6) Semantic knowledge of element configuration influences motion perception in the Ternus display Mark Mills & Mike Dodd
- (7) Local vs. global determinants of motion-induced blindness Erika Wells & Andrew Leber

#### **Perception-Attention**

- (8) Hemifield modulation of approximate number judgments Heeyoung Choo & Steve Franconeri
- (9) Sequential processing in graph comprehension
  Stacey Parrott, Maria Del Rosario Maita, David Uttal, & Steven Franconeri

#### **Perception-Action**

- (10) Perception and response towards various toolbar placements in a computer graphical user interface Daniel Hor, Igor Dolgov, Jeremy Schwark, & William Graves
- (11) Familiarity driven by manual interaction modulated processing efficiency for real-world objects Yusuke Yamani, Atsunori Ariga, & Jason McCarley
- (12) The loci of positive and negative compatibility effect Kai-Ling Chang & Hsuan-Fu Chao

#### **Attention-Perception**

(13) The effect of feature-based attention on spatial resolution

Jason Rajsic & Daryl Wilson

#### Attention: Object-Based Selection

- (14) Attentional selection of complex objects

  Lauren Hecht & Shaun Vecera
- (15) Object-based attention is modulated by object exposure duration Adam Greenberg, Elizabeth Cutrone, & Marlene Behrmann

#### Attention-Perceptual Load

- (16) Selective distractor processing in high perceptual load Jihyun Suh & Yang Seok Cho
- (17) Response terminated displays produce flanker effects despite high perceptual load Zachary Roper, Joshua Cosman, Toby Mordkoff, & Shaun Vecera

#### Attention-Motion

- (18) Spatial updating during attentive tracking
  Hauke S. Meyerhoff, Markus Huff, Frank Papenmeier, Georg Jahn, & Stephan Schwan
- (19) Multiple object selection and tracking are independent of shape memory
  Hyunyoung Park, Sarah Helseth, Sumeeth Jonathan, Priscilla Mok, George Alvarez, & Steven Franconeri
- (20) Visual attention and the tenuous binding of "what" and "where": Evidence from infants and adults Melissa M. Kibbe & H. Haroutioun Haladjian

#### Attention-Temporal

- (21) Exogenous entrainment to visual stimulation in the attentional blink Atsunori Ariga & Alejandro Lleras
- (22) Repetition blindness in picture: Absolute or relative activation strength? Ching-I Lin & Angela Ku-Yuan Tzeng
- (23) Distractor-target similarity determines emotional information processing in RSVP Min Woo Kim & Yang Seok Cho

#### Attention-Search

- (24) Hemispheric asymmetry of top-down influences and bottom-up effects in visual search with irrelevant singleton

  Kao DeWitt & Chikashi Michimata
- (25) The relationship between regularities in target location and selective attention Takashi Kabata & Eriko Matsumoto
- (26) Contextual cueing: Search or response facilitation?
  Steven Fiske & Thomas Sanocki
- (27) Lack of agreement in identifying critical events (targets) in lifeguarding Lyndsey Lanagan-Leitzel

#### Attention-Search: Capture

- (28) Defining the scope of singleton search
  Brandon Ashinoff, Charles Folk, & Howard Egeth
- (29) Task set modulates working memory driven attentional capture Chun-yu Kuo & Hsuan-Fu Chao
- (30) Enhanced change detection ability for object onsets in natural scenes

  Maria Donaldson & Nachide Yamamoto
- (31) The role of saliency in real world at different time courses Chia-Jung Wu & Cheng-Ta Yang

#### Attention-Search: Capture: Emotion

- (32) Effects of need-based stimuli on attentional capture and interference Ryan Kreager, Adam Biggs, Brad Gibson, Michael Villano, & Charles Crowell
- (33) Semantic and affective salience: The role of meaning and preference in attention Adam Biggs, Ryan Kreager, Brad Gibson, Charles Crowell, & Michael Villano

#### Attention-Search: Memory

- (34) Delay and interference effects for targets and distracters following visual search Karla Antonelli & Carrick Williams
- (35) The causal influence of visual salience on gaze guidance during scene search and memorization Tim Smith

#### Attention-Search: Individual Differences

(36) Revealing individual differences in visual search: ADHD leads to seeing too little and anorexia nervosa leads to seeing too Much
Kait Clark, Nancy L. Zucker, Karli K. Watson, & Stephen R. Mitroff

#### **Attention: Cross Modality**

- (37) Entraining attention across auditory and visual modalities

  Jared Miller, Laura Carlson, & Devin McAuley
- (38) Bilateral visual presentation revealed the contribution of audio-visual congruency in ventriloquism Shoko Kanaya & Kazuhiko Yokosawa

#### **Cognitive Control**

- (39) The effect of strategic control on detecting changes Yi-Chun Liu & Cheng-Ta Yang
- (40) The influence of inhibitory and approach motivational systems on the neural correlates of cognitive control Brandt Uitermarkt, Kira Bailey, & Robert West

#### Cognitive Control: Action

- (41) Action video game experience's effects on visual attentional abilities William Graves, Igor Dolgov, Jeremy Schwark, & Daniel Hor
- (42) Knockout! The effect of action video games on proactive cognitive control Kira Bailey & Robert West

#### Cognitive Control: Aging

(43) The effect of aging on dynamic adjustments of cognitive control Samantha Perry, Brandy Johnson, & Robert West

#### Attention & Visual Working Memory

- (44) Neural mechanisms of cognitive control in working memory Benjamin Tamber-Rosenau & Steven Yantis
- (45) Attention is necessary for maintaining feature bindings Eren Gunseli & Aysecan Boduroglu
- (46) Effects of feature-based selection by retro-cues in visual working memory
  Oi Li & Jun Saiki

#### Attention & Memory: Method

(47) The influence of attention on the probability and fidelity of memory Michael Lawrence

#### Memory: Iconic/Visual Working Memory

(48) Task-specific assessment of visual memories

Jane Jacob, Bruno Breitmeyer, & Evelina Tapia

#### Memory: Visual Working Memory

(49) Visual working memory for relations
Pamela Glosson & John Hummel

(50) Why are we "blind" to change? The role of encoding in change blindness

Xiaoyu Zhang, Jordan Martin, Naomi Stone, Geoffrey Dreher, Max Kahn, & Marcie Penner-Wilger

#### Memory: Spatial

(51) Describing spatial locations from perception and memory: The effect of spatial reference directions on reference object selection

Xiaoou Li, Laura Carlson, Weimin Mou, Mark Williams, & Jared Miller

#### Memory: Scene

(52) Association of neurotransmitter gene polymorphisms with rapid scene categorization Yuichiro Kikuno, Jun Saiki, & Tetsuro Matsunaga

#### **Memory: Prospective**

(53) Manipulating expectation of context at intention formation: Evidence of task and lure Adam Underwood & Melissa Guynn

#### **Face-Perception**

- (54) Threat lowers awareness thresholds in anxiety Lital Ruderman & Dominique Lamy
- (55) Enhanced visual detection of threat-related emotional body postures
  Ashley Blanchard & Maggie Shiffrar
- (56) The effect of perceptual distinctiveness on affective judgment Yi-Cheng Tsai & Cheng-Ta Yang

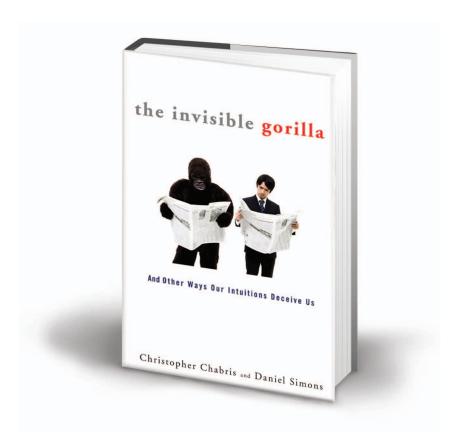
#### **Face-Attention**

- (57) Attentional disengagement from stimuli with learned emotional associations

  Jessica Collins & Kim Curby
- (58) Race advantage in different levels of face searching Zhijie Cheng, Guomei Zhou, & Man Wang

#### Face-Memory

- (59) Holding faces in working memory interferes with face discrimination but not object discrimination Laura Cacciamani & Mary Peterson
- (60) Visual short-term memory is content specific Joshua John & Michael Mangini
- (61) Object versus face perception causes different types of change blindness: Detecting versus localizing change Miko M. Wilford, Gary L. Wells, Bridget C. Baron, & Jacey L. Benal







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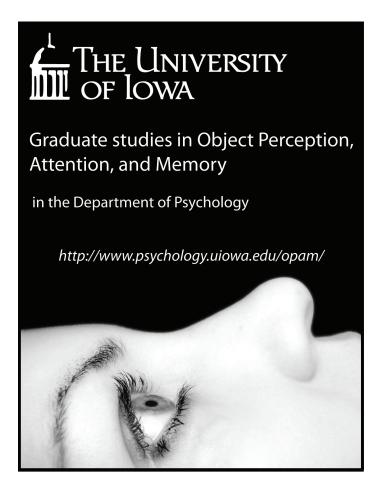
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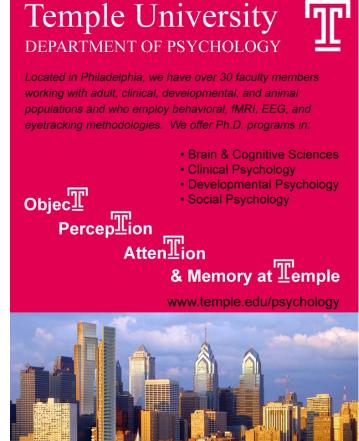
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## Perception & Attention 8:40 - 9:30 AM

Session Lead: Tim Vickery Yale University

## 8:45 Testing capacity limitations of surface completion using the simultaneous-sequential method

Mouna Attarha & Cathleen Moore University of Iowa

Surface representation appears to be a fundamental early visual processing stage, implying that surface completion occurs with unlimited capacity. In this study, capacity was measured using an enhanced simultaneous-sequential method, which can distinguish between unlimited-, limited-, and fixed-capacity processes. Observers searched for a curvilinear target among square distractors defined by the rotation of pacmen inducers. Equivalent simultaneous-sequential performance indicated unlimited capacity for the completion of both modal- and amodal-surface stimuli. We conclude that completion may unfold without interference for multiple surfaces within the visual field, consistent with the view that perception depends most directly on surfaces.

# 9:00 Spatial attention shifts in the perception of ambiguous object structure Yangqing Xu & Steve Franconeri

Yangqing Xu & Steve Franconeri Northwestern University

The distribution of spatial attention can influence the perception of ambiguous figures that change only in structure but not in meaning (Slotnick & Yantis, 2005). Participants viewed an ambiguous figure (similar to the Necker Cube) for a series of 8-second trials, and reported each perceptual switch with key-press responses. Using an ERP correlate of the distribution of spatial attention (n2pc), we found that more attention was directed toward the perceived closer side 1000 ms before the report of perception. The distribution of spatial attention is associated with the perceived structure of a constant visual stimulus.

## 9:15 Perceptual grouping determines the locus of attentional selection

Joshua Cosman & Shaun Vecera University of Iowa

The locus at which selective attention exerts effects on task-irrelevant information processing has been a perennial debate in cognitive psychology. As a resolution, Lavie proposed that the locus of selection is flexible, and acts either early or late in processing depending on the perceptual load of the task being performed. However, perceptual grouping is also known to affect the processing of task-irrelevant information. Here, we show for the first time that perceptual grouping dominates perceptual load to determine the extent of task-irrelevant information processing, suggesting that perceptual grouping, not load, determines the locus of attentional selection.

## Attention & Memory 9:40 a.m. -10:45 a.m.

#### Session Lead: Michi Matsukura University of Iowa

# 9:45 Whatever you do, don't look at the... Exploring the parameters of an exclusionary attentional template

Valerie Beck<sup>1</sup>, Steven J. Luck<sup>2</sup>, & Andrew Hollingworth<sup>1</sup>
<sup>1</sup>University of Iowa, <sup>2</sup>University of California, Davis

Observers are able to use an attentional template consisting of one, or even two, colors to guide the eyes to matching objects in a search array. Results from the current study suggest, however, that it is not possible to employ an exclusionary attentional template (i.e., template consisting of a color to avoid). When shown a color that would not be the target color at the beginning of a trial, observers' first few fixations were nevertheless directed to items that matched that color. The results demonstrate a key limitation on the ability to use working memory representations to guide attention.

# 10:00 Search and destroy: Observers use an inefficient explicit feature-based inhibition strategy in visual search Jeff Moher & Howard Egeth Johns Hopkins University

Attention can be guided towards a target based on explicit foreknowledge of a target feature in visual search. However, in a series of experiments, we show that explicit feature-based inhibition based on foreknowledge of a feature that does not match the target does not effectively guide search; instead, search is slowed when participants are told to ignore an irrelevant color. The magnitude of this slowing increases as the location of the items becomes less certain. The data suggest that participants first locate irrelevant items in order to suppress them, using an inefficient "search and destroy" strategy.

### 10:15 Temporal dynamics of the allocation of spatial attention

Carly Leonard & Steven J. Luck University of California, Davis

Goal-directed, stimulus-appropriate behavior is enabled by the coordination of different types of attentional mechanisms. Feature-based attention enhances processing of task-relevant visual input across the visual field, allowing efficient detection of potential targets. Alternatively, spatial attention modulates sensory gain for any stimuli appearing at attended locations. In the current study, we used ERPs to examine how feature detection transitions to modulation of the spatial window of attention. Modulation of the occipital P1 component to a task-irrelevant probe indexed this moment-to-moment allocation of spatial attention, showing its time course at foveal and peripheral regions.

## 10:30 Modeling effects of object naming on long-term object recognition memory

Michael Mack, Jennifer Richler, Sean Polyn, & Thomas Palmeri Vanderbilt University

Lupyan (2008) demonstrated that overtly naming objects leads to impaired recognition memory compared to objects rated for preference and posited that memory for named objects is distorted by a dynamic interaction between top-down category information and bottom-up perceptual representations. Recent work (Richler et al., submitted) proposes that stronger memory representations are encoded following a preference rating compared to naming. Evaluating these accounts in a computational framework of recognition memory (Shiffrin & Steyvers, 1997) suggests the naming effect can be explained using general principles of recognition memory, where memory differences arise from differences in the strength of initial encoding.

# Ecological Factors & Object Processing 10:55 a.m.-12:00 p.m.

# Session Lead: Melanie Palomares University of South Carolina

## 11:00 The attentional blink is attenuated for objects of expertise

Kara Blacker & Kim Curby Temple University

Extensive practice may allow individuals to circumvent information processing limitations. If visual expertise attenuates perceptual processing limitations, experts might show a reduced attentional blink (AB) for objects from their domain of expertise. Consistent with previous findings, Experiment 1 reports a reduced AB for face stimuli, typically considered to constitute a domain of perceptual expertise. Experiment 2 extends this finding to non-face objects of expertise; the magnitude of the AB for car stimuli was predicted by individuals' perceptual expertise with cars. Thus, perceptual expertise appears to provide benefits for information processing bottlenecks associated with awareness.

### 11:15 Perceptual differences between natural scene categories

Eamon Caddigan, Dirk Walther, Li Fei-Fei, & Diane Beck

University of Illinois Urbana-Champaign

Are good natural scene category exemplars seen better than bad ones? We tested this hypothesis using an intact vs. scrambled discrimination task. After observing better performance for good exemplars, we then examined how this effect was related to the information present in the image. Line drawings of good and bad natural scene exemplars were presented with different levels of degradation, and participants were asked to categorize them. We found that good exemplars quickly returned to ceiling-level performance at intermediate levels of degradation, suggesting that they contain more diagnostic information than bad exemplars.

### 11:30 Launching curved apparent motion: a motion interpolation study

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

In previous works we showed that dynamic occlusion and causal perception strongly influence the direction of apparent motion. This study quantitatively measured the geometry of the curved path induced by a Michotte-style "launch." Observers viewed motion sequences of two alternating rectangular tokens positioned along the circumference of a disk in stereoscopic displays, and adjusted the midpoint of the perceived motion path when the objects were launched by collisions with two other objects. The results showed that motion tokens were perceived as moving along the direction of launching, and this tendency was stronger in the presence of a disk occluder.

### 11:45 Perceived intentionality controls attentional tracking

Tao Gao<sup>1</sup>, Joshua New<sup>2</sup>, & Brian Scholl<sup>1</sup>

¹Yale University, ²Barnard College

Attention is often studied in terms of simple physical features, but visual experience also involves the perception of properties such as animacy and intentionality. We explored attention in chasing displays, wherein one moving disc (the 'wolf') is automatically perceived as chasing another (the 'sheep'). Observers' detection of sporadic probes during free-viewing of such displays revealed that: (1) attention was reflexively focused on the wolf; and (2) when the wolf changed its target, attention shifted remarkably quickly to the new sheep, independent of distance. These and other results reveal how the perception of intentionality can control attention in dynamic displays.

# Attention: Distribution 2:10 p.m.-3:15 p.m.

#### Session Lead: Brian Levinthal Northwestern University

# 2:15 Unitary vs. multiple attentional loci reflect space-based vs. object-based modes of attention

Lisa Jefferies & Steven Yantis Johns Hopkins University

Theories of attention propose that focal attention is deployed as either a single focus or as multiple foci. We ask whether instead of two alternative spatial distributions of attention, a unitary focus reflects space-based attention whereas a divided focus reflects object-based attention. To test this, we combined a task probing the distribution of attention with a working memory task that selectively taxed spatial or object processing resources. Our hypotheses were supported: a spatial working memory load prevented the deployment of a unitary focus whereas a working memory load of object information prevented the deployment of a divided focus.

# 2:30 The role of incidental object fixations in repeated search: Looking AT versus looking FOR an object in a scene Melissa Vo & Jeremy Wolfe

Harvard Medical School

One might assume that familiarity with a scene or previous encounters with objects embedded in a scene would benefit subsequent search for those items. However, in three experiments we show that this is not the case: Incidental fixations on one object during search for others did not speed search for the first object, neither did 30 seconds of free-viewing of the scene. Only searching for the specific object markedly speeded a second search for that object. We therefore argue that the first searches for objects in unchanging scenes are dominated by contextual guidance rather than incidental memory.

# 2:45 Human search strategies are informed by complex target distribution statistics Matthew S. Cain¹, Ed Vul², Kait Clark¹, & Stephen R. Mitroff¹ ¹Duke University, ²University of California, San Diego

Many real-world visual searches contain multiple targets in one display and such searches can be especially error prone. We investigated whether searchers adapt their strategies based on complex statistics of target distributions in multiple-target searches. Separate groups searched arrays drawn from three target distributions with the same average number of targets per display, but different target-clustering properties. People searched longer after finding targets when targets tended to cluster in displays, indicating that they adjusted their strategy based on higher order statistics. These findings can help optimize critical multiple-target searches (e.g., radiological, baggage, and military searches).

# 3:00 Temporal oscillations in attention capture by moving stimuli as revealed by fMRI Jennifer Lechak & Andrew Leber University of New Hampshire

Recent work has shown that ongoing fluctuations in fMRI activity in middle frontal gyrus (MFG) predict the degree of distraction by salient color singletons (Leber, 2010, J Neurosci). What remains unknown is whether and how resistance to distraction by other classes of stimuli can be predicted. Here we show that greater pretrial fMRI signal in inferior parietal lobule (IPL) - but not MFG - predicted lesser RT slowing from irrelevant motion singletons. These results confirm that multiple types of distraction are predictable from pretrial fMRI activity, and also suggest distinct neural substrates for resisting interference by static (color) vs. dynamic (moving) stimuli.

#### POSTER SESSION 1:00 - 2:00 PM

## The Millenium Hotel St. Louis Jefferson Room

#### Perception: Grouping

(1) Perceptual organization and gestalt formation: Emergent features in two-line stimuli Anna Stupina & James Pomerantz Rice University

How do "parts" group to form objects? We propose that grouping occurs via Emergent Features (EFs), which are the features that (1) are possessed by no individual part but that materialize only from the configuration; and that (2) make the object more salient than its parts. The Configural Superiority Effect (CSE) arises from EF creation when discrimination is facilitated by the addition of identical contexts to two stimuli, and was used to diagnose grouping. RT was predicted from the number of EF differences between target and distractors. Support was shown for candidate EFs such as intersections, parallelism, connectivity, and others.

(2) Mirror symmetry influences perception

Joshua Edler & Patrick Monnier

Colorado State University

Mirror symmetry is a salient aspect of the visual scene but its influence on object perception remains unclear. Recently, mirror symmetry has been investigated through a series of visual search studies loosely termed configural asymmetries. Configural asymmetries refer to differences in search performance in which displays composed of objects requiring left/right judgments are slower to process than displays composed of objects requiring up/down judgments. Two explanations have emerged: one suggesting differences in processing efficiency across regions of an object - another suggesting mirror symmetry facilitates grouping. Measurements herein support both accounts showing mirror symmetry is a plausible grouping dimension.

(3) Contour and surface processing of texturedefined second-order stimuli in the human visual system

Evelina Tapia<sup>1</sup>, Bruno Breitmeyer<sup>1</sup>, & Jane Jacob<sup>2</sup>
<sup>1</sup>University of Illinois at Urbana-Champaign,
<sup>2</sup>University of Houston

At the nonconscious level first-order contours are processed 30-60 ms before surfaces. Using a metacontrast masking paradigm, we examine whether the same sequence of processing also applies to second-order features. Results indicate that suppression of texture-defined second order contour visibility occurs at an earlier SOA than the suppression of texture-defined second-order surface. These findings indicate that texture-defined second-order contours, like first-order contours, are processed before texture-defined second-order surfaces and place constraints on models proposing that first- and second-order features are processed by separate neural circuits.

#### **Perception-Scenes**

(4) Canonical views of scenes depend on the shape of the space

Krista A. Ehinger, Ken M. Haggerty, & Aude Oliva Massachusetts Institute of Technology

Objects generally have a preferred ("canonical") orientation, but it is not known whether there are canonical views of scenes. We investigated this question by asking observers to explore 360-degree panoramic images and select the best view. Agreement between observers was high, particularly in smaller spaces and those with a range of visible depths. Observers showed a preference for views showing high depth, but did not use navigational information when selecting the best view. These results are similar to findings with objects: a canonical view shows as much of the scene as possible and is not bound by functional constraints.

#### Perception- Motion

(5) You spin me 'round: Do people curve when exiting a spiral maze?
Sara Brimhall, Michael McBeath, Ellen Campana, Steve Holloway, & Vanessa Cottingham
Arizona State University

When a marble exits a spiral, it goes straight - a simple fact about Newtonian physics that is covered in every high school physics class. Yet most people predict that the marble will curve. This "naive physics" bias is called the curvilinear motion (CM) bias. The existence of CM bias has been clearly demonstrated, but its source is under debate. Taking an ecological approach, we explore the possibility that the bias arises from correct knowledge of human movement, incorrectly generalized to inanimate objects. We demonstrate that both adults and children follow curved paths when exiting a spiral, consistent with this explanation.

(6) Semantic knowledge of element configuration influences motion perception in the Ternus display Mark Mills & Mike Dodd
University of Nebraska-Lincoln

The influence of semantic knowledge on motion correspondence was investigated using a modified Ternus display with human eyes (E1) and house windows (E2) as elements. It was hypothesized that knowledge of how elements tend to be configured will bias perception towards group motion, as opposed to other factors (e.g., similarity, proximity). Semantic knowledge substantially biased percepts toward group motion, though only when the eyes were presented in the expected configuration (E1). Moreover, this influence is object-specific given that the bias towards grouping was not as strong with the analogous window stimuli (E2).

(7) Local vs. global determinants of motioninduced blindness Erika Wells & Andrew Leber University of New Hampshire

Perceptual disappearance of objects surrounded by a moving mask, or motion-induced blindness (MIB), is a phenomenon whose underlying mechanism has yet to be clarified. We questioned whether local or global interactions between the target and mask mediate MIB. Exploiting our previous finding that MIB is enhanced by masks containing incoherent motion (Wells, Leber, & Sparrow, 2009, OPAM), we placed incoherent masks in spatially confined dis-

play locations, either surrounding the target (local) or in the opposite hemifield (global). Results showed opposite-hemifield incoherence was as effective in inducing disappearance as target-side incoherence, supporting a globally-acting mechanism of MIB.

#### **Perception-Attention**

(8) Hemifield modulation of approximate number judgments

Heeyoung Choo & Steve Franconeri Northwestern University

We often need to isolate visual processing to certain areas of the visual field, such as when judging number within collection A, while excluding collection B. One salient constraint in this isolation process is the visual hemifield boundary, which serves as a physiologically hardwired dividing line. We tested the role of this boundary during speeded number judgments, and found that attempts to isolate a collection involuntarily include other objects within that visual hemifield. The results together suggest that when creating an approximate number representation, dots falling in the same hemifield are to mandatorily pooled.

(9) Sequential processing in graph comprehension Stacey Parrott, Maria Del Rosario Maita, David Uttal, & Steven Franconeri Northwestern University

The use of graphs to display quantitative information is ubiquitous, making them an excellent case study of object processing in visual cognition. For example, bar graphs better convey discrete relations (X is bigger than Y) whereas line graphs are better suited to convey continuous relations (X grows with Y), and this difference may be due to different visual processing routines for each graph type (Zacks and Tversky, 1999). The present study provides preliminary evidence to suggest that bar graphs are processed not holistically, but sequentially, and in left to right order.

#### **Perception-Action**

(10) Perception and response towards various toolbar placements in a computer graphical user interface Daniel Hor, Igor Dolgov, Jeremy Schwark, & William Graves

New Mexico State University

Computer users' response speed using toolbars in GUIs may depend on the location of the toolbar on the screen. Our studies showed that despite all sides of a program window being of equal distance from the center of the screen, participants in a target detection task responded with different speeds when toolbar location was varied, even when the location was predictable. In some situations, participants responded fastest when the toolbar was at the left or right side, whereas in others they responded fastest when it was at the top. Furthermore, participants were consistently slowest when toolbars were at the bottom.

(11) Familiarity driven by manual interaction modulated processing efficiency for real-world objects

Yusuke Yamani, Atsunori Ariga, & Jason McCarley
University of Illinois at Urbana-Champaign

Object familiarity influences search performance, producing search asymmetries (e.g., Makinowski & Hubner, 2001). This experiment investigated whether familiarity driven by manual interaction with real-world objects would affect search efficiency. Stimuli were images of coffee cups with their handles oriented toward either the left or the right. Participants searched for a uniquely oriented target cup among homogeneously oriented distractor cups. Subjects, who preferred their right hand for holding a cup, found a left-handled target among right-handled distractors more efficiently than vice versa. Results imply that familiarity driven by motor interaction can modulate perceptual processing efficiency for everyday objects.

(12) The loci of positive and negative compatibility effect

Kai-Ling Chang & Hsuan-Fu Chao

Positive and negative compatibility effect had been discovered over decade, but the cause of both effects remains controversial. The hypotheses proposed so far, which emphasized either the perceptual or motor level, could not explain all the characteristics of these two effects. By manipulating the perceptual similarity between the prime and target, the present study examined the loci of the compatibility effect. The results indicated that the compatibility effect involve motor activation, motor inhibition, and perceptual facilitation.

#### **Attention-Perception**

(13) The effect of feature-based attention on spatial resolution

Jason Rajsic & Daryl Wilson Queen's University

A growing body of research has shown that spatial attention alters the appearance of stimuli. Here we explored whether feature-based attention would increase perceived spatial resolution, as has been shown with spatial attention. Each trial began with a brief presentation of a colored cue in order to direct feature-based attention to that cue's color. Following the cue, participants judged which of two differently-colored Landolt squares possessed the larger gap. Our results suggest that feature-based attention reduces spatial resolution, an effect opposite to that found with spatial attention.

#### Attention: Object-Based Selection

(14) Attentional selection of complex objects

Lauren Hecht<sup>1</sup> & Shaun Vecera<sup>2</sup>

<sup>1</sup>Gustavus Adolphus College, <sup>2</sup>University of Iowa

Most studies of object-based attention examine simple objects. However, many objects in the world are complex (e.g., composed of several parts). We examined the influence of an object's part structure on object-based shifts of visual attention. In a spatial cuing paradigm, observers did not demonstrate an object-based effect for multipart objects when the cue and targets were presented successively or with a brief inter-stimulus interval (cue-target ISI). The object-based effect only emerged at a longer cuetarget ISI, demonstrating that an object's complexity can impact its selection by object-based attention.

(15) Object-based attention is modulated by object exposure duration

Adam Greenberg, Elizabeth Cutrone, & Marlene Behrmann Carnegie Mellon University

Attention affords a behavioral advantage to visual information by selecting relevant parts of the visual field, often on the basis of object representations. This processing benefit can be experimentally modulated by degrading available object information. Here, the accessible object information was manipulated by varying the exposure duration of object stimuli. We observed minimal effects of object-based selection for exposure durations shorter than 400ms, and robust effects for longer exposure durations. These data support a binary model of object-based attention onset and suggest object-based selection is engaged only after a sufficient amount of object-defining information is accessible.

#### Attention-Perceptual Load

(16) Selective distractor processing in high perceptual load

Jihyun Suh & Yang Seok Cho Korea University

The perceptual load theory suggests that selection mode changes based on perceptual load (Lavie & Tsal, 1994). In the present study, two visual search experiments were conducted to examine whether the interference effect is modulated by the probability of the distractors capturing visual attention rather than the selection-mode change which is derived by the level of perceptual load. When manipulating the number of peripheral distractors in the high perceptual load, the interference effect increased as the number of task-irrelevant distractors increased even thought the task relevant and irrelevant objects were clearly distinguished.

(17) Response terminated displays produce flanker effects despite high perceptual load Zachary Roper, Joshua Cosman, Toby Mordkoff, & Shaun Vecera
University of Iowa

Perceptual load theory predicts abolished flanker effects under high load due to attentional resource limitations. Data limitations imposed by briefly presented displays, such as those typically used in load paradigms, may also abolish flanker effects under high load conditions due to the diminished probability of flanker sampling by attention. To preclude data limitations, we used displays that persisted until the observer's response. When attentional resource demands are high, load theory predicts no flanker effect irrespective of exposure duration, yet we observed a flanker effect in high load, response terminated displays suggesting that attentional resources alone may not restrict flanker processing.

#### Attention-Motion

(18) Spatial updating during attentive tracking
Hauke S. Meyerhoff, Markus Huff, Frank
Papenmeier, Georg Jahn, & Stephan Schwan
Knowledge Media Research Center Tuebingen

Dynamic tasks often require fast adaptations to new viewpoints. It has been shown that automatic spatial updating is triggered by proprioceptive motion cues. Here, we demonstrate that visual cues are sufficient to trigger automatic updating. In two experiments we examined whether continuous visual scene rotation cues induce automatic updating. In Experiment 1, we tested if updating occurs when floor plane rotations are invalid with respect to object positions. In Experiment 2, we manipulated presentation probability and tested whether updating can be suppressed if it is harmful for performance. Both experiments provide clear evidence for automatic updating induced by visual cues.

(19) Multiple object selection and tracking are independent of shape memory

Hyunyoung Park<sup>1</sup>, Sarah Helseth<sup>1</sup>, Sumeeth Jonathan<sup>1</sup>, Priscilla Mok<sup>1</sup>, George Alvarez<sup>2</sup>, & Steven Franconeri<sup>1</sup>

<sup>1</sup>Northwestern University, <sup>2</sup>Harvard University

We have the ability to concurrently select a limited number of locations, or track a limited number of objects. One suggested mechanism for this process is to treat the locations as corners of a polygon, and store the shape that they create. We asked participants to complete dual-tasks where they stored a series of shapes before completing either multiple object selection task. The shape memory proved independent of both, even while controls showed that adding a single additional shape did lower performance. These results suggest that selecting or tracking multiple objects do not involve shape memory.

(20) Visual attention and the tenuous binding of "what" and "where": Evidence from infants and adults

Melissa M, Kibbe & H. Haroutioun Haladjian Rutgers University Center for Cognitive Science

The current research explores how attention is deployed to maintain bindings of object features to locations over time. Both infants and adults were studied to obtain converging evidence that cohesive object representations require sustained, focused, object-based attention to be maintained. In a multiple object tracking task with adults, only explicit tracking, not implicit tracking or spread attention, maintained bindings. In a violation-of-expectation task with infants, increasing the number of attended locations decreased infants' ability to bind features to locations, but performance improved with development. These results suggest that feature bindings are tenuous and require sustained, focused attention.

#### Attention-Temporal

## (21) Exogenous entrainment to visual stimulation in the attentional blink

Atsunori Ariga & Alejandro Lleras University of Illinois at Urbana-Champaign

When the visual system is required to identify two successive targets (T1 and T2) embedded in a rapid sequence of images, accuracy in identifying T2 deteriorates for intervals between 200 and 500 ms after T1 In this study, we found new evidence that T2 recovery may sometimes take substantially longer (i.e., for 940 ms), when the RSVP stimulation after T1 is replaced with a continued (non-flickering) distractor. These results suggest that the presence/absence of rhythmic visual stimulation (which creates exogenous pulses of temporal attention) is a crucial factor underlying our ability to process rapid serial events.

# (22) Repetition blindness in picture: Absolute or relative activation strength? Ching-I Lin & Angela Ku-Yuan Tzeng

Repetition Blindness is the failure to see or recall the second of two visually similar or identical items C1 and C2 in rapid serial visual presentation. When RB occurred, subjects didn't always report C1and ignore C2. As Bavelier stated, both C1 and C2 were processed, RB occurred when one of them was not stabilized. We proposed a "Relative Activation Strength Hypothesis" to explain RB. The resulted suggested the relative activation strength of C1 and C2 maybe the key to RB.C1 and C2 worked in a competitive relationship. The weaker token tend to be ignored.

# (23) Distractor-target similarity determines emotional information processing in RSVP Min Woo Kim & Yang Seok Cho Korea University

A recent study shows that emotional processing is diminished when target detection is perceptually defined rather than semantically in an attentional blink paradigm (Huang et al., 2008). However, we suggest that the distractor-target similarity modulates emotional processing. To test this hypothesis, three perceptually defined attentional blink experiments were conducted. The similarity between the distractor and target was inversely related to the amount of emotional processing different distractor-target similarity configurations. The findings indicate that the emotional cost effect is reduced when distractor-target similarity increases and depletes the attentional capacity necessary for emotional feature processing.

#### Attention-Search

# (24) Hemispheric asymmetry of top-down influences and bottom-up effects in visual search with irrelevant singleton Kao DeWitt & Chikashi Michimata Sophia University

Participants searched for a circle among diamond distractors including one irrelevant singleton, positioned around the fixation, and responded to the line inside. The participants had the prior-knowledge of the target location, and the validity of the information was compared between the visual fields. The result showed that the response was faster in the valid condition than in the invalid condition. Also, there was a tendency of faster response to the right-visual field. These results suggest that the prior-knowledge were able to enhance the search, and possible hemispheric asymmetry in controlling of attention in the search with singleton.

# (25) The relationship between regularities in target location and selective attention Takashi Kabata & Eriko Matsumoto Kobe University

In visual search tasks, when targets appear in a certain location with high probability, target discrimination performance in the location is facilitated compared to that in other locations. In this study, we explored whether such facilitation effects are due to consecutive target presentation in the high probability location. The results show that facilitation is observed only when the targets appear in a certain location consecutively. This finding suggests that the short-term facilitation effect seen in probabilistic manipulations is produced by consecutive focus of selective attention at a certain location.

# (26) Contextual cueing: Search or response facilitation? Steven Fiske & Thomas Sanocki University of South Florida

Although the contextual cueing effect itself is well established, the underlying process that is actually facilitated is under debate. We investigated this issue in a standard contextual cueing paradigm with an interference manipulation intended to eliminate any facilitation at the search stage. After learning, the target location was switched with a previous distractor location. Contextual cueing was observed with significantly impaired performance on the repeated displays after the target location switch. Critically, the magnitude of this interference was greater at the larger set sizes. These findings indicate that contextual cueing facilitates search proper in support of the attentional guidance account.

## (27) Lack of agreement in identifying critical events (targets) in lifeguarding

Lyndsey Lanagan-Leitzel
Eastern Connecticut State University

Previous research has indicated poor monitoring of critical events by lifeguards. The current study asked participants (lifeguards pre/post-training, non-lifeguards, and trainers) to identify critical events in video clips of normal aquatic activity and explain why they are critical. Participants focused on physical danger, water depth, and lack of parental supervision in their descriptions. Although more events were identified after surveillance training, very few of these events were monitored by the majority of the lifeguards, and many were identified by the non-lifeguards. The very low rate of agreement is troubling and suggests training modifications may be necessary.

#### Attention-Search: Capture

# (28) Defining the scope of singleton search Brandon Ashinoff<sup>1</sup>, Charles Folk<sup>2</sup>, & Howard Egeth<sup>1</sup>

<sup>1</sup>Johns Hopkins University, <sup>2</sup>Villanova University

Singleton detection mode (Bacon & Egeth, 1994) is an attentional set to search for anything that is sufficiently different from the background. However, some research (Folk, Remington, & Wright, 1994) has suggested that when participants are in singleton detection mode not all stimuli will capture attention. This series of experiments investigates the necessary conditions for a stimulus to capture attention while a participant is in singleton detection mode.

## (29) Task set modulates working memory driven attentional capture

Chun-yu Kuo & Hsuan-Fu Chao National Taiwan University

The present study aimed at examining whether the task-irrelevant information that matches the content of working memory can capture attention. The memory recognition task and the attentional capture paradigm were combined to investigate the influence of task relevancy on attentional capture. The results showed that the task relevant singleton which matches the content of working memory induced larger attentional capture than the task irrelevant singleton did. Such finding indicated that working memory driven attentional capture is modulated by top-down control setting such as task relevance.

## (30) Enhanced change detection ability for object onsets in natural scenes

Maria Donaldson & Naohide Yamamoto Cleveland State University

Past research suggests that the onset of new objects in an environment captures observers' attention more effectively than other types of visual events. The present study incorporated this idea into a change blindness paradigm. It was hypothesized that object onsets would be resistant to change blindness because of the onset primacy effect. Participants viewed photographs of natural scenes and identified where the onset or offset of an object occurred. The onsets were detected more rapidly and accurately than offsets, suggesting that the primacy of object onset is a robust phenomenon that is observable across various domains of visual cognition.

## (31) The role of saliency in real world at different time courses

Chia-Jung Wu & Cheng-Ta Yang National Cheng Kung University

A salient object can capture attention is well-known. However, the effect of salience on directing attention at different time courses has not been fully characterized. This study was to investigate the effect of salience on directing attention. A probe detection task was used with different exposure durations of the initial scene and retention intervals. Results showed that the probe following a salient object location was faster detected regardless of exposure duration. This effect interacted with the retention interval. Results highlighted that processing object salience is time-consuming and this effect was rapidly eliminated after the offset of the scene.

#### Attention-Search: Capture: Emotion

## (32) Effects of need-based stimuli on attentional capture and interference

Ryan Kreager, Adam Biggs, Brad Gibson, Michael Villano, & Charles Crowell University of Notre Dame

Rewards have been shown to create response biases for stimuli associated with higher rewards (Kiss, Driver, & Eimer, 2009). However, reward-based motivation differs from need-based motivation as the latter can remain truly task-irrelevant. Our study used three stimuli types (affect-positive, affect-neutral, and need-based) to assess changes in distractor interference at multiple times. Changes in subjective feelings of hunger predicted changes in interference generated by food stimuli. This evidence suggests goals contained within an observer's attentional set can be widely influence by any number of short- and potentially long-term goals that are task-independent.

# (33) Semantic and affective salience: The role of meaning and preference in attention Adam Biggs, Ryan Kreager, Brad Gibson, Charles Crowell & Michael Villano University of Notre Dame

Attentional processing is affected by meaningful stimuli, particularly when the meaning evokes strong emotions. Our study was designed to separate the different influences of knowledge and affect on attention. Increased knowledge about the meaning of a neutral distractor was found to decrease the observed interference (Experiment 1). However, symbols with positive affect captured attention to produce increased interference (Experiments 2 and 3), but symbols with negative affect increased interference due to difficulties with disengagement (Experiment 4). Thus, the specific attentional mechanisms involved in processing meaningful stimuli are dependent upon the affect the stimulus evokes in the observer.

#### Attention-Search: Memory

# (34) Delay and interference effects for targets and distracters following visual search Karla Antonelli & Carrick Williams Mississippi State University

Visual memories for target and distractor objects are differently impacted by viewing behavior and other factors, indicating that targets could have episodic information that distractors lack. To test the episodic nature of visual memories, we used two factors known to affect episodic memories, delay and retroactive interference. Visual memory was tested immediately after visual search, after a 30-minute delay, and after presentation of additional objects. Accuracy for target objects was worse in the interference conditions compared to the delay condition, but distractor memory did not decline -- a finding consistent with the possibility of additional episodic components for targets.

# (35) The causal influence of visual salience on gaze guidance during scene search and memorization

Tim Smith
Birkbeck College, University of London

Visual salience at fixation is often reported as significantly higher than chance. However, it is unclear if this gaze behaviour is caused by visual salience as comparisons have always been between objects or scenes. In the present study the salience of a target object was

manipulated within scenes. Removing visual salience had a minimal effect on gaze behaviour but increasing saliency significantly increased the probability of early fixation during both search and memorisation. These results suggest that visual salience may play a causal role in fixation probability but its contribution independent from cognitive relevance is currently unknown.

#### Attention-Search: Individual Differences

(36) Revealing individual differences in visual search: ADHD leads to seeing too little and anorexia nervosa leads to seeing too much Kait Clark, Nancy L. Zucker, Karli K. Watson, & Stephen R. Mitroff
Duke University

In understanding the nature of visual cognition, it is important to determine how individual differences affect performance. We have found relationships between symptoms of both ADHD and anorexia nervosa and performance on a simple visual search task at high set sizes. Both correlate with search accuracy such that greater symptoms predict worse performance. Critically, the type of errors made by each group reveals clear dissociations: ADHD-symptomatic individuals produced high miss rates while anorexia-symptomatic individuals produced high false alarm rates. We discuss how these differences in performance errors reveal how and why individual characteristics may influence visual performance.

#### **Attention: Cross Modality**

## (37) Entraining attention across auditory and visual modalities

Jared Miller<sup>1</sup>, Laura Carlson<sup>1</sup>, & Devin McAuley<sup>2</sup>
<sup>1</sup>University of Notre Dame, <sup>2</sup>Michigan State
University

Auditory and visual attention to rhythmic stimuli can be thought of as involving periods of maximal and minimal attention such that the distribution of attention is entrained to the environmental input. We examined how entraining auditory attention to a specific rhythm affects the allocation of visual attention. Subjects moved their eyes from fixation to a visual stimulus whose onset was either in synch or out of synch with an entrained auditory rhythm. Saccade latency was fastest for the in synch condition, indicating that entrainment in auditory attention also entrains visual attention such that both are maximized concurrently.

# (38) Bilateral visual presentation revealed the contribution of audio-visual congruency in ventriloquism

Shoko Kanaya & Kazuhiko Yokosawa

The ventriloquism phenomenon has revealed factors affecting perceptual integration of multisensory events. However, simplified presentations of single (auditory, visual) sensory signals in each modality, in previous research cannot fully explain our behavior in more complex, real-world, environments. Although cognitive factors have been dismissed in previous ventriloguism research, here we report contributions of one cognitive factor, audio-visual congruency of speech. When bilateral visual stimuli are presented in synchrony with a single voice, cross-modal speech congruency had a significant impact on the ventriloguism effect. This suggests greater flexibility in our responding to multi-sensory environments than previously considered.

#### **Cognitive Control**

## (39) The effect of strategic control on detecting changes

Yi-Chun Liu & Cheng-Ta Yang National Cheng Kung University

A change is composed of multiple features, and a certain change (traffic light) is contingent on a particular feature-change (color). However, no prior studies have examined how stimulus contingency may influence visual processing of redundant change signals for a detection decision. This study manipulated the ratio between two types of changes as 1:1 in Experiment 1 and 1:3 in Experiment 2. Results showed that observers altered their strategy from a parallel self-terminating processing. These results highlighted that the effect of strategic control on processing redundant change signals.

(40) The influence of inhibitory and approach motivational systems on the neural correlates of cognitive control

Brandt Uitermarkt, Kira Bailey, & Robert West lowa State University

Some evidence demonstrates a relationship between individual differences in motivational systems and cognitive control. To examine the neural correlates of this relationship, participants completed BIS/BAS scales prior to performing the Stroop task while ERPs were recorded. The behavioral data did not reveal any relationship

between motivational systems and response time. Behavioral Inhibition, Reward Responsiveness, and Drive were associated with the use of proactive control and Fun Seeking was associated with the use of reactive control.

#### Cognitive Control: Action

## (41) Action video game experience's effects on visual attentional abilities

William Graves, Igor Dolgov, Jeremy Schwark, & Daniel Hor

New Mexico State University

Bavalier and colleagues find that video game playing experience has beneficial impacts on people's visual attentional abilities as measured by performance in various cognitive paradigms. We sought to replicate Green and Bavalier (2003) by testing video-game players and non-players in flanker, enumeration, and attentional blink paradigms, extending prior research by including a parallel processing flanker task condition. We found no evidence for any attentional advantages for video game players in the tasks that were modeled after Green & Bavalier's design. However, our results showed that video game experience was beneficial in the parallel processing condition of the flanker task.

# (42) Knockout! The effect of action video games on proactive cognitive control Kira Bailey & Robert West

Iowa State University

Research has demonstrated a beneficial effect of playing action video games on visuospatial cognition. Research has also demonstrated that action video games are negatively associated with the use of proactive cognitive control in the Stroop task. In the current investigation, the influence of action video game experience on proactive cognitive control in the N-back working memory task was examined in two experiments, an individual difference study and a training study. The findings of both experiments indicate that action video game experience can disrupt the utilization of proactive cognitive control to support the maintenance of information in working memory.

#### Cognitive Control: Aging

## (43) The effect of aging on dynamic adjustments of cognitive control

Samantha Perry, Brandy Johnson, & Robert West lowa State University

The goal maintenance theory of aging leads to the prediction that conflict adaptation should be attenuated in older adults. This hypothesis was examined in a study using the counting stroop task. Younger and older adults completed this task while Event Related Potentials (ERPs) were recorded. The conflict adaptation effect was smaller in older adults than in younger adults. The MFN and conflict SP were sensitive to conflict adaptation in the younger adults but not in the older adults. These findings demonstrate that older adults may have difficulty using task context to guide behavior.

#### Attention & Visual Working Memory

## (44) Neural mechanisms of cognitive control in working memory

Benjamin Tamber-Rosenau & Steven Yantis Johns Hopkins University

Attention shifts within and updates to the contents of working memory (WM) are controlled by a frontoparietal network. The shift and update operations have not been directly compared. Subjects underwent fMRI while maintaining two letters in WM, shifting attention between them, and updating them via replacement or via integration of perceptual and mnemonic information. Shifts and updates recruited common areas in frontal and parietal cortex, suggesting that selection and updating are mediated by similar frontoparietal control networks. Our results reveal aspects of the functional architecture of cognitive control within WM.

# (45) Attention is necessary for maintaining feature bindings Eren Gunseli & Aysecan Boduroglu Bogazici University

The present research investigated the role of attention in maintaining features and bindings. When the visual change detection task did not require participants to maintain bound representations and critical changes were replacements of old studied features with new ones, valid retrocues provided equal benefit for both whole array or single probe displays. However, when the task required participants to maintain feature bindings, change detection accuracy showed a greater retrocue advantage than when only features had to be maintained. These findings support the view that maintaining bindings of features in VSTM demands greater attention than maintaining features only.

## (46) Effects of feature-based selection by retro-cues in visual working memory

Oi Li & Jun Saiki Kyoto University

Recently it has become clear that it is possible to orient attention to locations in visual working memory. Since visual stimuli can be attended on the basis of not only their locations, but also of their simple features, we used color-cues and shape-cues presented after a stimulus array to investigate feature-based selection in working memory. Behavioral performance was enhanced by the presence of a feature-based retro-cue. Moreover, we noted a difference in the pattern of behavioral costs between the color-cue task and the spatial-cue task, indicating different processes in the two cases.

#### Attention & Memory: Method

## (47) The influence of attention on the probability and fidelity of memory

Michael Lawrence Dalhousie University

Typical studies of memory employ discrete stimuli that permit quantification of the probability memory, but not the fidelity of memory. Continuous stimuli, combined with mixture modeling, permit quantification of both the probability and fidelity of memory. Applying these tools to the study of how spatial attention affects memory, it is found that while endogenous spatial attention affects both the probability and fidelity of memory, exogenous spatial attention affects only the probability of memory. These results should serve to constrain models of attention, memory, and their interplay.

#### Memory: Iconic/Visual Working Memory

# (48) Task-specific assessment of visual memories Jane Jacob, Bruno Breitmeyer, & Evelina Tapia University of Houston

Priming and comparison tasks were used to estimate the time course of iconic and post-iconic stores for form or color features. In each task, a prime is followed by the probe at stimulus onset asynchronies (SOAs) varying from 63 to 1920 ms. In the priming task, observers responded to the form or else color of the probe. In the comparison task, observers indicated whether the probe and prime were same or different. Priming results showed a rapidly decreasing priming effect as SOA increased, indicating reliance on an iconic representation; comparison results indicated reliance on post-iconic and iconic representations.

#### Memory: Visual Working Memory

(49) Visual working memory for relations

Pamela Glosson & John Hummel

University of Illinois at Urbana-Champaign

Visual and cognitive sciences generally agree that WM capacity is 4 +/- 1 items. In the vision literature, an item is an object and in the cognitive literature an item is a role binding. Each predicts a radically different visual WM capacity for spatial relations among object parts. Our experiments and computational model suggest an intermediate account is more accurate and appropriate for visual WM for relations. This work suggests two pairs of parts can be held in working memory along with all their inter-relations, and the same part in different relations is not the same item in working memory.

(50) Why are we "blind" to change? The role of encoding in change blindness
Xiaoyu Zhang, Jordan Martin, Naomi Stone,
Geoffrey Dreher, Max Kahn, & Marcie Penner-Wilger
Franklin and Marshall College

Change blindness refers to the phenomenon that observers often fail to report large changes that occur during a visual disruption. Previous studies have suggested that this might result from an error of encoding, storage, or retrieval. To determine the role of encoding and storage in change blindness, we manipulated the image and blank duration in the flicker paradigm. Identification was much slower when the image duration was shortened, but was not significantly different when the blank duration was lengthened. These results suggest that encoding phase of visual short-term memory plays an important role in change blindness.

#### Memory: Spatial

(51) Describing spatial locations from perception and memory: The effect of spatial reference directions on reference object selection Xiaoou Li, Laura Carlson, Weimin Mou, Mark Williams, & Jared Miller
University of Notre Dame

Research in spatial memory has shown that an array of objects can be organized by a set of spatial reference directions along which interobject spatial relations are encoded. Research in spatial language has shown a preference to select reference objects that are in close proximity or alignment with the object being spatially lo-

cated. Five experiments assessed whether spatial reference directions are the means by which proximity and alignment effects are observed. Results indicate that the spatial preferences for encoding object locations according to spatial reference directions strongly bias the selection of a reference object in a spatial description task.

#### Memory: Scene

(52) Association of neurotransmitter gene polymorphisms with rapid scene categorization Yuichiro Kikuno¹, Jun Saiki¹, & Tetsuro Matsunaga²
¹Kyoto University, ²AJINOMOTO Integrative Research for Advanced Dieting

It has been suggested that CHRNA4 known as a nicotine receptor subunit gene was associated with a cued visuospatial attention task. However, in order to strengthen the association, it is necessary to demonstrate the association with more comprehensive tasks. In the present research, rapid scene categorization task was employed as the starting point. Participants had to judge whether a rapidly presented picture was "Natural" or "Man-Made" as quickly and accurately as possible. The results showed that there was an association between CHRNA4 and accuracy of "Natural" scene categorization. The implication of this discovery will be discussed.

#### Memory: Prospective

(53) Manipulating expectation of context at intention formation: Evidence of task and lure Adam Underwood & Melissa Guynn
New Mexico State University

Current study seeks to determine whether expectation of context can be manipulated without explicit instruction or implication during a prospective memory task. Additionally, the study seeks to determine whether task and lure interference, along with good prospective memory, can occur during an unexpected context. To achieve this, the prospective memory cues (fruit words), while occurring in each task, were more highly associated with one ongoing task (fruit/vegetable categorization) than the other (tree/shrub categorization). Results indicate expectation of context can be manipulated without explicit instruction or implication; and furthermore, task and lure interference was observed in the unexpected context.

#### Face-Perception

(54) Threat lowers awareness thresholds in anxiety
Lital Ruderman & Dominique Lamy
Tel Aviv University

Attentional bias towards threat has been recognized as a major factor in the etiology and maintenance of anxiety. In this study, anxious subjects showed lower awareness thresholds than non-anxious subjects for facial expressions and pictures of animals, but only when presented with threat targets. When happy faces were presented, no differences were found between anxiety groups. These findings suggest that anxiety may be associated with enhanced awareness of threatening stimuli, which lower perceptual thresholds for various other stimuli. Alternatively, repeated exposure to threatening stimuli may create an emotional context that induces a general state of hypervigilance in anxious individuals.

(55) Enhanced visual detection of threat-related emotional body postures

Ashley Blanchard & Maggie Shiffrar Rutgers - Newark

Most studies of emotion perception have focused on facial expressions and have generally supported the "threat advantage hypothesis" in finding enhanced visual sensitivity to angry and fearful faces. Emotional states are also communicated through body postures. A series of psychophysical studies investigated whether observers exhibit enhanced visual sensitivity to threat-related body postures. In a modification of the "face in a crowd" paradigm, observers viewed arrays of body postures depicting different emotional states. Postures were normed for the speed and accuracy of emotion recognition. Consistent with the threat advantage hypothesis, observers demonstrated speeded detection of angry and fearful body postures.

(56) The effect of perceptual distinctiveness on affective judgment

Yi-Cheng Tsai & Cheng-Ta Yang National Cheng Kung University

Distinctive objects are usually memorized better than a normal ones and it is likely that participants have more liking on those objects as a result of the better memory. However, no prior studies have examined whether perceptual distinctiveness can increase the mere exposure effect. This study was to study how perceptual distinctiveness may affect the recognition

memory and affective judgment. Results showed that distinctive objects were memorized better than normal ones with higher d', and participants show more preferences. Results highlighted that perceptual distinctiveness can increase both recollection and familiarity processes in memory such that preference increases.

#### **Face-Attention**

(57) Attentional disengagement from stimuli with learned emotional associations

Jessica Collins & Kim Curby

Temple University

Does learned semantic knowledge about the emotional properties of a stimulus impact perception in a manner similar to emotional meaning acquired through perceptual processes? Subjects learned to associate eight neutral face images with negative or neutral personality characteristics. These images then served as valid or invalid spatial cues to a target image (square or circle) that participants classified in an attentional disengagement paradigm. Contrary to previous research using emotionally expressive schematic faces (Fox et al., 2002), the allocation of attention was more affected by the valence of the learned negative associations among participants low, rather than high, in trait anxiety.

(58) Race advantage in different levels of face searching

Zhijie Cheng, Guomei Zhou, & Man Wang Sun Yat-sen University

The current research examined the categorization/individuation models of Own-Race Advantage (ORA) in perceptual identification tasks. Across 3 experiments, 3 face searching tasks in different levels were conducted. A significant ORA in individual face searching task was observed when the races of target and distracters are mixed. Otherrace faces were detected faster in race searching task. Interestingly, this other-race advantage was also observed in human face searching task. We suggested that this advantage was not due to faster categorization of other-race faces, but rather due to faster detection of these threatening other-race faces.

#### Face-Memory

(59) Holding faces in working memory interferes with face discrimination but not object discrimination

Laura Cacciamani & Mary Peterson University of Arizona

Similar areas of the prefrontal cortex (PFC) are activated for face working memory (WM) and face perception, but not object perception. We used a face WM task to overload the PFC in healthy participants while they made same-different discriminations for faces and cars. On face discrimination trials, subjects made more errors (FAs) with versus without a face WM load, whereas car discrimination was unaffected. It is known that PFC damage increases face recognition FAs. The presence of similar impairments in neurologically intact individuals with saturation of face-specific PFC provides behavioral evidence regarding the neurological underpinnings of face perception.

(60) Visual short-term memory is content specific

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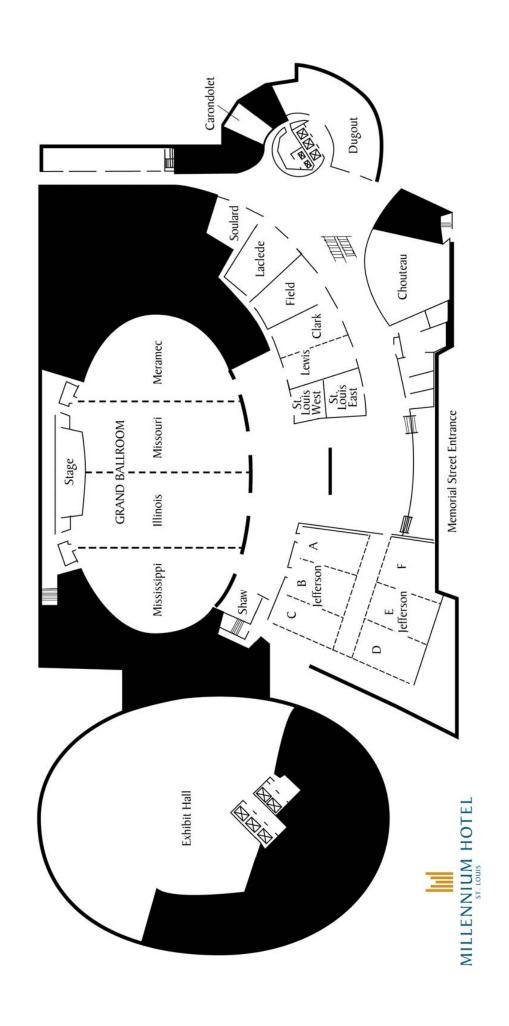
Past work in visual short-term memory (VSTM) has explored its capacity limitations. Here, we investigate the precision of VSTM for single items in a 2AFC threshold task. Two types of stimuli (faces and noise patterns) were synthesized to contain equivalent low-level visual structure, controlling for their inherent complexity. Stimuli were presented prior to an intervening mask thought to selectively activate brain regions implicated in early visual processing. Despite controlled complexity, thresholds for noise patterns were significantly higher than thresholds for faces, while the masking condition significantly disrupted only noise trials. These findings suggest that VSTM is content specific.

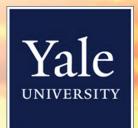
(61) Object versus face perception causes different types of change blindness: Detecting versus localizing change

Miko M. Wilford, Gary L. Wells, Bridget C. Baron, & Jacey L. Benal lowa State University

People often fail to recognize changes in their visual fields—a phenomenon known as change blindness. Participants were presented with a modified change blindness task including both faces and objects. Some were asked whether there had been change whereas others were asked what changed. The results illustrated how the different types of perception involved with faces and objects resulted in different types of change blindness. Compared to houses, people were less blind to detecting change in faces, but were more blind in localizing what feature changed. This critical interaction effect disappeared when the faces and houses were tested upside down.

NOTES:





Yale's Visual Cognitive Neuroscience Laboratory

-and-

Perception & Cognition Laboratory

congratulate
OPAM on 18 years

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