Fall Meeting of the Comparative Cognition Society 2016

Thursday November 17, 2016
9:00 – 5:00
(Coffee Hour 8:00-9:00)
Sheraton Boston
Boston, MA

www.comparativecognition.org

Fall Meeting of the Comparative Cognition Society 2016

Back Bay B, Sheraton Boston, Boston, MA

8:00 – 9:00	**Coffee Hour**
9:00 – 10:05	**Social Cognition**
10:15 – 11:15	**Complex Cognitive Processes**
1:15 – 2:45	**Perception & Discrimination**
2:55 – 3:55	**Learning & Memory Processes**
4:00–5:00	**Keynote Presentation – Jeffrey Lamoureux**

Important Note to Presenters: Talks should be no longer than 12 minutes (three additional minutes scheduled for discussion)

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Social Cognition

Session Chair: Michael Brown

9:00	**Welcome and Introduction**
9:05	Noam Miller & Ramy Ayoub (Wilfrid Laurier University) **Flexible Use of Social Information and Learning in Zebrafish** Animals that live in groups, including humans, spend much of their time in close proximity to conspecifics. There are many reasons for this, including enhanced safety from predation and the possibility of taking advantage of social information. These two differing motivations for grouping have not previously been experimentally distinguished. We trained individual zebrafish (*Danio rerio*) to either approach or avoid a group of conspecifics for a food reward and show that fish learn either task equally quickly. A control group learned to locate food based on environmental cues more quickly, and was better at test, than either social group. These results demonstrate that grouping behavior can be modified by learning and that some of the drivers of grouping can be placed in conflict with each other and thus differentiated. There are many reasons to congregate and they are likely subserved by several different mechanisms.
9:20	Andrew C. Gallup, Janine Militello, & Elaine Herron (State University of New York at Oneonta) **The Effect of Oxytocin on Contagious Yawning in Budgerigars (*Melopsittacus undulatus*)** Experimental evidence of contagious yawning has been documented in only five species, including recent support in budgerigars (*Melopsittacus undulatus*). Although contagious yawning has been considered a behavioral marker of empathy, the neurochemical basis for this response is still largely unknown. Oxytocin, a mammalian hormone and neuropeptide, facilitates positive social interaction and has been implicated in empathic processing and prosocial behavior in humans. Mesotocin, the avian homolog of oxytocin, has been shown to promote flocking behavior in birds. Since oxytocin activates mesoctocin receptors in the avian brain, we investigated the potential link between oxytocin and contagious yawning in budgerigars. Birds were administered oxytocin or saline solution and displayed videos of yawns or matched control behaviors (2x2 repeated measures design). Overall, we replicated earlier evidence of contagious yawning in this species, but failed to show an effect of oxytocin on this response. These findings are discussed in relation to recent experiments on humans.

9:35	Erin E. Frick (University of Southern Mississippi), Holli C. Eskelinen (Dolphins Plus), Stan A. Kuczaj II (of Southern Mississippi) **Establishing a Link Between Personality Traits and Social Rank in a Group of Bottlenose Dolphins (*Tursiops truncatus*)** The present study investigated the relationship between personality and social rank within a group of captive bottlenose dolphins (*Tursiops truncatus*) housed at the Roatan Institute for Marine Science (RIMS). Social rank was established utilizing questionnaires distributed to experienced RIMS personnel and personality traits were derived from ethological behavioral coding that incorporate contextual variables. Traits were correlated to each dolphin's social rank position using Spearman rank order correlation coefficient. Traits that emerged revealed sex-related differences for personality components that were correlated with social status. Results suggest that a relationship between personality and social status is complex. Factors such as age, sex, maternal style, strength of associations, and interactions between hierarchies influence how rank related traits are expressed in different behavioral contexts.
9:50	Mackenzie Smith, Kelly Leverett & Sarah Brosnan (Georgia State University) **The (Non)Effects of Oxytocin on Capuchin Monkey (*Cebus apella*) Responses to Three Economic Coordination Games** Recent evidence has pointed to a role for oxytocin in motivating cooperation. Capuchin monkeys (6 pairs) were presented with three computerized economic games (Assurance, Chicken and Prisoner's Dilemma) after receiving either vaporized oxytocin or a saline control. Contrary to earlier work in which oxytocin reduced food sharing in capuchins, in this study it did not influence behavior. Five pairs found the highest paying, coordinated outcome in the Assurance Game, however the monkeys had more difficulty establishing stable outcomes or strategies in other games. In the Chicken Game, four of six pairs found the Nash equilibrium, with two pairs showing evidence of the optimal alternating strategy. In the Prisoner's Dilemma, two of the pairs alternated between the two highest paying outcomes significantly more than expected. Overall, capuchins were able to find the Nash equilibria, although the payoff dominant outcomes often eluded them.
10:05	10 Minute Break

Complex Cognitive Processes

Session Chair: Olga Lazareva

10:15	Julia Watzek & Sarah F. Brosnan (Georgia State University) **Rational Fools: Capuchins But Not Rhesus Monkeys Violate Transitivity in Stochastic Environments** Human and animal decision-making is known to violate rational expectations in a variety of contexts. According to ecological rationality, the statistical structure of real-world environments could account for seemingly irrational behavior. We presented 16 capuchins and 7 rhesus monkeys with 3 options that differed in value and varied probabilistically over time. In the control condition, individuals that act optimally should adhere to transitivity (if A>B and B>C, then A>C); in the test condition, they should violate transitivity. In the control, all subjects converged on the optimal, transitive strategy. In the test condition, 3 distinct strategies emerged for capuchins: biggest immediate gain (suboptimal, transitive), biggest overall gain (optimal, intransitive), and most frequent option (suboptimal). All rhesus monkeys short-term maximized. Notably, this led to negligible losses compared to the optimal strategy. These results suggest that successful decision rules readily emerge in stochastic environments. While the statistical structure may favor intransitive behavior, stable preferences in line with rational choice principles may facilitate the formation of near-optimal decision rules when short-term and long-term goals align. The species difference in conjunction with ongoing human testing informs how transitivity may have evolved as a cognitive shortcut to preserve mental processing resources.
10:30	Travis R. Smith & Michael J. Beran (Georgia State University) **Executive Control in Capuchin Monkeys** Eight capuchin monkeys completed a two-choice discrimination task where the options consisted of two arrays of clipart icons. Across trials monkeys had to determine whether the array had a high or low numerosity (6 vs 16 clipart icons) or high or low variability (every icon differed vs. every icon was identical). Thus, there were four different trial types that were presented, and the background color of the screen cued the discrimination type being asked (high numerosity, low numerosity, high variability, low variability). On each trial the arrays differed in variability and numerosity, with one dimension operating as the target dimension and the alternative dimension operating as an irrelevant dimension. In the congruent condition, the irrelevant dimension was the same in both arrays (i.e., only the target dimension differed). In the incongruent condition, the irrelevant dimension randomly varied between both arrays. Test trials with novel clipart icons were included to rule out the possible influence of set memorization on performance. Once subjects acquired the congruent discrimination, they transitioned to test sessions and the incongruent condition without a drop in accuracy, suggesting that the irrelevant dimension was not

	interfering with discrimination performance and the monkeys could effortlessly screen out the irrelevant information.
10:45	Stephen Ferrigno (University of Rochester), Nate Kornell (Williams College), & Jessica Cantlon (University of Rochester) **Metacognitive Illusions in Monkeys: The Effects of Perceptual Fluency on Confidence Judgments** A variety of animals are capable of making accurate metacognitive confidence judgments. For example, monkeys can make accurate bets on whether or not they will get a trial correct. How animals make these decisions is still debated. Some theories suggest that animals have direct access to their memory and are capable of self-reflection, yet others suggest that animals use associative learning or cues like reaction time to accomplish these tasks. There is a third, non-exclusive hypothesis about the kinds of mechanisms animals could use during metacognitive tasks. In humans, confidence judgments are often based on cues like perceptual fluency (e.g. how easy something is to see) rather than direct access to memory traces or associative learning. Here we test macaque monkeys with a perceptual fluency manipulation (image contrast) in a match-to-sample gambling task to test whether monkeys use perceptual fluency to make confidence decisions. We show that monkeys' performance was affected by perceptual fluency and could not be accounted for by either associative learning models or direct access accounts. This similarity between monkeys and humans suggests that both species use similar mechanisms for confidence judgments.
11:00	Bonnie M. Perdue (Agnes Scott College), Jennifer Johnson (Georgia State University), Ella Brown (Zoo Atlanta), Zoe Johnson-Ulrich & Jennifer Vonk (Oakland University) **From Touchscreen Computers to Zoo Visitor Education: Cognitive Research in Sun Bears** Malayan sun bears (*Helarctos malayanus*) are a small bear species found in tropical climates throughout Southeast Asia. Wild populations of sun bears are threatened by habitat destruction and hunting. The zoo strives to educate the public about these issues. Compared to other species, sun bears are relatively understudied and little is known about their cognitive abilities. However, recent work has begun to investigate cognition in this species. Here we will present findings from research involving training the bears to use a touchscreen computer system. This work both provides insight into cognitive abilities and provides enrichment for the bears. We will also include findings from interactions with a puzzle box that requires behavioral flexibility and has been used in a number of species. Finally, we were interested in how the public display of this type of research might influence zoo visitor behavior, attitudes, and knowledge about sun bears, and will present findings on the far reaching implications of comparative cognition research.
11:15	**Lunch Break**

Perception & Discrimination **Session Chair: Robert Cook**	
1:15	Carole Parron & Joël Fagot (University of Aix-Marseille) **A Face: Is a Stimulus Like Any Other?** Over the past few decades, there has been no real consensus over how non-human primates process a picture of face. Whether or not configural information prevails, as in humans, over featural information in face recognition, remains unknown. In a first experiment, we showed that baboons spontaneously detected some configural changes in a face recognition task. They were better in processing the qualitative spatial relations among facial features (the first-order properties) than the fine quantitative spatial relations (the second-order properties). This prevalence could be related to the intrinsic properties of the face or rather reflects a general mechanism of spatial relations processing. In a second experiment, we thus used some artificial stimuli sharing configural properties with faces: the greebles. After an extensive training with original greebles, baboons were tested to recognize first- or second-order modified versions of these stimuli. They were still better in the perception of qualitative relational properties within the greebles. We conclude that, in baboons, specific configural sensitivity is not restricted to faces and that a common mechanism may support configural processing for face and nonface stimuli.
1:30	Will Whitham (Georgia State University), Michael J. Beran (Georgia State University), Christopher M. Conway (Georgia State University), Brielle James (Georgia State University), Audrey E. Parrish (The Citadel, The Military College of South Carolina), & David Washburn (Georgia State University) **Statistical Regularities and Quantity to Humans and Rhesus Macaques** A recent study showed that human participants systematically underestimated the number of dots in arrays when the dots consistently co-occurred with one another (Zhao & Yu, 2016). This effect is hypothesized to have occurred because the consistently co-occurring pairs of dots were learned, chunked together, and perceived as single units. In the present study, we first aimed to replicate the findings of Zhao and Yu (2016) in a relative, rather than absolute, quantity discrimination task. Twenty-two human participants were asked to make 300 speeded judgments of the larger of two dot arrays. On each trial, one of the two dot arrays contained statistically regular pairs, while the other did not. Participants were found to have underestimated the numerosity of arrays with regularities in the final 100 trials. We are currently exploring whether statistical learning similarly affects numerosity judgments in rhesus macaques (*Macaca mulatta*).

1:45	Olga Lazareva (Drake University), Regina Gazes (Bucknell University) **SNARC effect in pigeons?** The spatial-numerical association of response codes (SNARC) effect is the tendency to respond faster or more accurately to the smaller numbers when response is located on the left than when it is located on the right (and vice versa for the larger numbers). The SNARC effect is presumed to reflect an automatic tendency to order numbers and magnitudes from left to right in Western cultures. We trained pigeons to select a smaller of the two simultaneously presented arrays of circles. All circles had the same diameter so that the larger arrays also occupied larger areas. Once the pigeons learned the task, they were presented with a novel, non-differentially reinforced pairs of arrays. Upon completion of the testing, the contingencies were reversed and the birds had to learn to choose a larger of the two arrays; after that, the testing was repeated. The order of the tasks was counterbalanced across the birds. The majority of the birds displayed a strong SNARC effect, although its direction (left-to-right or right-to-left) was not consistent across the birds. Future research will explore the control of SNARC effect by magnitude of the array and by its surface area.
2:00	Suzanne L. Gray, Muhammad A. J. Qadri, Daniel I. Brooks, Robert G. Cook (Tufts University) **Attentional Strategies in Concurrent Visual Search in Pigeons** Multiple strategies can be effective when different dimensional discrimination tasks are simultaneously available. In one strategy, the observer may examine each stimulus and evaluate it independently, and in another, the observer focuses attention on one task until it is completed before switching attention to the next task. This latter strategy may minimize interference as discriminations are considered separately. We investigated what strategy pigeons would use when presented with a visual search array varying in two distinct dimensions, brightness (light to dark) and orientation (vertical to horizontal). On each trial, up to 32 stimuli were simultaneously displayed on the screen with an equal number in the two tasks having reinforced and non-reinforced values. Independent of dimension, the pigeons' target choice order was highly correlated to the difficulty of the discrimination, with the birds choosing the "most" discriminable reinforced stimuli first. They did not preferentially stay with one dimension before switching to the other. This suggests pigeons may be evaluating stimuli based on overall discriminability (easiest to hardest) rather than dimension (e.g., brightness to orientation) in visual search displays.

2:15	Muhammad A. J. Qadri & Robert G. Cook (Tufts University) **Shading-Based Shape Discrimination in Pigeons** The pattern of illumination across an object's surface provides people with shape information about the surface. Five pigeons were previously successfully trained to discriminate shading-generated convexity. We extended these observations by training these same pigeons to conditionally discriminate convexity based off of object identity. After this training, we examined whether the learned discrimination could be the result of image memorization by conducting a within-subject pseudo-categorization procedure with two novel objects. During this phase, the discrimination of the convexity-assigned object influenced the pigeons' responding to the perspective-assigned object. These data continue to suggest the importance of shading as a shape cue in the avian visual system.
2:30	Ashlynn M. Keller & Robert G. Cook (Tufts University) **Cross-modal Rhythm Perception in Pigeons (*Columba livia*)** Rhythm is the repeated pattern of stimuli over a regular interval. Multiple modalities enable rhythm perception providing an organism with knowledge about their surroundings for the detection of predators, prey, or possible mates. Although humans possess rhythm, other animal species show minimal rhythmic abilities, especially non-vocal learning species. We trained pigeons, a non-vocal learner, on a choice discrimination separating eight rhythms by fast (>90 bpm) and slow (<75 bpm) tempos. This discrimination was trained across the visual and auditory domains with pigeons learning the visual discrimination faster and better than the auditory domain. To assess possible cross-modal rhythm processing, we tested the pigeons after reversing the response contingencies on the visual stimuli while maintaining the trained responses to the auditory stimuli. Despite numerous manipulations, little evidence of interference across modalities was observed. Results and comparative implications for cross-modal rhythm discrimination are discussed.
2:45	10 Minute Break

Learning & Memory Processes
Session Chair: Ken Leising

2:55	Presenter: Jerome Cohen; Co-authors: Nicholas Guilbeault, Alexander Badour (University of Windsor) CANCELLED **Mouse Spatial and Non-Spatial Working Memory in an Enclosed Open Field and Cross- maze** Benice et al. (2006) assessed non-spatial and spatial working memory in mice by determining if they would show their exploration of an object that was moved to a different corner of an enclosed open field and of a novel object that replaced one of the non-moved objects. We replicated their study with mice in the open field and with

	other mice in an enclosed cross- maze. Unlike that earlier study, however, we repeated this test three more times with new objects every 16 days. We report that on the first test session, only rats in the open field reliably increased exploration of the moved object while on the third session, only mice in the cross maze reliably increased their exploration of the novel object. These differences suggest that the type of path mice are forced use as a function of the testing environment (open field vs. cross-maze) determines which feature of an object (its position or non-spatial features) they are more likely to retain or retrieve from their working memory.
3:10	Raphaelle Malassis, Arnaud Rey, & Joel Fagot (University of Aix-Marseille) **Statistical Learning of Nonadjacent Associations: A Comparative Study with Baboons and Humans** When presented with complex sequences involving both adjacent and non-adjacent associations, animals and humans rely preferentially on adjacent associations (e.g., Wilson et al. 2015). In the present study, we tested nonadjacent association learning (i.e., the ability to learn the association between A and B elements over a variable intervening element X), when the predictive relationships between nonadjacent elements were stronger than those between adjacent elements. Humans and baboons were tested in a serial response time task. They were presented with sequences of 3 spatial locations. Location 1 predicted Location 3 while location 2 varied. Results showed that the leaning patterns of the two species were similar: they extracted the nonadjacent associations after the same (small) amount of exposure. In an additional experiment, baboons generalized their performance over novel intervening locations. These results suggest that baboons, like humans, were able to extract nonadjacent associations when adjacent associations were unreliable.
3:25	Murray R. Horne (California State University, East Bay) **Negative Patterning in a Spatial Learning Task Involving Beacons and Landmarks** In two experiments, rats were required to learn about the presence or absence of a hidden platform in a swimming pool. In Experiment 1, the presence of a spotted and striped cue, individually, indicated the position of the platform, while the combination of the spotted and striped cues predicted the absence of the goal (i.e., negative patterning; A+/B+/AB-). In Experiment 2, a third cue, a black sphere, was added and a more complex negative patterning paradigm (A+/BC+/ABC-) was used. In both experiments, there was successful discrimination between when the rats would or would not find the platform. Further results from Experiment 2 suggest that animals form configurations of locations with reference to beacons and landmarks that are supported by configural associative theories rather than elemental theories of learning.
3:40	Lauren Cleland, Holly Wright, & Kenneth Leising (Texas Christian University) **A Temporal Gap and Visual Mask Do Not Disrupt Spatial Occasion Setting** Occasion setting occurs when a reinforced response to a discriminative stimulus is signaled by a second stimulus (i.e., an occasion setter). A hierarchical account

	describes an occasion setter as modulating the discriminative stimulus, whereas, a configural account describes the occasion setter and the discriminative stimulus as being encoded as a configural stimulus. To evaluate these accounts, four pigeons were trained with an occasion setter (a colored background) that signaled whether and where to respond in the presence of a landmark (a small patterned visual stimulus). Initially, the colored background overlapped entirely with the presentation of the discriminative stimulus, but over sessions the degree of overlap was reduced in 2.5 s increments until a 5 s gap was present. An additional manipulation involved a visual mask (a checkered board) inserted throughout the 5 s delay on some trials. The occasion setters continued to control whether and where the pigeons responded to the discriminative stimulus.

Jeffrey Lamoureux (Boston University)

Introduced by Michael Brown

4:00 -5:00

The Role of Attention in Extinction Processes

Following extinction of a conditioned response, presenting the conditioned stimulus outside of the context in which extinction occurred often results in a return to a high level of responding. This "renewal" effect suggests that the expression of extinction learning is more dependent on the testing context than is initial conditioning. Although many researchers have reported this phenomenon, few theoretical accounts have posited a specific mechanism for the greater context-specificity of extinction learning. Recently, several laboratories including our own have been investigating the possibility that extinction may cause an increase in the attention paid to contextual cues encountered during extinction training. I will review a number of recent findings from both human and non-human participants suggesting that increased attentional processes may serve as a mechanism for some, but not all, instances of renewal. These studies suggest that extinction may enhance attention to both tonic contextual cues and phasic conditioned stimuli, and perhaps even to temporal cues. In contrast, other studies have provided little to no evidence of enhanced attention. In light of these findings, I will argue that the specific experimental parameters under which extinction promotes attentional augmentation may be quite complex, and in need of further study.

Please Consider Joining the Comparative Cognition Society

Founded in 1999, the Comparative Cognition Society (CCS) is a scientific society dedicated to gaining a broad scientific understanding of the nature and evolution of cognition in human and nonhuman animals. The Comparative Cognition Society is a nonprofit scientific society with no doctrine or philosophy, except the scientific method as it is commonly understood in all natural sciences. Anyone who studies perception, learning, memory, or any other cognitive or representational process in animals is welcome. Our members include faculty members, animal behavior professionals, and students in psychology, biology, anthropology, applied animal behavior science, and related fields.

Membership in the society supports the following activities:

- A primary activity of CCS is sponsorship of the annual International Conference on Comparative Cognition (CO3), which has been held annually each March in Melbourne, Florida since 1994. Both Faculty/Professional Scientist members and Student members of CCS receive a discount on CO3 conference fees. To promote student interest in comparative cognition, student conference fees are kept at a minimum. CCS sponsored a second conference in 2008 and 2009 (Fall conference held in coordination with the annual meeting of the Psychonomic Society.
- CCS has been a leader in electronic publishing and in an effort to provide the products of our science to scientists, students, and the general public at no cost and in a format that allows dynamic illustrations of animal behavior and analyses of that behavior. The current portfolio of electronic publications supported by members of the society includes:
  - *Comparative Cognition and Behavior Reviews* - The first four volumes of this annual online journal of are available.
  - Two cyberbooks have been published in cooperation with the society
    - *Avian Visual Cognition*
    - *Animal Spatial Cognition: Comparative, Neural, and Computational Approaches*
  - *Proceedings of the Annual Conference on Comparative Cognition* - conference proceedings include some full-text PowerPoint™ presentations

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