Abstracts of the Psychonomic Society — Volume 14 — November 2009
50th Annual Meeting — November 19–22, 2009 — Boston, Massachusetts

Papers 1–7   Friday Morning

Scene Processing
Grand Ballroom, Friday Morning, 8:00–9:35

Chaired by Carrick C. Williams, Mississippi State University

8:00–8:15 (1)

Encoding and Visual Memory: Is Task Always Irrelevant? CARRICK C. WILLIAMS, *Mississippi State University*—Although some aspects of encoding (e.g., presentation time) appear to have an effect on visual memories, viewing task (incidental or intentional encoding) does not. The present study investigated whether different encoding manipulations would impact visual memories equally for all objects in a conjunction search (e.g., targets, color distractors, object category distractors, or distractors unrelated to the target). Participants were presented sequences of 12 real-world pictures for 637 msec each and were asked to search for prespecified targets (e.g., green apple), memorize all objects, search for specified targets while memorizing all objects, search for postidentified targets (e.g., *How many green apples were there?*), or memorize all objects with one object prespecified. Encoding task significantly affected visual memory, but only for targets and unrelated distractors, indicating differences in the encoding processes of visual memories. Finally, confidence ratings indicated that participants were able to accurately judge the veracity of their visual memories.

8:20–8:35 (2)

When Does Memory Facilitate Perception (of a Scene's Layout)? After One or Two Episodes. THOMAS SANOCKI & NOAH SULMAN, *University of South Florida*—Four experiments indicate that prior memory of a scene is necessary for a top-down spatial priming effect. We measured spatial processing within scenes that were immediately preceded by either a (same) scene prime or a control prime. The scene was either new or repeated on a trial. When new, scenes primes did not cause more accurate processing than did the control prime. However, after one or two repetitions, scene primes increased accuracy (sensitivity) of spatial processing of the briefly presented scene target, relative to the control prime. Thus, facilitation of scene layout processing was not immediate (first primed trial) but required memory for at least one prior episode with the scene. In a fifth experiment, reaction time methods suggested that scene primes can cause a bias effect on the first trial with a new scene.

8:40–8:55 (3)

The Influence of Scene Context on Parafoveal Processing of Objects. MONICA S. CASTELHANO, *Queen's University*—Does scene context influence object recognition before the object is directly fixated? We examined this question using a modified boundary paradigm (Rayner, 1975). The participants' task was to indicate whether a target object matched an object name presented earlier. Critically, objects were presented on either a scene or a gray background. On each trial, a cue appeared, and, once fixated, an object preview would onset 4º or 10º away. The preview object could be identical to the target, of the same category (but with the same or a different shape), of a different category (but with the same or a different shape), or a control (rectangle). During the saccade toward it, the target object replaced the preview. The results revealed that, although there was no effect of preview category, same-shape previews presented at 4º produced a greater benefit on a scene than on a gray background. Two possible influences of scene context on parafoveal preview benefit will be discussed.

9:00–9:15 (4)

The Role of Semantic Memory in Learning Contextual Regularities in Real-World Scenes. JAMES R. BROCKMOLE, *University of Notre Dame*, & MELISSA L.-H. VO, *University of Edinburgh*—When encountering familiar scenes, observers can use episodic memory to facilitate the guidance of attention to objects appearing in known locations or configurations. We investigated whether and how memory for semantic contingencies that exist across different scenes is used to guide attention. Observers searched for letter targets embedded in different bedrooms. In a between-subjects manipulation, targets were always on bed pillows or randomly positioned. When targets were systematically located within scenes, search for them became progressively more efficient. Learning was abstracted away from bedrooms and transferred to a living room, where the target was on a sofa pillow. These contingencies were explicit and led to central tendency biases in memory for precise target positions. These results broaden the scope of conditions under which contextual cuing operates and demonstrate for the first time that semantic memory plays a causal and independent role in the learning of associations between objects in real-world scenes.

9:20–9:35 (5)

Visual Memory: Confidence, Accuracy, and Recollection of Specific Details. GEOFFREY R. LOFTUS, *University of Washington*, MARK T. REINITZ, *University of Puget Sound*, WILLIAM PERIA, *University of Washington*, & JULIE SEGUIN, *University of Victoria, Wellington*—How does the confidence/accuracy relationship differ when picture recognition is based on general familiarity versus specific features? Pictures were presented for varying exposure durations, followed by an old–new recognition test. Observers provided a confidence rating for each old–new response and also indicated whether each response was based on the picture's general familiarity or on one or more specific features in the picture. Feature-based responses produced higher confidence and higher accuracy. However, holding confidence constant, a feature-based response was less accurate than a familiarity-based response. The scientific conclusion is that confidence and accuracy are not based on the same internal events. The practical conclusion is that, contrary to common sense and to normal behavior (see Bell & Loftus, 1988), an eyewitness's accuracy in a legal setting should be discounted more when his or her recognition responses are based on memories for specific features than when they are based on general familiarity.

Selective Attention I
Constitution Ballroom, Friday Morning, 8:00–9:35

Chaired by Jeremy M. Wolfe
Brigham and Women's Hospital and Harvard Medical School

8:00–8:15 (6)

Two Dissociable Decision Criteria in Visual Search Revealed by Varying Target Prevalence. JEREMY M. WOLFE, *Brigham and Women's Hospital and Harvard Medical School*, & MICHAEL J. VAN WERT, *Boston University*—The frequency of targets in visual search (*target prevalence*) shapes search behavior. When targets are rare (1%–2% prevalence), observers use conservative response criteria, producing high miss rates. This might be just a version of a speed–accuracy trade-off, since low prevalence yields fast absent responses. We disprove this hypothesis by showing that very high target prevalence (98%) shifts response criteria in the opposite direction, leading to elevated false alarms, without leading to fast target-present responses. Rather, the rare target-absent responses are greatly slowed. In a second experiment, prevalence was varied sinusoidally over 1,000 trials. Observers' criterion and target-absent RTs tracked prevalence, whereas sensitivity (d') and target-present RTs did not. The results support a model with two criteria, both influenced by prevalence. One criterion governs perceptual decisions about each attended item. The other influences a quitting threshold that modulates RTs for target-absent responses.

8:20–8:35 (7)

Reward-Induced Attentional Amnesia in Visual Search. BRIAN R. LEVINTHAL, *Northwestern University*, & ALEJANDRO LLERAS, *University of Illinois, Urbana-Champaign* (read by Alejandro Lleras)—Intertrial effects in visual search have been demonstrated in a wide variety of paradigms and are known to be remarkably robust. The distractor previewing effect (DPE) is a particularly robust intertrial effect that emerges during oddball feature searches and reflects purely inhibitory attentional biases against one specific visual feature (or category). Previously, we have argued that these inhibitory biases reflect an implicit assessment of the usefulness of the information encountered in recent

in anger recognition was correlated with age-related improvement in disgust recognition. The results suggest special and common mechanisms underlying age-related differences in anger and disgust recognition from facial expressions.

(3008)
Concrete-to-Abstract Representations When Learning a Hierarchy of Categories. JADE GIRARD & SERGE LAROCHELLE, *University of Montreal* (sponsored by Serge Larochelle)—An experiment was run with the goal of determining which level of a category hierarchy is learned first. A feature overlap factor favored either high-level categories in the high-first condition or low-level categories in the low-first condition. A standard category verification task was administered six times during the learning process. Then, an explicit knowledge test was administered in order to take a closer look at the category representations of participants. Performance was better for low-level categories in both conditions, suggesting that the overlap factor did not determine the first level of abstraction. A closer look at the length and composition of the representations revealed that participants form high-level representations with attributes and values defining low-level categories. These results suggest a concrete-to-abstract process in learning hierarchically structured categories.

(3009)
Conceptualization of Perceptual Cues Guided by Metaphor, Depth, and Imagined Perspective. TIMOTHY C. CLAUSNER, *University of Maryland, College Park*, EVAN M. PALMER, CHRISTOPHER M. BROWN, & CAROLINA F. BATES, *Wichita State University*, & PHILIP J. KELLMAN, *UCLA*—We studied the role of magnitude metaphors (e.g., *larger is higher*) and depth cues (e.g., *larger is closer*) in an air traffic control visual search task. The effectiveness of size, contrast, color, and shape cues for encoding aircraft altitude (z dimension) in 2-D (x,y) displays were measured. Imagined viewing perspectives determined consistency between metaphors and depth cues. Participants looked from above or from below at a physical 3-D model, then imagined that perspective while viewing fronto-parallel displays. Displays imagined from above with depth-consistent cues yielded better performance than did those in the from-below, depth-inconsistent condition, even though the displays were identical and matched the *more is up* metaphor. Performance did not vary with imagined perspective for *more is down* metaphor displays. Both depth consistency and the *more is up* metaphor are required to explain these results. Performance varied with imagined perspective for grayscale—but not color or shape—encodings, possibly due to discrete versus continuous magnitude encoding.

(3010)
Strategy-Specific Differences in Working Memory Utilization in Category Learning: Evidence for Multiple Systems of Category Learning. MICHAEL A. ERICKSON & JUSTIN C. ESTEP, *University of California, Riverside*—One use of working memory in category learning is to manage different task representations (Erickson, 2008). We report the results of two studies that examined the relationship between working memory capacity (WMC) and category learning accuracy in Shepard, Hovland, and Jenkins's (1961) task. Although at most three dimensions were relevant for this task, we varied the number of dimensions that were presented and that changed between trials. When only three dimensions were present, WMC was only related to accuracy for problem types II, III, V, and VI. As a fourth dimension was added, this pattern changed. For example, the correlation between WMC and accuracy increased for problem type I (rule structure), whereas it remained at the same low level for type IV (prototype structure). This finding provides evidence that difficulty alone does not account for increased working memory utilization, but that it interacts with the underlying classification strategy.

(3011)
Applying Principles of Attention Learning From Categorization to Reinforcement Learning. FABIAN CANAS & MATT JONES, *University of Colorado, Boulder* (sponsored by Matt Jones)—Reinforcement learning (RL) has shown great promise as a framework for learning dynamic tasks. Although RL has performed well on complex tasks, the models have been dependent on carefully crafted stimulus representations that capture the information relevant to the task. Without such a representation, RL methods are hopelessly lost in realistic, high-dimensional tasks. Here, we apply principles of representational learning established in category learning—specifically selective attention—to develop models that learn their own representations, allowing RL algorithms to learn complex tasks for which they were not specifically tailored. RL and category learning are remarkably complementary: RL's focus is on updating representations by computing sophisticated feedback signals from temporal patterns of reward, whereas category learning focuses on creating powerful representations but uses relatively simple rules to update them. I will present simulation results showing how attention learning speeds RL in high-dimensional tasks, as well as behavioral data testing these models.

(3012)
Incidental Learning of Rule-Based and Information-Integration Categories. DENNIS RÜNGER & F. GREGORY ASHBY, *University of California, Santa Barbara* (sponsored by F. Gregory Ashby)—A central tenet in the implicit learning literature is that individuals can learn about environmental regularities unintentionally. We therefore asked whether category learning can occur for irrelevant features. Participants made a two-choice discriminative judgment on the color of a Gabor patch whose orientation and spatial frequency could be ignored. Unbeknownst to participants, two categories were defined on the basis of the irrelevant features and mapped consistently on the two color alternatives. Learning of the categories was tested either directly or indirectly. For the indirect test, we were able to show that responses on ambiguous color trials were influenced by the category information contained in the irrelevant dimensions. For the direct test, the categories were learned intentionally after the color information had been removed. We obtained a learning advantage for participants who had received the same category structure in the incidental learning phase. Learning was the same for rule-based and information-integration categories.

(3013)
Violations of Screening Off: A Bayesian Error Attribution Model of Causal Reasoning. RALF MAYRHOFER, YORK HAGMAYER, & MICHAEL R. WALDMANN, *University of Göttingen*—One of the most fundamental assumptions underlying causal Bayes nets is the Markov constraint. According to this constraint, an inference between a cause and an effect should be invariant across conditions in which other effects of this cause are present or absent (i.e., screening off). Previous work in different laboratories has demonstrated that reasoners tend to violate this assumption systematically over a wide range of domains. Moreover, we have shown that the degree of violations of screening off is moderated by assumptions about the mechanisms underlying otherwise identical causal relations. We have developed a causal Bayes net model that includes a hidden common preventive noise source that provides a rational explanation of these apparent violations. We will present two new experiments that confirm predictions derived from the model.

(3014)
Laypeople's Essentialist Beliefs Based on Experience With a Disorder Category. DIANA H. HOOTEN & JESSECAE K. MARSH, *Texas Tech University*—Mental health clinicians are less likely than laypeople to believe mental health categories are real categories with essences (Ahn, Flanagan, Marsh, & Sanislow, 2006). This divide could be problematic, given that laypeople make up a clinician's client base. Is this difference due to clinicians' formal training or because they have more experience with mental disorder categories than laypeople do? To examine the impact of experience on essentialist beliefs, we asked undergraduate participants who did or did not identify as members of mental disorder categories to rate whether mental disorders have shared qualities, causal symptoms, and, ultimately, whether they believe the categories have an essence. Participants also rated their level of interaction with the disorder categories. More interaction with mental health categories resulted in lower essentialist beliefs, regardless of whether participants identified themselves as members of the categories. These findings have implications for theories of how beliefs about categories change through experience.