SPAM 31

San Francisco, California | November 16, 2023

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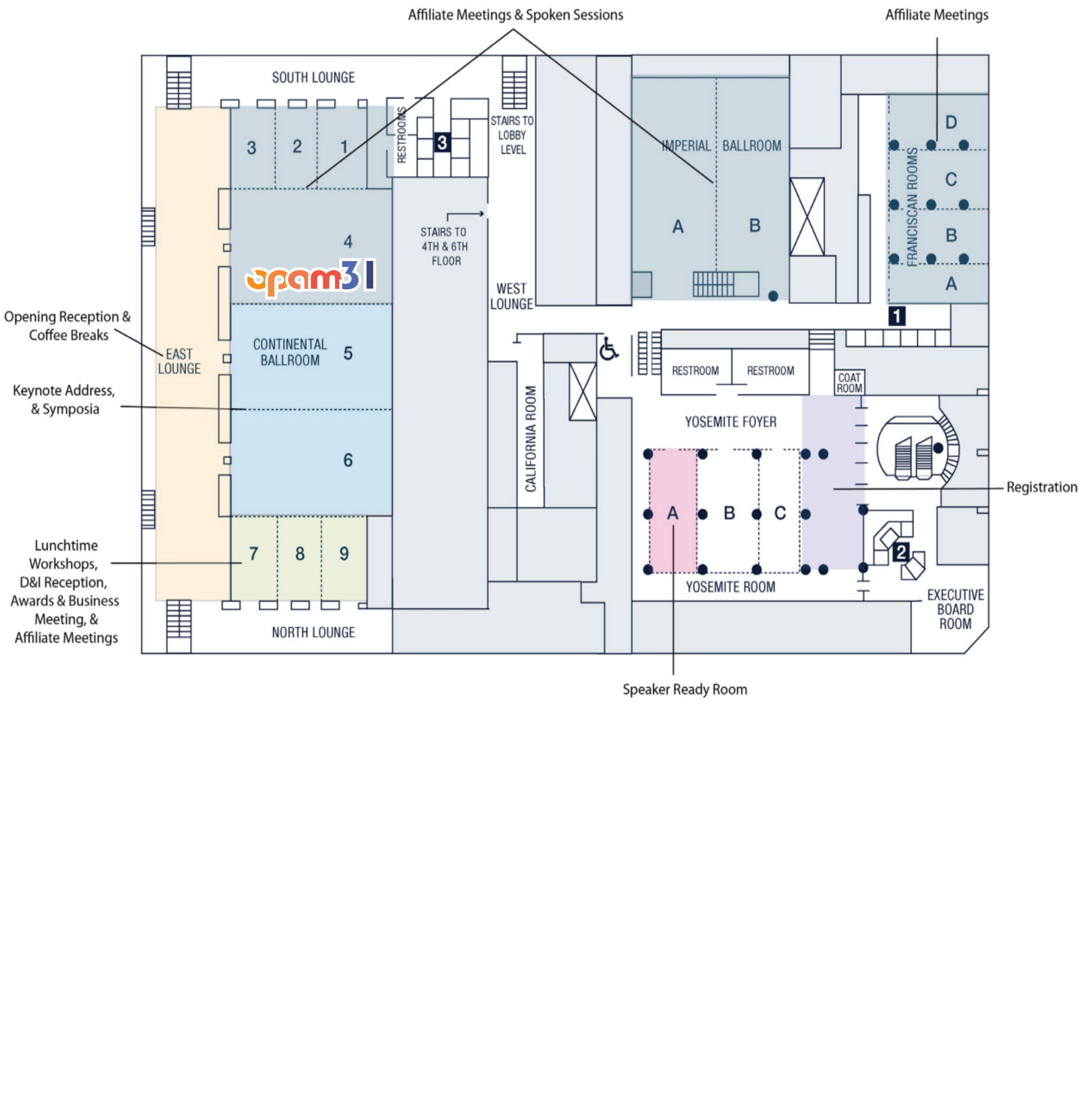
MAP - TALK SESSIONS

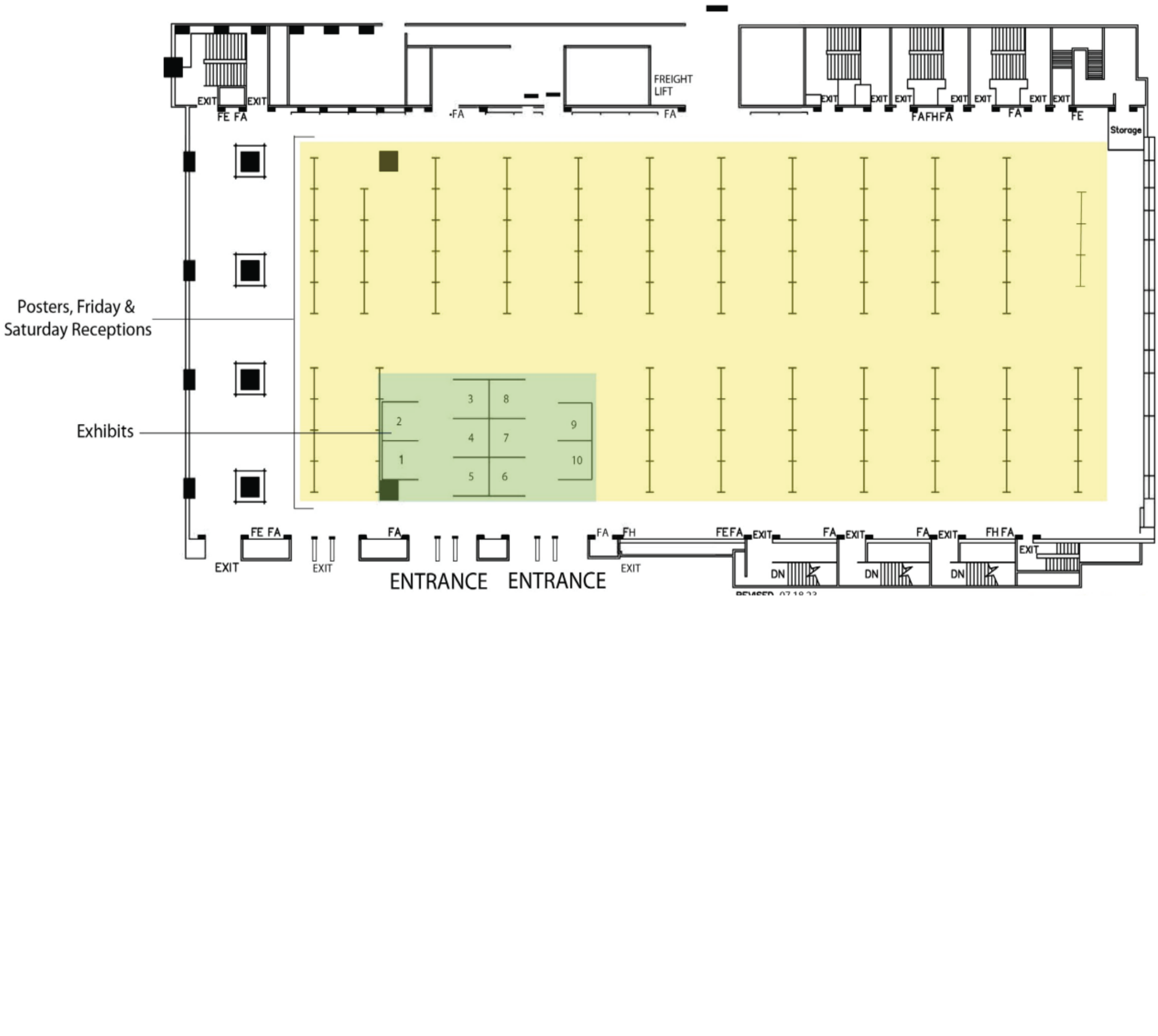
LOCATION:
Continental 4
Ballroom Level
Hilton San Francisco Union Square



MAP - POSTER HALL

LOCATION:
Grand Ballroom
Hilton San Francisco Union Square

GRAND BALLROOM LEVEL *(Access from Tower 2 in Hotel Lobby)*



2023 KEYNOTE ADDRESS

The Evolution of an Idea: Eye Movements in Theory and Application

Continental 4 Ballroom | 4:00 - 4:55 PM

James R Brockmole, Ph.D.

Professor of Psychology
University of Notre Dame

Dr. Brockmole is Professor and Chair of the Department of Psychology at the University of Notre Dame, where he also leads the Visual Cognition Laboratory.

Dr. Brockmole and his students investigate how humans form, store, employ, and manipulate short- and long-term representations of objects and scenes via behavioral and eye-tracking methods. Across his career, he has investigated the factors that control the deployment of visual attention, the properties of visual working memory, the effects of context on visually guided tasks, the influences of action on attention and memory, individual and group variability in visual processing, and the applications of visual cognition research to educational contexts.

Dr. Brockmole completed his B.A. at Notre Dame and his Ph.D. at the University of Illinois at Urbana-Champaign, after which he completed a postdoctoral fellowship at Michigan State University. He was previously a Lecturer (Assistant Professor) and Reader (Associate Professor) at the University of Edinburgh before transitioning back to Notre Dame.

SCHEDULE AT A GLANCE

ALL TIMES ARE PACIFIC STANDARD TIME

OPAM31

San Francisco, California | November 16, 2023

7:15 - 8:15 AM	REGISTRATION
7:45 - 8:00 AM	OPENING REMARKS
8:00 - 9:00 AM	TALK SESSION 1
9:00 - 9:15 AM	BREAK
9:15 - 10:15 AM	TALK SESSION 2
10:15 - 10:30 AM	BREAK
10:30 - 11:30 AM	POSTER SESSION 1
11:30 - 12:15 PM	LUNCH
12:15 - 1:15 PM	POSTER SESSION 2
1:15 - 1:30 PM	BREAK
1:30 - 2:30 PM	TALK SESSION 3
2:30 - 2:45 PM	BREAK
2:45 - 3:45 PM	TALK SESSION 4
3:45 - 4:00 PM	BREAK
4:00 - 4:55 PM	KEYNOTE ADDRESS: DR. JAMES BROCKMOLE
4:55 - 5:00 PM	CLOSING REMARKS

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ABSTRACTS

TALK SESSION 1 8:00 - 9:00 AM

1. Perception- and Decision-driven Biases Exhibit Differential Response Trajectories in a Working Memory Task
Kuo-Wei Chen & Gi-Yeul Bae

The present study analyzed response trajectories (from the initial mouse position to the final report) in a delayed estimation task to test the hypothesis that cardinal bias and serial dependence emerge in different processing stages. We reasoned that perception-driven biases should exhibit a straight-line trajectory because the bias occurred before the report while decision-driven biases should exhibit a curved line because the bias occurs during the report via response adjustments. We found that cardinal bias exhibited a straight-line trajectory (i.e., perception-driven) while serial dependence exhibited a curved-line trajectory (i.e., decision-driven), suggesting the two biases emerge in different processing stages.

2. Capacity Limits for Perception of Face Gender and Inversion
Samantha C. Lee & Lars Strother

Faces are associated with privileged visual processing, including potentially reduced attentional demands relative to other visual objects. Recent studies have used a dual-task divided attention paradigm to demonstrate capacity limitations for semantic categorization of familiar objects. We report results from two experiments that showed greater dual-task deficits for categorical judgments of faces than for color. We also report results suggesting that the degree to which two faces can be processed in parallel depends on the nature of the judgment, such that judgments of face orientation (i.e., upright versus inverted) showed greater evidence of parallel processing than judgments of face gender.

3. Perceptual Representations of Uncertainty Are Complex but Not Fully Probabilistic
Andrew J. Lee, Daniel Turek, & Ömer D. Tanrıkulu

One popular theory proposes that visual perception disambiguates noisy visual input through a Bayesian inference process. This has led to a more contentious idea that perceptual representations embody uncertainty in the form of probability distributions of visual interpretations. Yeon and Rahnev (2020) challenge this notion by presenting evidence that perceptual decision-making relies on a simpler representation of a single visual interpretation accompanied by a measure of uncertainty. In light of these conflicting views, we report two experiments that address methodological concerns and demonstrate that the complexity of perceptual representations may be more extensive than previously suggested, but may have an upper limit.

4. Forging a Head: How External Visual Elements influence the Perception of a Shape's Facing Direction
Jiangxue Valentina Ning & Benjamin van Buren

We show that an external element strongly influences a shape's perceived directedness, but that the effect depends on the element's alignment with the shape's intrinsic structure. In Experiment 1, observers more often saw an oval as facing a nearby dot when the dot was aligned with the oval's long (vs. short) symmetry axis. Do observers *automatically* associate long-axis-alignment with directedness? In Experiment 2, observers were faster when using an anterior key to report long-axis alignment and a posterior key for short-axis alignment, compared to the reverse mapping. We conclude that external elements interact with internal axes to determine perceived directedness.

TALK SESSION 2 9:15 - 10:15 AM

1. Slow and Steady: Conscientious Individuals May Prioritize Accuracy Over Speed in Visual Attention Tasks
Justin N. Grady, Patrick H. Cox, Samoni Nag, Emma M. Siritzky, & Stephen R. Mitroff

Given many everyday tasks and critical professions rely on visual attention, it is important to assess which factors can influence this core cognitive ability. The current study assessed the impacts of conscientiousness, fatigue, and their interaction on two attention-based tasks: visual search and object identification. The results showed that higher conscientiousness relates to better search accuracy and that conscientiousness protects search accuracy from the negative effects of fatigue. Through a novel touch-and-swipe response measure, response time data from a sorting task suggested that the interaction between conscientiousness and fatigue operates more over cognitive processes than over motor processes.

2. Agency-based Attentional Selection Histories Guide Visual Search
Adam C. Vilanova-Goldstein & James R. Brockmole

Agency biases attention towards objects we control. We investigated how agency might establish selection histories that enable this bias to compound over multiple experiences. Participants first controlled the movement of one circle amid other moving circles, and then searched for a target that was revealed by adding gaps to the circles' contours. Search was facilitated when participants had control over the eventual target (agency bias), when target identity repeated across trials (identity-based selection history), and, critically, when control over objects repeated (agency-based selection history). These selection histories were additive, indicating a binding between object identity and one's sense of agency.

3. Encounters With Semantic Violations Do Not Interfere With Immediately Subsequent Scene-viewing Behavior
Alan Z. Lu & John M. Henderson

Unexpected elements like semantic violations in scenes disrupt visual processing at fixation, but little is known about their effects on subsequent viewing behavior. Here, we examined whether semantic violations impact subsequent oculomotor programming and semantic guidance of attention. Fixation durations and saccade amplitudes did not differ after exiting a semantically consistent vs. inconsistent object. Inconsistent object semantics neither influenced subsequent attentional guidance nor interfered with semantic guidance by other scene elements. These results show that disruptions from semantic violations do not extend beyond their object borders and that inconsistent semantics are ignored or suppressed when deciding where next to attend.

4. When Detecting a Salient Target Makes Search More Effortful
David S. Lee, Andrew Clement, & Brian A. Anderson

Prior research identified two distinct search modes: singleton detection and feature search. Singleton detection produces inefficient performance compared to feature search, with search being slower and more prone to distraction, which raises the basic question of why people engage in singleton detection. Across four experiments, we test the widely-held assumption that singleton detection is less effortful than feature search by allowing physical effort demands to trade off with search demands. Surprisingly, participants consistently exerted more physical effort to reduce the frequency of singleton detection trials, suggesting that they found singleton detection to be more effortful than feature search.

TALK SESSION 3 1:30 - 2:30 PM

1. Saccade Target Status Influences the Reference Frame of Object-Location Binding
Tzu-Yao Chiu & Julie D. Golomb

The visual system needs to keep track of object identities and locations to maintain perceptual stability across saccades. Here we examined the role of saccade targets in object-location binding across saccades. In two experiments we showed that saccade target objects can be bound to both spatiotopic and retinotopic coordinates (unlike previous studies showing purely retinotopic binding for non-saccade-target objects). The spatiotopic binding occurred even when the saccade target location was less predictable and cannot be explained by post-saccadic eccentricity differences. Our findings suggest that saccade target status triggers binding the saccade target's identity to the more ecologically relevant spatiotopic location.

2. Mixing and Mingling: Inter-item Competition in Visual Working Memory is Both Feature-general and Feature-specific
Janna W. Wennberg & John T. Serences

A canonical feature of visual working memory (WM) is its limited capacity. As a result, increasing the load of working memory leads to inter-item interference, or inter-item competition. However, little is known about whether this competition is feature-general—determined only by overall memory load—or feature-specific, where competition is driven by feature similarity. Models all positing a sensory-recruitment architecture make divergent predictions about the role of feature similarity vs. the role of WM load alone. In three behavioral experiments (N = 40 each), we show that feature-specific interference plays a dominant role during encoding but not in maintenance.

3. EEG Activity Reveals a Common Content-independent Pointer System for Auditory and Visual Working Memory
Darius Suplica, Gisella Diaz, Henry Jones, William Thyer, John Veillette, Howard Nusbaum, & Edward Awh

We analyzed EEG recordings of subjects holding auditory and visual items in working memory (WM) using a multivariate decoding model and representational similarity analysis. Modality-specific attentional factors, as well as intra-modality load were highly classifiable. We additionally observed moderately successful cross-modality load decoding in both directions, providing support for models of WM that argue for shared signatures of load. Finally, the relative load signature of conjunction trials (where subjects remember both modalities), was identical to that of single-feature trials, suggesting that auditory and visual information can be seen as sub-features bound to a single object in WM.

4. Temporal Grouping in Visual Working Memory Allows Better Access but at a Cost of Confusability
Joyce Tam & Brad Wyble

A growing body of literature shows that temporal information, in addition to spatial locations, plays a critical role in the structure of visual working memory. Here, we theorized that multiple items presented at the same time form a Temporal Group (TG). We found that (1) When two items are probed, memory reports were more precise for same-TG items, and (2) Same-TG items are more likely to be confused with one another. These TG effects were also contingent on task settings that incentivize temporal grouping, showing that temporal grouping is flexibly applied for task optimization.

TALK SESSION 4 2:45 - 3:45 PM

1. The Role of Sensory Activation in the Guidance of Attention by Visual Working Memory
Zexuan Niu & Andrew Hollingworth

Visual working memory (VWM) is protected from the interference generated by new perceptual input. VWM is also proposed to interact dynamically with perception to guide attention. Here, we examined the effects of perceptual interference on VWM maintenance and on VWM-based attention guidance. Perceptual masking during the retention interval did not interfere with VWM maintenance. Masking also did not interfere with the guidance of attention from VWM, indicating that sensory recruitment may not be required for this interaction. Finally, perceptual processing of the masking color also guided attention, indicating that sensory activation can interact with attention in parallel with VWM-based guidance.

2. Interactions Between Visual Working Memory and Face Perception
Sanika Paranjape, Sarah Shomstein, & Dwight J. Kravitz

Visual working memory (VWM) is generally studied using low-level features, with maintenance involving perceptual cortical areas (Lee et. al., 2013), producing interference between VWM and perception (Teng & Kravitz, 2019). Here, we generalize sensorimotor recruitment beyond simple features, using an orthogonal dual-task paradigm. First, we show that maintaining a face in VWM distorts perceptual discrimination of other faces. Moreover, the faces in the discrimination task introduce biases in subsequent continuous reports of the face held in VWM. This bidirectional interference suggests that face-selective areas are involved in VWM maintenance, further eroding the distinction between supposed perceptual and cognitive processes.

3. What Can 9 Million Trials Tell Us About Memorability and Rejectability of Items in an Online Game?
Dyllan Simpson, Jeremy Wolfe, & Anna Kosovicheva

Hybrid visual search tasks involve searching for multiple types of target held in memory. Some target items are reliably more memorable than others. Similarly, when searching for those targets, some distractor items are more 'rejectable' as items not held in memory. Using a large set of 9 million trials from an online hybrid search game, we can derive memorability and rejectability measures from participants' errors. We show that item memorability and rejectability are separable. Items can be rejectable without being particularly memorable, and vice versa. Both effects are quite consistent across participants and stable across age, training, and performance level.

4. Drawings Reveal Changes in Object, but Not Spatial, Memory Across Time
Emma Megla, Samuel R. Rosenthal, & Wilma A. Bainbridge

Time has an immense influence on memory—truncated encoding results in memory for only the "gist" of an image, and long recall delays can lead to dramatic consequences, such as faulty eyewitness testimony. But what is changing in these memories across time? By having participants draw what they remember from a scene image across variable encoding or delay times, we find that while the number of recalled objects—including false objects—is highly influenced by time, spatial memory is surprisingly consistent. We also find that which objects people recall is predicted by encoding time.

ABSTRACTS

POSTER SESSION 1 10:30 - 11:30 AM

1. Testing Individual Differences in the Preparation Effect

Roy Shoval, Koby Lindzen, & Tal Makovski

According to the preparation effect, observers are more alert when distractors are expected to appear. Here, we tested 145 participants to examine possible individual differences in the magnitude of the preparation effect. Specifically, we asked whether the effect is related to working memory capacity and/or to the ability to filter out irrelevant information. However, the magnitude of the preparation effect did not correlate with these factors. These results indicate that the effect is rigid and unaffected by individual differences. They further support the notion that a mandatory 'process-all mechanism' is the underlying mechanism of the effect.

2. Covert Attention Modulates Visual Speech Perception Independent of Eye Position

Kelly E. McEvoy, Kira Wegner-Clemens, Lynne E. Bernstein, & Sarah Shomstein

Visual information extracted from a speaker's face enhances speech comprehension. While some individuals benefit from visual speech information, others do not. Past work showed that an individual's gaze behavior during easy-to-understand speech predicts how much they benefit from visual information during noisy speech. We hypothesize that the visual speech information benefit is driven not by individual gaze patterns, but by differences in allocating visual attention. By manipulating attention, we found that the degree of attentional benefit in lipreading was directly predicted by the free-viewing gaze pattern (mouth-looking preference) and the ability to extract speech from the noisy back-

3. What Counts as "Travel Time" in a Foraging Task?

Injae Hong, Ava Mitra, Nathan Trinkl, Grace Yan, & Jeremy Wolfe

This study investigated whether interposition of a secondary task during travel between patches in foraging alters patch leaving time. Between patches where participants picked "berries", observers either performed multiple object tracking or just "travelled" for short or long durations. Patch leaving time should depend on overall rate of picking. Overall rate depends on travel time. Was the tracking task part of travel time? If not, estimates of overall rate should go up and observers should leave patches sooner. Instead, tracking may actually make observers more exhaustive in their picking. Apparently, occupied travel time is still travel time in foraging.

4. RefCOCO-Gaze: A Large-Scale Gaze Dataset for an Object Referral Task

Seoyoung Ahn, Ritik Raine, & Gregory Zelinsky

Language is a pervasive means of guiding visual tasks. To explore this, we conducted an object referral task where participants searched for objects in images while listening to descriptions. Our dataset, RefCOCO-Gaze, consists of 19,490 gaze scanpaths from 220 participants, covering 2,094 unique image-expression pairs. Analysis revealed diverse eye-movement behaviors during object referral, including waiting, scanning, and verification. Search efficiency depended on factors like visual and linguistic ambiguity. Our dataset is valuable for researchers developing computer vision algorithms that mimic human attention and shed light on how language influences complex visual processing.

5. Effort-Driven Attentional Capture

Molly R. McKinney, David S. Lee, & Brian A. Anderson

Our attention can be persistently biased by valent cues (e.g., drug cues), sometimes at the cost of current goals. Stress and fatigue can put individuals with history of drug dependence at higher risk of relapse. Here, we examined whether attention is biased toward stimuli associated with high effort demand. Participants first learned pairings between color squares and levels of required effort and were then tasked with orienting to a circle target while ignoring a square distractor. Although color was irrelevant to the second task, both targets and distractors were prioritized when rendered in the color previously associated with high effort.

6. Spatial Frame of Reference for Inhibition of Return in Three-Dimensional Space

Noah Britt & Hong-jin Sun

The Posner's spatial cueing task is designed to measure the time it takes to re-orient attention when a target is presented following a cue appearing on the same or different side in a 2D space. In this study, we modified the spatial cueing task to present objects in 3D space with cue or target appearing on the same or different depths as well as the same or different sides. To study the spatial frame of reference of the cueing effect, we introduced simulated self-motion to produce discrepancy between viewer-centered and world-centered difference between cue and target.

7. It's All About Me! Attentional Prioritization of Self-Rewarding Information

Rebecca N. Warren, Andrew Clement, & Brian A. Anderson

Studies have shown attentional biases toward rewarding stimuli can be established when the participant is the reward recipient. However, whether attentional biases toward rewarding information for another person are present and how they compare to rewarding information for oneself is unknown. Pairs of participants searched for three target colors in a visual search task. The target colors were assigned either reward for oneself, reward for the other participant, or no reward. In a subsequent phase, participants searched for a unique shape, and the previous target colors were presented as critical distractors. Participants showed the strongest attentional bias toward self-rewarding information.

8. Meaningful or Familiar? The Role of High-level Features in Inattentional Blindness

Yifan Ding, Daniel J. Simons, Connor Hults, Rishi Raja, & Alexis Lee

We conducted four inattentional blindness experiments (total N=1700) to examine whether familiarity affects noticing of unexpected objects. Experiment 1 replicated evidence for greater noticing of upright schematic faces but did not replicate evidence (Mack & Rock, 1998) of greater noticing of happy faces than sad or neutral ones. Experiments 2-4 used participants from different pairs of countries and tested whether they were more likely to notice their own nation's flag or company logo than those of another country. These three experiments found little or no evidence that familiarity affects noticing rates for unexpected objects.

9. Occlusion, Stimuli Type, and Target-to-Distractor Layer Effects in Visual Search for Real-World Objects

Rachel T.T. Nguyen & Matthew S. Peterson

Occlusion makes search more inefficient (Wolfe et al., 2011), and searches for partially occluded real-world objects are more inefficient compared to search for a basic object (Nguyen & Peterson, In Review). We studied how amount of visible occlusion, the layering of the occluders, the degree of stimulus transparency, and whether the objects were grayscale or their natural colors. Participants searched for the presence of real-world objects. Occlusion, Stimuli type, and Layer effects occurred, where 25% and higher amounts of occlusion lowered search efficiency, colored aided search, and transparency only affected search for colored objects but not for grayscale objects.

10. The Influence of Display Complexity on Target Prevalence and Decision Making During Visual Search

Brandon Eich & Melissa R. Beck

The probability of a target being present across visual search trials (target prevalence) affects the decision of if an item is a target or distractor and the decision of when to quit search. Display complexity may also affect these decisions and could outweigh the influence of target prevalence. In the current study, complexity reduced the target prevalence effect for the item identity decision but not for the quitting decision. Eye-tracking supported this with increased display complexity leading to similar distractor decisions regardless of prevalence level, and high prevalence leading to more items being examined across levels of complexity.

11. Controlling for Spatial Envelope Does Not Affect Emotion-induced Blindness With Textual Stimuli

Lindsay A. Santacroce & Benjamin J. Tamber-Rosenau

Emotion-induced blindness (EIB) effects from text RSVP streams are often noisy/small compared to image EIB effects. We hypothesized that this discrepancy could stem from frequent visual transients due to stimulus spatial envelope changes from RSVP frame to RSVP frame in textual, but not image, EIB. Participants completed two textual EIB blocks with identical word stimuli ranging from four to ten characters. Critically, in only one block, the words were padded with pound symbols to a consistent length. Contrary to our hypothesis, the EIB effect did not change across blocks, ruling out one explanation for weak textual EIB effects.

12. Risk Preferences in Attention and Decision-Making

Nusrat Jahan, Laurent Gregoire, Edgar Bailon, James C. Spencer, & Bran A. Anderson

In most risky decision-making studies, there is only one risk that a potential reward is weighed against. Little is known about whether selection history (what people tend to choose) or the subjective aversiveness of outcomes (what they avoid) more strongly influences attention when choosing between two aversive stimuli. To address this question, the present study examined eye movements in a novel gambling task with multiple risks (losing money and getting shocked). We found that participants were biased to initially orient to aversive stimuli that they favored in their decisions and this bias persisted into an extinction phase.

13. Affective Priming of Attentional Scope: Feelings, Forests, Trees

Rebeka C. Almasi & Myeong-Ho Sohn

Attending to global versus local information of a stimulus is suspected to be vulnerable to influence by affect. This research tested whether positive or negative emotional primes change response times to congruent or incongruent Navon stimuli, thereby allowing us to determine whether one attentional scope is more facilitated by relatively positive/negative emotion than the other. The valence of primed emotion did not change the magnitude of the congruency effect, regardless of attentional scope–in other words, we found no evidence that feeling better or worse changes your ability to attend to the forest versus the trees.

14. How Do Expert Musicians Deal With Local Complexity in a Sight-reading Task?

Joris Perra, Bénédicte Poulin-Charronnat, Thierry Baccino, Patrick Bard, Philippe Pfister, Philippe Lalitte, Mélissa Zerbib, & Véronique Drai-Zerbib

The aim of this study was to determine how musicians deal with local complexity as a function of music reading expertise in a sight-reading task. Pianists of three different expertise levels had to sight read 4-bar score while their eye movements were recorded. The results revealed 1) experts' saccadic flexibility skills when dealing with upcoming local complexity, 2) experts' ability to deal with the complexity-induced foveal load; and 3) experts' visuomotor flexibility skills as regard to the played note. Overall, this study highlights the usefulness of local feature analyses as a tool for investigating the markers of expert sight-reading skills.

15. An Exploration of Perceptual Training Methods for Improving Medical Image Perception Part 1: Training Sessions

Emily Stutesman, Janelle Hernandez, Rebecca Penn, Megan Papesh, & Michael C. Hout

Detecting anomalies within medical images is critical to routine/emergency medicine. Here, we used a semi-longitudinal approach to investigate four perceptual learning methods for training a laboratory analogue of medical image analysis. In weeks 1-3, participants developed skills using one of the learning methods. Weeks 4-5 were "off weeks," followed by a skill retention test in week 6 and a skills transfer task in week 7. Training was assessed via performance on simple search arrays and complex scenes. Performance increased steadily over time, for both target detection and exhaustive searches, indicating that anomaly detection can effectively be trained via practice.

16. An Exploration of Perceptual Training Methods for Improving Medical Image Perception Part 2: Retention and Transfer

Janelle Hernandez, Michael C. Hout, Megan Papesh, Emily E. Stutesman, & Rebecca Penn

Detecting anomalies within medical images is critical to routine/emergency medicine. Here, we used a semi-longitudinal approach to investigate four perceptual learning methods for training a laboratory analogue of medical image analysis. In weeks 1-3, participants developed skills using one of the learning methods. Weeks 4-5 were "off weeks," followed by a skill retention test in week 6 and a skills transfer task in week 7. Training was assessed via performance on simple search arrays and complex scenes. Performance increased steadily over time, for both target detection and exhaustive searches, indicating that anomaly detection can effectively be trained via practice.

17. Cross-Task Congruency Sequence Effect between Gaze- and Location-Based Simon Tasks

Chaewon Lee & Yang Seok Cho

The present study investigated whether gaze direction shares a set of spatial codes with other modes of spatial information. Participants were to perform horizontal and vertical gaze-based Simon tasks alternately in a trial-by-trial manner in Experiment 1 and horizontal gaze-based and vertical color location-based Simon tasks in Experiment 2. The cross-task CSE was evident between the horizontal gaze-based and vertical color location-based Simon tasks, indicating that the two modes of spatial information activate a shared set of spatial codes. Furthermore, the time course of the location-based Simon effect was different from that of the gaze-based Simon effect.

18. Effect of Notification Type on Sustained Attention Performance

Kathryn V. Nason & Jonathan Wilbiks

Previous research has demonstrated an effect of mobile device notifications on sustained attention. We tested the differential effects of auditory and visual notifications presented while participants were completing the Sustained Attention to Response Task. We hypothesized that trials on which notifications were received would result in slower reaction times across both notification types. Results were in accordance with previous findings, demonstrating an overall effect of reaction time on sustained attention performance. Visual notifications were associated with significantly slowing of reaction times, while auditory notifications were not. The present study suggests auditory and visual notifications have unique impacts on sustained attention.

ABSTRACTS

19. Effects of Learned Spatial Probability Are Suspended, but Not Eliminated, During Parallel Search

Ryan S. Williams, Jay Pratt, & Susanne Ferber

Implicit learning of spatial regularities produces attentional biases that persist over large timescales when both learning and transfer involve serial search. We tested whether exposure to parallel search undoes prior learning, or if learned associations are nonetheless preserved, but hidden. Replicating previous findings, we demonstrate that spatial probabilities benefit search regardless of search-type during learning but persist only when learning and transfer both involve serial search. Critically, when we reinstated serial search following parallel search, the learned spatial probability effect remerged. Thus, learned spatial probabilities are robust to retroactive interference and can lie dormant without exerting influence over search behavior.

20. Easy Listening or Driving Distraction? The Relationship between Audiobook Difficulty Level and Driving Performance on Simple Routes

Jessica M. Kespe, Erika Ziraldo, & Lana Trick

We investigated if the effects of listening to an audiobook while driving would be impacted by book difficulty. The results showed that the cognitive complexity of the audiobook made it difficult for participants to pay attention while driving, which had no impact on speed, but slower hazard RTs, decreased lead vehicle distance, increased deviation in lead vehicle distance and lateral position. Additionally, participants remembered less information from the audio book, and rated it as more challenging, harder to focus, and mentally demanding. Altogether, the results highlight the impact of cognitive overload from a secondary task on different measures of driving performance.

21. High-level Conceptual Associations Between Objects Beyond Visual Co-occurrence Statistics Matter for Gaze Guidance in Scenes

Alexandra Theodorou & John M. Henderson

The visual world is complex, yet visual information processing is effortless. During scene viewing objects semantically related to other objects seem to be prioritized for attention (Hayes & Henderson, 2021). Previous work has defined semantic relations relevant for gaze guidance based on models from computational linguistics. Here, we investigate measures of object-object relations derived from visual co-occurrence statistics in scenes to predict fixations (Bonner & Epstein, 2020). Our findings suggest that gaze guidance depends on high-level object-object semantics beyond simple co-occurrence statistics. This furthers our understanding of object representational dimensions relevant for guiding eye-movements in scenes.

22. Mechanisms of Cognitive Control and Distractor Suppression in Heavy Drinkers

Sojung Youn & Brian A. Anderson

Impaired cognitive control has been linked to weakened self-regulatory processes underlying compulsive substance intake. Impaired task performance has been demonstrated in substance-abusing groups during Stroop and Go/No-Go tasks. Distractor suppression in visual search might also involve goal-directed regulatory components by resolving attentional competition. However, the efficiency of learning-dependent distractor suppression has not been examined in drug-abusing individuals, and direct comparison between cognitive control and distractor suppression is lacking. Here, we present evidence supporting a divergence of mechanistic processes between cognitive control and attentional control, and impaired learning dependent distractor suppression in heavy drinkers.

23. Learned Distractor Rejection: Robust, Rapid, and Hard to Measure

Isaac Savelson, Christopher Hauck, Mei-Ching Lien, Andrew B. Leber, & Eric Ruthruff

Learned distractor rejection (LDR), or the ability to reduce the attentional capture associated with otherwise distracting stimuli, is a frequently referenced, but relatively unexplored, phenomenon. Typically, an attenuation of capture occurs as experience with a color singleton distractor is gained, a process that repeats when the color changes. Here, using large sample sizes, we report two main findings. First, LDR initially appeared to occur within <5 distractor instances, faster than previously thought. Second, LDR appeared to hasten each time the distractor color changed. These results demonstrate that LDR can be difficult to measure, but is nevertheless highly robust.

24. A Compendium of Considerations in Motion-Induced Blindness Research

Vishnu Soni, John Sparrow, & Joseph Planchet

Motion-Induced Blindness (MIB) has sparked significant scholarly activity over the past two decades. Despite this, there is a lack of empirically supported guidelines and considerations for using the MIB display, which has resulted in newer studies replicating previously used methods with limited consideration for the potential improvements and risks involved. Thus, this study aims to review the common research methods in MIB, discuss their overlooked implications, and highlight novel data collection approaches. Topics covered include response collection, target position, fatigue, target disappearance, and MIB display color, luminance, and saliency. New empirical findings are also incorporated to support these discussions.

25. Individual Differences in Patch Leaving Strategy are Guided by a Drive Toward Optimization

Mackenzie J. Siesel, Walden Y. Li, & Andrew B. Leber

When picking strawberries, when should we move from one bush to another? This “patch leaving” decision predicts success in a variety of visual foraging tasks, yet people vary dramatically in their patch leaving times. Here, we questioned whether individuals customize their leaving times to their own unique search capacities to maximize success. Participants completed two tasks: 1) Exhaustive Search, in which they had to find all targets; 2) Free Choice, in which they chose when to leave each patch. Using the exhaustive search to estimate optimal patch leaving times, we found people’s optimal leaving times successfully predicted patch leaving choices.

26. Examining the Impact of Acetaminophen on Early Attentional Processing of Emotional Images

Felicity R. Woodson, Ming-Ray Liao, & Brian A. Anderson

In addition to pain relief, acetaminophen appears to attenuate the evaluative and emotional processing of valent stimuli and reduce brain activity within the salience network. The extent to which these effects are related to changes in attention remains unknown. Participants were randomly assigned to either control (placebo) or treatment (acetaminophen) groups and performed an emotional attentional blink (EAB) task. Despite replicating a robust EAB for valent images, there were no performance differences between groups, suggesting that acetaminophen did not reduce distraction by valent images. A follow up study using more salient distractors and a rating task is ongoing.

27. Learned Attentional Flexibility and Spontaneous Fluctuations in Sustained Attention Modulate Pupil Size

Austin L. Torain & Anthony W. Sali

The efficacy of sustained attention as well as our readiness to shift spatial attention, known as attentional flexibility, vary over time and across different contexts. Individuals learn shift likelihoods and adjust their attentional flexibility accordingly. We assessed the relationships among pupil size, attentional flexibility, and sustained attention using a gradual continuous performance task that required participants to shift or hold their gaze according to visual cues. Unexpected attention shift and hold cues were associated with reductions and increases in pupil size, respectively. Additionally, there was a quadratic relationship between pupil size and fluctuations in sustained attention, supporting models of arousal.

28. Identifying Task Components Contributing to Attentional Control Strategy Choice

Tianyu Zhang & Andrew B. Leber

Suboptimal behavior is commonly observed in visual search tasks, which is partly attributed to avoiding the cognitive effort associated with optimal strategies. However, it remains unclear which task components individuals tend to avoid. Recent work has identified a group-level avoidance of enumeration process. In this study, we aimed to understand how such avoidance might relate to individual variation in strategy. We investigated the relationship between enumeration and search processes and strategy use . The results showed that the performance in the combined task of enumeration and search correlated significantly with individuals' optimality. Preliminary evidence also indicated the contribution of enumeration effort.

29. "Attentional Transplants" Cause Recipients to Like Images More Similarly to Donors: Evidence for Inter-observer Commonalities in How Attention Drives Preferences

Hong B. Nguyen & Benjamin van Buren

When different people view a scene, they attend to different things, and these differences in attention influence how much they like the scene. Patterns of attention may be highly individually specific. However, the effects of different patterns of attention on preferences may not be. Here we demonstrate this, using a new method of ‘attentional transplants’. We show that, if an observer likes an image, it is possible to transplant their viewing pattern into another observer — and that this causes the recipient to like the image better, compared with transplanting the viewing pattern of a donor who disliked the image.

30. Contextual Modulation of Perceptual Fluency and Cognitive Control

Emma Wiedenmann, Rebeka C. Almasi, Sarah Malykke, Sowon Hahn, & Myeong-Ho Sohn

The conflict adaptation effect, which demonstrates flexible cognitive control, and the reduction of performance benefit from perceptually fluent stimuli in context. This study investigated the relationship between perceptual fluency and cognitive congruence. Participants completed a priming task to assess perceptual quality before engaging in a target task. In Experiment 1, participants detected the congruence of a color Stroop stimulus, while in Experiment 2, they resolved the Stroop conflict. Clear primes increased the congruence effect during conflict detection but decreased it during conflict resolution. These findings suggest that perceptual clarity may facilitate more target-oriented processing.

31. Do Eye Movements Account for Latent Attentional Capture by Abrupt Onsets?

Rachel A. Eng, Samantha Joubran, & Naseem Al-Aidroos

It is heavily debated whether abrupt onsets automatically capture attention. Gaspelin et al. (2016) proposed that capture by onsets always occurs but is not seen if the task is too easy (latent attentional capture). We asked, does the prior evidence of latent attentional capture indicate that onsets always capture (covert) attention, or might it reflect oculomotor capture? We measured capture by onsets while participants searched for a colour-defined target. We found that latent attentional capture by onset cues, but not colour cues, is driven solely by the capture of eye movements.

32. Allocation of Spatial Attention in Human Visual Cortex as a Function of Endogenous Cue Validity

William Narhi-Martinez, Yong-Min Choi, Blaire Dube, & Julie D. Golomb

Previous research has shown increases in neural activation within cortex representing cued stimulus locations. How and when might this activity be modulated by the validity of an endogenous spatial cue? Using fMRI, we recorded neural activity while spatial attention was pre-cued with a central arrow prior to the memory array presentation. Validity of the arrows alternated between 100% (deterministic blocks) and 70% (probabilistic blocks), and we examined spatially-specific V1/V4 activity in preparation for and following the memory array. Results revealed stronger increases in cued location activity for deterministic vs. probabilistic cues, but this difference only emerged after the memory array.

33. How Malleable Are Your Judgments? The Effect of Subliminal Priming on Similarity Judgments

Anna K. Lawrance, James W. Tanaka, Amy E. vanWell

Similarity judgments play a fundamental role in human cognition. This study investigated the malleability of similarity judgments to the effects of priming. On each trial, participants rated the similarity of three images of seemingly unrelated objects, which were preceded by a related (“waterproof”) or non-word priming stimulus for 17ms. PsiZ—a psychological embedding software—utilized participants’ similarity judgments on related versus nonword priming trials to generate two 2D embeddings. On related priming trials, items formed two distinct clusters of waterproof and not-waterproof items in the embedding based on their primed ad-hoc category membership. Suggesting conceptual priming influenced mental representations of similarity.

34. Increased Cognitive Effort Leads to More Positive Moods: The Successful Performance & Task Difficulty Hypotheses

Lily Reck, Rebeka Almasi, Sarah Malykke, & Myeong-Ho Sohn

Previous research shows that stimuli associated with increased cognitive effort can acquire positive valence and that participants in high-effort tasks report more positive moods than those in low-effort conditions. The current study investigates the successful performance hypothesis, focused on conflict resolution, and the task difficulty hypothesis, which analyzes exertion of control, to determine how cognitively-demanding tasks lead to a bias towards high-effort, positive stimuli and to more positive emotional states. Results show no interaction between conflict resolution and emotional state, but that mood reports in the low-control task difficulty condition were significantly more positive than those in the high condition.

35. Characterizing Exposure History Effects on Visual Search Performance Using Big Data

Chloe Callahan-Flintoft, Patrick H. Cox, Dwight J. Kravitz, Emma M. Siritzky, Stephen R. Mitroff, & Kelvin S. Oie

Exposure history effects—the impact of prior events on current performance—can be highly influential but difficult to characterize with sample sizes typical of cognitive psychology tasks. With big data (488,000 participants) from the Airport Scanner mobile app (Kedlin Co.), the current study demonstrated that while prior exposure to targets in visual search has the strongest effect on performance, less task-relevant stimuli (e.g., salient distractors) can also have an effect depending on target presence. These effects are seen early in task learning, as well as later when participants are better-versed in the task. Moreover, the effects vary depending on how much time elapsed between trials.

ABSTRACTS

POSTER SESSION 2 12:15 - 1:15 PM

1. Number Perception in Humans Versus Machines: Investigating the Origins of the Approximate Number System

Miranda N. Long & Darko Odic

Visual perception ranges from content that more closely aligns with sensory input (e.g., color, motion) to the more abstract (e.g., number, agency). Although a traditional account of number perception suggests that humans have an innate, modular, specialized system for representing number, recent neural network models challenge this view. Together, by combining a careful examination of neural network models and an empirical experiment where human observers are presented with the stimuli used to train these networks, we demonstrate that humans do not necessarily mirror the processes recently demonstrated in machine-learning models.

2. Working Memory Modulates the Time-course of the Parafoveal Processing in Skilled Reading

Anastasia A. Stoops & Kiel Christianson

English readers with higher working memory have longer saccades, suggesting more efficient parafoveal word processing. We examined the role of working memory on the parafoveal processing of Russian subject/object grammatical case. Previous eye-tracking boundary-change studies have established that skilled Russian readers use morphosyntax available in the parafovea. This study used participants' working memory and preview manipulation to predict eye-movement measures. Working memory interacted with the preview in gaze and total time but in different directions. Higher working memory readers were more disrupted by the ungrammatical preview in gaze while lower working memory readers showed disruption in total time.

3. A Balancing Act: Do Balance Abilities Contribute to the Body-Tilt Illusion?

Sophia R. Baia & Michael K. McBeath

This study investigates if balance and direction of tilt contribute to body-tilt angle overestimation. Participants completed balancing tasks, tilting trials, and a demographics-exercise questionnaire. Consistent with past research, participants experienced stronger body-tilt illusions with eyes closed. Additionally, participants experienced stronger body-tilt illusions when tilted sideways compared to forward/backward and backward compared to forward. A stepwise multiple regression indicated that balance ability, exercise habits, and yoga practice do not significantly influence body-tilt judgments but suggests that those with worse balance may exhibit a marginally stronger body-tilt illusion. The findings imply the illusion functionally helps people balance, independent of their balance ability.

4. Tracking Through Rotation is Deficient: A Prediction of the Composite Object Representation Hypothesis

Qihan Wu & Jonathan Flombaum

Is object perception a composite of representations (COR), descriptions of internally referenced structure together with tags that externally reference an object's location and alignment; or is it instead 'direct', the perception of features in a single coordinate frame? We provide evidence for the COR hypothesis by confirming a prediction: that tracking rotation around an origin is deficient compared to tracking translation about an origin. The prediction follows from COR because tracking through rotation requires the updating of internally to externally referenced alignment, a demanding computational step that is not needed to track comparable translation.

5. Travel Time Estimation Depends on Distance, Mode of Travel, Temporal Discounting Tendency

Meiyu (Melrose) Pan & Eve Isham

This study investigates people's perception of travel time and speed for different transportation modes based on distance and temporal discounting. The online survey presents scenarios varying transportation modes and distances. Results show that personal vehicles are perceived as faster, particularly for shorter distances. Advanced bus features create a perception of increased speed. Individuals with higher future discounting overestimate personal vehicle speed. Implications include designing public transit and reducing personal vehicle reliance.

6. Investigating the Effects of Valence and Arousal on the Boundary Extension/constriction Phenomenon

Ava E. Axelrod & Lindsay A. Houck

Boundary extension (BE) is a phenomenon where observers remember more of a scene than they physically saw. While there is established work on the spatial mechanisms of BE, there are inconsistent findings on the impact of the emotional valence/arousal of the scene. Two experiments evaluated the emotional valence and arousal of the stimuli on boundary extension. Negatively valenced images contributed to more boundary extension than positively valenced images, while image arousal did not impact boundary extension. Additionally, image category (animal, object, person, scene) greatly influenced boundary extension, with scene images eliciting less boundary extension than all other categories.

7. Examining Individual Differences in Perceptual Versus Conceptual Representations Using PsiZ

Eric Y. Mah & James W. Tanaka

Psychological embeddings are rich multi-dimensional representations of internal, psychological similarity spaces. Recently, Roads and Love (2021) developed the PsiZ program for inferring embeddings from behavioural data. We explored the utility of PsiZ for examining individual differences, in particular for detecting perceptual versus conceptual categorization strategies. Using basketball player face stimuli (20 players, 4 teams), we created embeddings for a basketball novice group of 15 participants, 10 self-described basketball-watchers, and 1 self-described basketball expert. We found evidence that basketball-watchers and the self-identified basketball expert made more conceptual team-based judgments whereas the novice group primarily made perceptual similarity-based judgments.

8. Cortical Magnification, Not Summary Statistics, Explains Information Loss in Peripheral Vision

Rachel F. Heaton, John E. Hummel, Alejandro Lleras, & Simona Buetti

Numerous researchers have proposed special mechanisms and representations to account for the loss of information in peripheral vision. We implemented a neurally realistic V1 model to investigate whether such mechanisms are required, or whether information loss can instead be explained by cortical magnification. We presented the model stimuli centered either at fixation or in the periphery, and measured information loss due to crowding using Gaussian radial basis functions. Our results suggest that cortical magnification can account for information loss and failure to individuate features in the periphery without the need to appeal to a special lossy compressed peripheral representation.

9. Insights From Eye Blinks Into the Cognitive Processes Involved in Visual Word Recognition

Ronen Hershman, David Share, Elisabeth Weiss, Avishai Henik, Adi Shechter

We measured the temporal probability of eye blinking during word recognition among skilled adult readers and elementary school children. Interestingly, our results showed that in contrast to behavioral and pupillometry results, the probability of eye blinking was higher for familiar (real) words than for unfamiliar (pseudo)words. Considering the novelty of our findings and methods, we believe that this investigation opens up new possibilities for studying underlying cognitive processes in a variety of domains of human cognition.

10. The Rocksim Database: Multidimensional Scaling Analyses of Similarity Ratings for 30 Categories of Rocks

Bryan L. White, Eben Daggett, & Michael C. Hout

The images of geological samples utilized by Meagher, et. al., (2017) constitute a diverse, feature rich, stimulus set that enjoys reasonable expectation of novelty across the majority of research participant populations. This makes them uniquely suited for use in a wide variety of research paradigms, such as those exploring memory, categorical learning, and visual perception/attention. Here, we sought to enrich this stimulus database with models of similarity for each category. Participants used the Spatial Arrangement Method to indicate similarity perception, assigning stimuli measures of "sameness" indexed by closeness in space. Full multidimensional scaling analysis is reported for each set.

11. A Change Localization Benefit for Mixed Arrays Compared to Uniform Arrays

Temilade Adekoya, Chong Zhao, Edward Awh, & Edward Vogel

We examined the consequences of stimulus heterogeneity – uniform arrays with only one type of feature (e.g. color) versus mixed arrays with two feature-types (e.g. color and orientation) – on visual working memory performance. Consistent with object-based models, we observed a significant cost of increasing load in both the mixed and uniform conditions. However, we also saw evidence for a modest advantage in the mixed array conditions, a difference that is not predicted by pure object-based models. Ongoing follow-up work examines whether the advantage in the mixed condition reflects differences in whether items are stored, or differences in memory fidelity.

12. Workload Processing Efficiency for Identification of Distractors Within Words

Sarah Sinclair-Amend, Joseph Houpt, & Valerie Shalin

The effect of distractor location on processing effeicency was examined to compare Coltheart's Orthographic Route (Coltheart, 2001) to Coltheart's Phonetic Route and Perfetti's Word Identification (Perfetti & Stafura, 2014). Evidence from general configural processing research suggests that reading via visual recognition without phonetic conversion is viable. To determine if expert readers, (dyslexics/controls), were processing phonic units rather than words holistically, we examied the location processing efficency of distractors. There was a general lack of support for the location of the distractor effects which supports Coltheart's Orthographic Route. Dyslexics performed similarly to controls, which does not support Perfetti's (2007) theory of poor lexical quality in dyslexics.

13. Information Presentation Congruence: Physiological and Subjective Comparisons of Social Media Content's Effect on Recall

Zoe Loh, Helia Hosseinpour, Lace Padilla, & Spencer C. Castro

The present study assesses how different visual formats and media impact how people process and remember information. We recorded participant eye movements and pupil sizes while reading sections of a climate change report in the form of 1) a PDF and 2) a simulated social media feed presented on either paper or a computer screen. After reading, participants answered multiple-choice questions and completed the NASA Task-Load Index. Participants reported greater mental demand for the PDF than the scrolling feed and the digital version than the physical version. However, we could not conclude a difference in accuracy between conditions.

14. Independent Effects of Valence and Memorability on Visual Statistical Learning

Meital Friredman-Oskar, Tomer Sahar, Tal Makovski, & Hadas Okon

Past research showed that negative valence benefits memory and visual statistical learning (VSL) tasks. This study investigated the role of image memorability in VSL and whether it can explain the valence effect. Participants viewed streams of images varying in valence (neutral, negative) and memorability (high, low). Experiment 1 revealed that only enhanced memorability improved VSL. However, when memorability was fixed, negative stimuli were learned better than neutral stimuli (Experiment 2). Similarly, high-memorability images enhanced VSL, but only with neutral stimuli (Experiment 3). These findings demonstrate the impact of item memorability on VSL and its independence from the effect of valence.

15. Subjective Frequency Estimates Are Unrelated to How Easy It is to Hold a Representation in Memory, but Tell You How Distracting a Lure Object is

Chong Zhao, Keisuke Fukuda, & Geoffrey Woodman

Previous research has shown that certain objects are more memorable than others. Here, we proposed a novel explanation of this visual memorability phenomenon which states that some objects are more memorable due to sheer frequency of encounter. We had observers provide subjective frequency estimates for the objects of our stimulus set. Then, across three experiments, we found that items that observers judged as more frequently seen were easier to reject as new items, but did not correlate with which items were more likely to garner hit responses when they were old. In sum, our findings suggest that visual memorability is a multifaceted construct that is not entirely due to frequency of encounter.

16. Visual Working Memory Capacity Affects the Effectiveness of Order Retro-cues

Ting Guo, Qi Li, Jiajia Yang, Satoshi Takahashi, Ejima Yoshimichi, & Jinglong Wu

This study investigated whether visual working memory (VWM) capacity affects the effectiveness of order retro-cues. Two VWM capacity factors were manipulated: memory load (2 or 4 objects per array) and location overlapping (overlapping or non-overlapping arrays). Experiment 1 used color-location conjunction objects, while Experiment 2 used more complex color-shape-location conjunction objects. Both experiments showed improved VWM performance with informative retro-cues, indicating that participants can select multiple items simultaneously. Moreover, retro-cue benefits decreased with memory load, and the effect of location overlapping varied with stimulus complexity. These findings suggest that the effectiveness of order retro-cues is closely linked to VWM capacity.

17. Investigating the Influence of Affective States on Memory Retrieval: a Potential Link to Depression

Yutong Zhu

Participants (N = 20) completed two GO/NO-GO affective word recognition tasks, with the interval featuring sad facial cue to elicit negative affect. Results indicated a significant improvement in negative word recognition accuracy after seeing facial cue, compared to positive and neutral words ($F(1.31,23.63) = 7.56$, $p = .007$, $\eta p2 = .30$). Furthermore, participants with higher depression levels performed better in recognizing affective words both pre-and-post cue ($F(1,18) = 7.05$, $p = .016$, $\eta p2 = .28$). These findings underscore the vital role of affect congruence in bridging learning and memory retrieval processes, while shedding light on its clinical implication on depression.

ABSTRACTS

18. Tracking the Effect of Associative Learning on Visual Working Memory With Multivariate Decoding

William X. Ngiam, William Thyer, Will S. Epstein, Henry M. Jones, & Edward Awh

Multivariate decoding of working memory (WM) load can precisely track the number of individuated items stored. We used this analysis (mvLoad) to examine the impact of statistical regularities that enabled chunking of color pairs. Subjects completed a recall task with 2 or 4 colors, or 2 associatively learned color pairs. mvLoad showed that when 4 colors were clustered into 2 chunks via learning, a reduced number of individuated memories were encoded. Thus, statistical regularities do not afford increases in the number of individuated items in WM; instead the sample display are encoded as a smaller number of learned groups.

19. Visual Working Memory Representations Show an Oblique Effect Even Under Modulation of Parietal Cortex With Anodal Transcranial Direct Current Stimulation

Harun Yörük & Benjamin J. Tamber-Rosenau

Frontoparietal brain areas support visual working memory (VWM) during concurrent perception. Here, we tested whether anodal transcranial direct current stimulation (tDCS) of posterior parietal cortex (PPC) would lead to reliance on parietal resources during VWM for orientation, either with or without visual distraction during the delay period. To assess reliance on early visual cortex (EVC) vs. PPC, we quantified the oblique effect, which is thought to rely in part on EVC. VWM performance was similar regardless of tDCS, and the oblique effect was stronger under distraction. These results suggest that VWM is potentially protected from distraction in EVC, not PPC.

20. Feature or Memory: Influences on Visual Search In Varying Levels of Clutter

David A. Tomshe, Melissa R. Beck, & Amanda van Lamsweerde

We investigated the use of visual properties (feature-based-search) versus memory (memory-based-search) in visual search. Participants searched aeronautical charts of varying clutter, or complexity, across blocks of repeated charts and new, non-repeating charts. In Experiment 1, search was faster for repeated than non-repeated high clutter charts, but not for low or medium clutter charts. In Experiment 2, we encouraged memory-based-search by increasing the number of repetitions for low and medium clutter charts. However, search was not faster for repeated charts, supporting feature-based-search. Results support feature-based-search for easy search (low and medium clutter) and memory-based-search for difficult search (high clutter).

21. Discovery of Optimal Strategies in Visual Working Memory

Yin-ting Lin & Andrew B. Leber

To what extent do individuals adapt strategies to maximize performance in different task contexts? Here we examine generality of strategy use in visual working memory tasks that involve distinct optimal strategies. Results show that participants frequently did not use the optimal strategy. Instead, many participants improved over time, particularly showing a sudden boost in strategy optimality. This suggests a sudden discovery of the optimal strategy. Further, we found that optimal strategy use across task contexts was positively related, suggesting that individual differences in strategy use may be in part guided by a task-general mechanism.

22. Working Memory Interference Does Not Impair Moral Decision-making

Jiaxuan Teng, Shuo Yang, Athena Montgomery, & Eve Isham

The current study investigates the impact of working memory capacity on moral judgement and arithmetic reasoning. We employed a dual task protocol to examine how higher cognitive interference affects decision time and perception of difficulty. It was observed that despite high cognitive interference, moral decisions were made faster than arithmetic judgments. Individual moral values, however, did not predict the moral decision time. Metacognitively, moral decisions were perceived as less difficult than arithmetic reasoning under interference. Overall, the results suggest that moral decision making may be more automatic, perhaps primitive and fundamental, and therefore is less impacted by cognitive interferences.

23. Extrinsic Motivation's Influence on Memory Performance in Online VS In-person Recall Tasks

Xavier Canas, Zoe Loh, & Spencer Castro

The present study assesses how differences in extrinsic motivation impacts memory performance. We conducted two versions of a study and found that online participants outperformed in-person participants in baseline memory performance. We believe the accuracy difference occurred because the online population was provided $15 in compensation while in-person was given extra credit, resulting in different motivation levels. To manipulate motivation we replicated the online study and provided $8 instead of $15 in an attempt to lower their accuracy. We conclude that there is a difference in accuracy for the online studies after manipulating motivation.

24. An Exploration of the Relationship Between Reward and Working Memory Encoding

Niya Yan & Brian A. Anderson

While the influence of reward on working memory encoding has been explored extensively, the effect of reward on the working memory encoding process when people are not expecting to report the probed information remains unclear. In the present study, participants who had learned associations between color and reward level were unexpectedly asked to report the identity of the color-singleton letter rendered in the high-value color. Surprisingly, they showed no better performance compared to individuals who did not undergo reward learning. This result indicates a limitation in the role of reward in facilitating working memory encoding.

25. Volitional Multitasking: When Do We Pause the Video?

Alejandra Zuniga, Laila Al Jaburi, Tracy Dillon, Amanda Quan-Kramer, Sid Valenciano, & Alexandra B. Morrison

The present study builds on research about volitional regulation of media multitasking by investigating if media multitasking levels vary by task demand. In a within-subjects laboratory study, participants completed an N-back working memory task with two levels of demand (0-back, 3-back), and two multitasking conditions (option to multitask by watching a video during the task, no multitasking option). They also provided self-reported confidence estimations. Participants multitasked more often in the low-demand condition and tended to have higher performance as well. The results of the current study suggest that people could reserve multitasking for less demanding activities to prevent performance interference.

26. The Mood-Congruency Effect of Complex Emotions: Investigating the Role of Patriotism

HongSheng Lin & Matia Okubo

This study examined the mood-congruency effect of complex emotions, with a particular emphasis on patriotism. Seventy Han Chinese served as participants. Participants were divided into two groups: one listened to patriotic music, while the other listened to neutral music during the study and test phases. Each group viewed 25 patriotic and 25 neutral (non-patriotic) images in the study phase, followed by a recognition memory test in the test phase. Patriotic music improved the hit ratio in the recognition test, highlighting the crucial role of complex emotions, like patriotism, in memory processing.

27. Investigating the Limits of Visual Working Memory Flexibility

Greer Gillies, Motonori Yamaguchi, Heinrich Liesefeld, Jonathan S. Cant, & Keisuke Fukuda

Visual working memory (VWM) is limited by a pool of "resources" that can be distributed among items. The strong version of the "flexible resource" model predicts that observers can distribute resources equally. We examined the limits of VWM flexibility using both multi-item and single-item report tasks where participants remembered the colours of circles and were asked to either "try their best" (baseline) or "remember all items equally well" (equal allocation). Observers were unable to equally distribute VWM resources across all items in a display. This pattern of results suggests that the ability to flexibly distribute VWM resources is highly limited.

28. Swap Errors Drive Individual Differences in Visual Working Memory Capacity Estimates

Olga Kozlova, Kirsten C. Adam, & Keisuke Fukuda

Individual differences in Visual Working Memory (VWM) predict many important outcomes, and the literature often assumes that capacity limits are the main driver of individual differences. Here, we examined whether inaccurate VWM representations (e.g., binding errors) may contribute to individual differences in VWM ability. Participants (N=313) performed a whole-report working memory task, and we used Monte Carlo simulations to model trial-by-trial response distributions of accurate responses, swap errors, and guesses. We found that swap errors strongly predicted overall VWM capacity estimates, suggesting that feature-binding failures are a key driver of individual differences in VWM.

29. Children Show Adult-like Memory Patterns to Scene Images by the Age of Four

Xiaohan (Hannah) Guo & Wilma A. Bainbridge

Adults consistently remember certain images better than others, owing to the intrinsic memorability of images. However, how early children have developed sensitivity to these intrinsic features that constitute image memorability remains unknown. In this study, we compared children's memory of scene images to adults' memory modeled by a deep neural network (ResMem) and tested using a continuous recognition task. Results showed that ResMem predictions significantly correlated with children's memory by four years old, although three-year-olds showed within-group consistent memory of scene images. These results suggest that children develop adult-like memory patterns of scene images by the age of four.

30. Cue Context and Working Memory Load Affect Within-Run Slowing in a Multiple Probes AX-CPT Paradigm

Theresa G. Mowad & Catherine M. Arrington

Within-run slowing occurs as cue context decays. We examined the impact of working memory load (WML) and cue context on performance in a multiple probes AX-CPT paradigm. Experiment 1 presented the WML before the cue and Experiment 2 presented the WML after the cue. Within-run slowing disappeared in high WML and choice response conditions in both experiments. These results are consistent with an interpretation of within-run slowing as a decay of cue context but places boundary conditions on the effect.

31. Memory for Arbitrary Sentence Details is Worse for Abstract Than Concrete Concepts

Charles P. Davis & Eiling Yee

Is context differently encoded alongside abstract (e.g., nostalgia) compared to concrete (e.g., saxophone) concepts? Whereas the reliance of abstract concepts on context for constraining their meaning is well supported, more recent work has pointed to a different dynamic: abstract concepts rely on systematic contexts for their understanding, but activation of such contextual information might inhibit encoding of arbitrary contexts. We test this prediction in a change-detection paradigm, presenting sentences that pair abstract and concrete concepts with arbitrary contexts—in a recognition phase, participants are poorer at detecting changes to those arbitrary contexts for abstract compared to concrete concepts.

32. The Strength of Visual Working Memory Degrades With Age

Shira Tkacz-Domb, Sarah Shomstein, & Dwight Kravitz

Previous studies show bidirectional interference between visual working memory (VWM) and ongoing perception, consistent with the common recruitment of perceptual cortical areas (Teng & Kravitz, 2019). We hypothesized that VWM degrades with age, evidenced by changes in the strength and nature of interference effects. Following the presentation of task-irrelevant color in an orthogonal dual-task, the interference induced in a subsequent continuous report of an item held in VWM increased with age in both its amplitude and the broadness of its tuning. These results suggest that the ability to precisely and stably maintain information in working memory degrades with age.

33. How Does Spatial Updating in VWM Impact Feature Processing?

Eva Lout, William Narhi-Martinez, Blaire Dube, & Julie D. Golomb

Memory for visual features is worse in spatially dynamic vs. static displays. Are memory errors still apparent if intentionally updating in spatially dynamic contexts? In a delayed estimation task, following a 4-item memory array, item placeholders either remained static or the display rotated one position. When instructed to mentally update object locations with rotation, object features sometimes 'stuck' to their original locations, suggesting that robust object-location binding contributes to errors in spatial updating, even when deliberately updating. Interestingly, binding errors were also present when participants were told to ignore rotations, suggesting that dynamic contexts may trigger automatic attempts to update.

34. Improved Memory or Decreased Forgetting? Magnitude of Generation Effect Increases With Short Delay in Verbal Recall Test

Michaela Ritchie & Jonathan Wilbiks

To corroborate past findings that a negative generation effect may be eliminated after a 2-day delay, we examined the relationship after a shorter delay. A total of 168 students participated in one of two experiments, comprising each of reading and generation tasks. Participants engaged in a free recall test of the material from the previous task after a 2-minute delay. In experiment two, the delay was increased to six minutes. Although a negative generation effect emerged across both conditions, no significant difference was found in memory for generated material over longer delays, suggesting that generated material may be more robust to forgetting.

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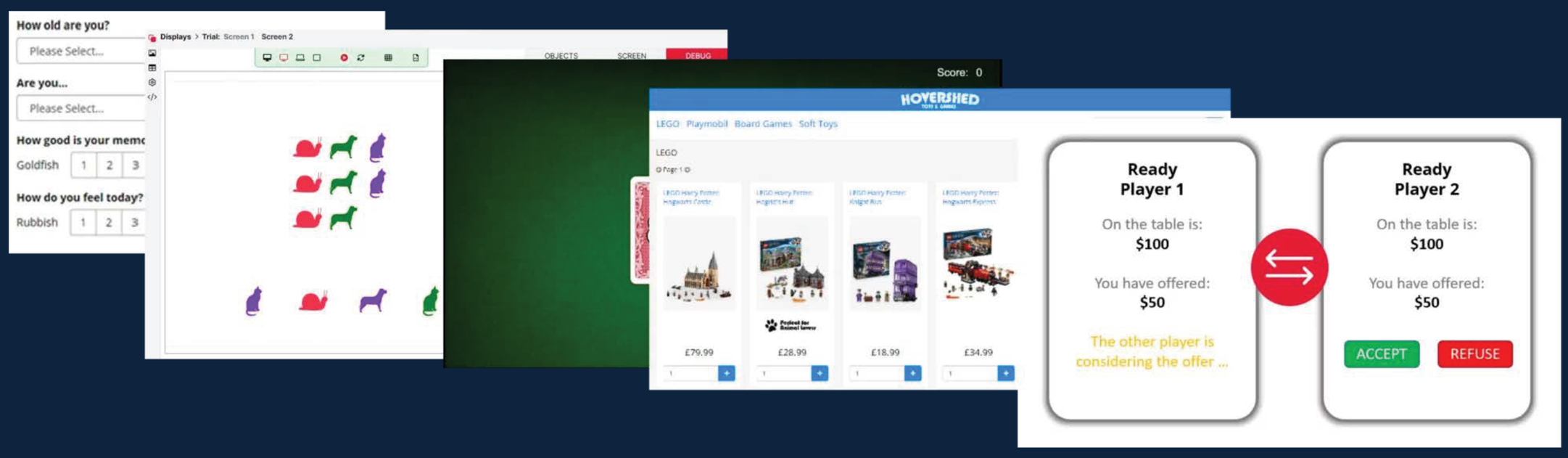

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