Fall Meeting of the Comparative Cognition Society 2017

Thursday November 9, 2017
9:00 – 5:00
(Coffee Hour 8:00-9:00)
Vancouver Convention Center West
Meeting Room 118
Vancouver, British Columbia

www.comparativecognition.org

Fall Meeting of the Comparative Cognition Society 2017

Meeting Room 118 - Vancouver Convention Center West - Vancouver, BC

8:00 – 9:00	**Coffee Hour**
9:00 – 10:05	**Social Cognition**
10:20 – 11:45	**Learning & Choice**
11:05 – 11:45	**Invited Talk – R. Miller & C. Polack**
1:40 – 2:40	**Perception & Discrimination**
2:50 – 3:50	**Comparative Questions**
4:00–5:00	**Keynote Presentation – Liisa Galea**

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

Comparative Cognition Society

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Please consider joining us in April for the 25th annual *International Conference on Comparative Cognition*

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CCS thanks the Psychonomic Society for its support and help

Social Cognition

Session Chair: Michael Brown

9:00	**Welcome and Introduction**
9:05	Jeffrey S. Katz, Andrea Thompkins, Bhavitha Ramaihgari, Paul Waggoner, Gopikrishna Deshpande (Auburn University) **Separate Brain Areas for Processing Human and Dog Faces as Revealed Via Awake Canine fMRI** In dogs, areas of the temporal cortex have been associated with pictures of human and dog faces (Cuaya et al. 2016; Dilks et al. 2015). Our group has also found activation for passively viewing images of human and dog faces in the left temporal lobe, a region that visually placed around the analogous temporoparietal junction area in humans. However, we have found separate and adjacent areas for human and dog faces unlike Dilks et al. These findings suggest that this temporal lobe activation represents a phylogenetically shared adaptation across canines, macaque monkeys, humans, and sheep, albeit with shifts in the specific location in the temporal lobe for face processing across species.
9:20	Noam Miller (Wilfrid Laurier University) **Knowing Your Place: How Personality and Dominance Interact with Learning in Japanese Quail** Japanese quail form stable dominance hierarchies that partially determine access to food and the outcomes of fights. By staging a series of contests in a 'dominance tube', we established the dominance hierarchies in three separate groups of 13-15 quail each and quantified the individual 'personality' (boldness and sociability) of each bird. We show that less social quail tend to be more dominant. Quail can adjust their behavior based on the relative rank of a partner, but how flexible is their representation of dominance? Do they 'know their place'? We next trained three mid-ranking quail from each group on an operant discrimination task in which the dominance rank of group-members was the only reliable cue (e.g., the reward was always nearest the bird less dominant than the subject). Only a few of the quail learned the task and an even smaller number showed correct transfer when tested with novel group-members. Some quail are therefore able to use dominance ranks within their flock to guide foraging decisions, suggesting that their representation of rank is flexible.
9:35	Jeremy Shea, Emily Shea, Amanda Dumoulin & Levente L. Orbán (Kwantlen Polytechnic University) **Foraging Behaviour on Occupied Flowers: Is *Bombus impatiens* Aggression Greater Towards Heterospecifics or Conspecifics** Bumblebees show a marked preference for flowers that are occupied by another bee, compared with flowers that are unoccupied. Our goal is to investigate the conditions under which workers engage in cheating behaviour, and how aggression in foraging could play a role in the success of the forager's ability to contribute to the colony. *Bombus impatiens* workers exploring the inside of a 3m x 3m x 3m flight cage encountered artificial flowers occupied with one of three different 3D printed artificial bees, representing both heterospecific and conspecific species. Opalithplättchen number tags were used to monitor individuals and record their foraging behaviour with 3 Vivotek IP8172P IP cameras. Results are available upon completion of this experiment.
9:50	Anastasiya Kobrina, Laurel Screven, and Micheal L. Dent (University at Buffalo, SUNY) **Mice are Capable of Discriminating Natural from Synthetic Vocalizations** Mice emit spectrotemporally complex ultrasonic vocalizations (USVs) which are thought to be important for various social interactions. Yet, little is known about how mice perceive or use these vocalizations. USVs have been categorized based on a variety of spectrotemporal parameters, including frequency, amplitude, and duration. Previous studies have established that mice can detect and discriminate natural, synthetic, and altered USVs. The current research examined whether mice are capable of discriminating natural USVs from their synthetic analogs using operant conditioning procedures with positive reinforcement. Mice can discriminate between some natural USVs and their synthetic renditions but not others. Mice utilized duration, bandwidth, and peak frequency differently for natural and synthetic USV discrimination. These results contribute to our understanding of the ways USVs may be used for acoustic communication in mice.
10:05	15 Minute Break

Learning & Choice

Session Chair: Olga Lazareva

10:20	Michael F. Brown, Katie Adams, Adam Davila, Frederick Nitchie, & Joanna N. Keane (Villanova University) **An Approach to Determining the Structure of Spatial Pattern Representations** In a 5 X 5 matrix of locations where food pellets could be hidden, rats were exposed to daily sessions of three trials in which 5 locations forming a linear pattern were baited. For some rats, the pattern exemplar on each trial varied unpredictably. For other rats, the pattern exemplar varied in a spatially systematic manner over the three trials of each session. Rats in the latter group made choices in accordance with the pattern to a great extent than did rats in the former group. We propose that this result is best explained as facilitation of spatial pattern learning by the spatial systematicity of the sequence of pattern exemplars over each session. Given this, the results reveal the structure of representations of spatial patterns.
10:35	Travis R. Smith & Michael J. Beran (Georgia State University) **Risky Choice in Capuchin Monkeys (*Cebus apella*)** Seven capuchin monkeys choose between computerized stimuli that represented a risky option (delivering 8 pellets at a 0.125 probability) or that delivered 2 pellets either a) based upon the monkeys' circle-size discrimination performance (work alternative) or b) determined probabilistically (with the probability yoked to the monkeys' accuracy levels obtained in a prior work session). A 12-s delay period preceded pellet delivery, but the monkeys could shorten the delay period (down to approximately 3.5-s) in some conditions. The shortened delay time was added to the subsequent inter-trial interval to keep trial duration constant overall. Finally, in some sessions on-screen cards present during the delay period would signal the outcome (e.g., risky-win, risky-loss, alternative-win, or alternative-loss), and in other sessions the cards were uninformative about the trials' outcome. Overall, monkeys favored the risky option in the signaled sessions and the alternative option in the unsignaled sessions, replicating findings in pigeons. Also, monkeys generally shortened the delay period, but did so less often when a signaled-loss was cued. Monkeys also shortened the delay period on unsignaled trials when they performed a circle discrimination task that they subsequently got wrong. This may suggest that the monkeys could discriminate trial outcomes without external, explicit signals.
10:50	Brielle James, Kristin French, Victoria Kelly (Georgia State University), Audrey Parrish (The Citadel), & Michael Beran (Georgia State University) **Performance on the Reverse-Reward Contingency Task by Preschool-Aged Children** In the reverse-reward task, individuals choose between two sets of items and are given the set they do not choose. This test has been given to many nonhuman primate species, with consistent failures reported. We presented 60 preschool children (36 - 71 months) with repeated choices between a single sticker and a set of three stickers. Whichever set they touched was removed, and each sticker in the opposite set was added to a sticker sheet with 36 spots to fill. Children were not explicitly told the task rule to allow for a more direct cross-species comparison. Most children were re-tested five to nine months later. There was a small but significant increase in performance between tests. At the first test, 17% of children performed above chance levels in terms of choosing optimally. This relation approached statistical significance at the second test with 35% of children performing above chance. There was no correlation between age and performance at either test time. In past research, nonhuman animals made choices between food items compared to stickers for these children. Thus, children need to be given this task with consumable rewards to provide a stronger cross-species comparison.
11:05	**Invited Talk (30 min)** Ralph R Miller and Cody W Polack (State University of New York at Binghamton) **Transfer of Learning** An animal never faces exactly the same situation twice. Hence, learning would be useless if there were no transfer across the eliciting stimuli, responses, and outcomes of the training and test situations, which is not to suggest that all transfer is beneficial. We will review the benefits and costs of both successful and unsuccessful transfer, as well as some of the mechanisms determining whether transfer occurs and how these mechanisms were likely shaped by natural selection and are further tuned by learning. Distinctions will be made between 'near transfer' (aka generalization) and 'far transfer' (aka abstraction, rule learning) and considered in light of so-called 'deep learning.' The role of associative interference in the failure of transfer will be highlighted.

11:50	**Lunch Break**

Perception & Discrimination
Session Chair: Suzanne MacDonald

1:40	Jennifer Vonk (Oakland University) **Gorillas and an American Black Bear Struggle with Conditional Discrimination** I have experienced difficulty in training gorillas and a black bear to use a Likert scale to indicate preferences for representations of objects on a touchscreen computer. The training task represents a form of conditional discrimination in which subjects must select one response button for items that they dislike, and another response button for items that they like. To try to facilitate training, we simplified the task to include two 2-dimensional shapes as test stimuli, each associated with a distinct response button. The black bear learned the task in approximately 50 sessions but did not show immediate transfer to stimuli of the same shape and color. Two of the gorillas eventually met criterion on a color transfer task, but not a shape transfer task. Similarly, the black bear learned another conditional discrimination task that involved different correct spatial locations based on the background color of the screen but the gorillas again failed to learn after 300 sessions (3000 trials). Thus, in this case, at least one black bear appears to surpass several great apes in learning conditional discrimination tasks, but neither species demonstrates significant transfer.
1:55	Caroline M. DeLong (Rochester Institute of Technology), Wendi Fellner (The Seas, Epcot®, Walt Disney World® Resort), Heidi Harley (New College of Florida), Irene Fobe, K. Tyler Wilcox, Kathryn Gardner (Rochester Institute of Technology), & Kim Odell (The Seas, Epcot®, Walt Disney World® Resort) **Visual Discrimination of Rotated 2D Objects in a Bottlenose Dolphin (*Tursiops truncatus*) and Goldfish (*Carassius auratus*)** Aquatic species such as bottlenose dolphins and goldfish can move in three dimensions and frequently view objects from different orientations. These studies examined their ability to visually identify 2D objects despite changes in orientation. A dolphin performed a match-to-sample task in which a sample was presented at a different orientation from its match in a 3-alternative choice array. Samples were presented at 6 aspect angles (0°, +/- 45°, +/- 135°, 180°) and alternatives were presented at 0° (upright). Performance was above chance for all aspect angles. Performance with familiar objects (M = 87%) exceeded performance with novel objects (M = 72%). Five goldfish performed a two-alternative forced choice task. In two experiments, they were trained to discriminate between two objects at 0°, then tested with both the S+ and S- at the same novel aspect angles (+/- 45°, +/- 90°, +/- 135°, 180°). Performance was above chance overall (M = 66%, 67%), and exceeded chance for 0°, 45°, and 90° in both experiments. When fish were tested with the S+ at novel aspect angles and the S- at 0°, performance (M = 59%) did not exceed chance. This study provides evidence that both species can visually identify rotated 2D objects.
2:10	Heather Hill, Emily Garcia, Kendall Pasko (St. Mary's University), Deirdre Yeater (Sacred Heart University), Sara Guarino (Texas Christian University), & Nicolas Mireles (Eastern Tennessee University) **How Do Cetaceans Respond to Violations of Expectations When Presented With Novel or Familiar Objects?** Bottlenose dolphins (Tursiops truncatus) have shown a lateralization of visual processes in previous studies. Previous results have shown dolphins sometimes discriminate eye usage between stimuli depending on the level of familiarity. The goal of this study was to extend previous work on lateralized eye preference when viewing (un)familiar stimuli through a violation of expectation procedure. This study manipulated the familiarity of the stimuli and the presentation procedure with 10 bottlenose dolphins, 11 belugas (Delphinapterus leucas), and 5 Pacific white-sided dolphins (Lagenorhynchus obliquidens) in managed care. Gaze duration and eye use was coded from video recordings of each trial. Lateralization was not found at the group level. Both the effects of familiarity and the violation of expectation procedure on gaze duration and eye preference were not significant. Results indicated that the cetaceans viewed the first presentation of stimuli longer than the second, implying a loss of interest or failure to notice the change in stimuli. However, the cetaceans generally attended the whole trial more often when an unexpected procedure was used, suggesting the cetaceans noticed a change. This pattern of behavior is similar to humans who experience change blindness.

2:25	Nicole M. Muszynski & Patricia A. Couvillon (University of Hawaii at Manoa & Pacific Biosciences Research Center) **Category Discrimination Enhances Oddity Learning in Honeybees** Honeybees show a variety of associative learning phenomena, and their performance resembles that of vertebrate species. The contemporary trend is to explore phenomena not easily explained with associative principles, such as same-different problems, the simplest of which is oddity. In three-stimulus oddity experiments with two-color pattern stimuli, unique on each trial, free-flying bees were trained individually to visit a laboratory window and rewarded with sucrose for choice of the odd stimulus. The bees' performance reached about 50% correct, significantly greater than chance (33%). The purpose of Experiment 1 was to improve performance by increasing the number of stimuli to four. Performance was better than chance, but no better than performance in three stimulus problems. The purpose of Experiment 2 was to enhance the discrimination of oddity with an irrelevant category difference. The trial-unique stimulus sets were either three identical patterns and one solid color or three identical solid colors and one pattern, intermixed across trials. The bees' performance reached about 70% correct. The irrelevant category difference facilitated the discrimination of oddity, although the reason is not clear. Incorporating a category difference into other types of same-different problems might shed light on the generality of the facilitation and its possible mechanism.
2:40	10 Minute Break

Comparative Questions
Session Chair: Noam Miller

2:50	Jennifer Mather (University of Lethbridge), Claudio Carere (University of Tuscia) & Graziano Fiorito (Stazione Zoologica Anton Dohrn) **Octopuses and Mirrors: A Tale of Two Species** Passing Gallup's 'mark test', in which an animal sees its mirror image with some alteration (a mark) that cannot otherwise be viewed, is sometimes seen as a sign of self awareness. No one has used the mark test on the octopuses, which have acute vision, good intelligence and possible self-awareness. Alteration of the skin may cause damage perceptible to other senses, so simply exposing the octopus to a mirror is a good first step. Two species, *Octopus rubescens* and *O. vulgaris*, saw a mirror, a non-reflective surface and a view of a conspecific. Both species were more active to the mirror compared to the other surface, but *O. rubescens* behaved similarly to the viewed image and the sight of a conspecific. However, *O. vulgaris* showed a mantle-up display only to the conspecific, and made more 'passing cloud' skin displays to the mirror, so they did not view their mirror image as another octopus. Whether this indicates self-awareness and what the octopus 'thought of ' the mirror image will be discussed.
3:05	Andrew C. Gallup (SUNY Polytechnic Institute) **A Comparative Investigation Into the Relationship Between Yawn Duration and Brain Size** Evidence suggests that yawning functions to promote state change and arousal through enhanced intracranial circulation and brain cooling. Since the neurophysiologic effects from yawns are likely tied to the magnitude of the action, it was recently hypothesized that animals with larger and more complex brains would have longer yawns. Consistent with this view, a recent study showed that yawn duration is indeed a robust predictor of brain size and cortical neuron number across a diverse sample of mammalian taxa. The current report examines whether a similar relationship between yawn duration and brain size exists for other vertebrate classes (birds) and within different taxonomic ranks of mammals, including family (Felidae) and species (Canis lupus). Openly accessible videos from the Internet were reviewed to obtain average yawn durations, and these figures were then correlated with previously published brain parameters from each species. In all cases, yawn duration was strongly correlated with measures of brain size. These results demonstrate the robust and reproducible nature of this relationship, and provide convergent support for an important and general neurophysiological function to yawning across diverse species.

3:20	Irina Mikhalevich (Rochester Institute of Technology) **Minds Without Spines: Toward a More Comprehensive Animal Ethics** Philosophical accounts of animal rights and welfare have largely ignored invertebrate animals – a neglect that is reflected in public policy. To the extent that 'invertebrates' are discussed in the animal ethics literature, they are typically lumped into a single undifferentiated category despite their remarkable diversity, and subsequently excluded from subject-centered moral consideration and experimental welfare protections (with a recent exception for octopuses). Recent developments in comparative cognition research, however, suggest the presence of sophisticated cognitive abilities in many invertebrates such as insects, arachnids, and cephalopod mollusks, while comparative neurobiology is beginning to reveal how the 'alien' brains of these animals can give rise to cognition and, perhaps, consciousness. However, conceptual and methodological problems in animal cognition science result in significant uncertainties about the presence of complex cognition in animals generally and invertebrates in particular, and it is unclear how these scientific uncertainties should affect our ethical analyses. The goal of the present paper is to outline how we might develop a more comprehensive, inclusive and scientifically engaged animal ethics—and to consider how this expansion should be reflected in public policy.
3:35	Jeannine E. Holmes & Suzanne E. MacDonald (York University) **Public Perceptions of Animal Thinking** In a replication of a survey by Rasmussen, Rajecki, and Craft (1993), 241 undergraduate psychology students and 148 members of the public were asked to indicate how reasonable it was that a child, dog, cat, bird, or fish had the capacity for each of 12 different cognitive abilities. Consistent with the original study, participants credited both children and animals with simple thinking, but reserved ascriptions of complex thinking to children. However, perceptions of animal cognition appear to have improved since the original study. Specifically, results revealed a general increase in participant ascriptions of complex thinking to animals, converging perceptions related to mammals, and an increase in perceptions of fish cognition. We also assessed the impact of the Internet and social media on public perceptions of animal cognition. While a significant impact was not noted, further examination in this area would be beneficial given the limited scope of our initial investigation and the significant power these mediums provide in information sharing and accessibility.
3:50	**10 Minute Break**

Keynote Address
Liisa A.M. Galea
(University of British Columbia)
Introduced by M. Brown

4:00 -5:00

GAME OF HORMONES: WHY SEX MATTERS FOR BRAIN HEALTH

As anyone who has gone through adolescence, pregnancy, or aging can attest: hormones can exert powerful effects on brain and behaviour. My laboratory has focussed primarily on three main areas of research: how motherhood, stress and sex hormones affect neuroplasticity, cognition and emotional behaviours. Why do I study sex differences in cognition? I'll give you a hint: it's not so Google employees can write manifestos. Men and women differ in their vulnerability to develop neurodegenerative and psychiatric diseases, many of which are also associated with sex differences in the severity of cognitive disruptions and neural manifestations of the disease. For example, women are more likely to be diagnosed with Alzheimer's disease (AD) and suffer from greater cognitive deterioration with AD compared to men. Hence, to gain a better understanding of how to effectively treat these symptoms in both men and women, it is important to acknowledge and study differences that might arise between both sexes in response to environmental perturbations. The hippocampus produces new neurons throughout the lifespan in rodents and humans and adult neurogenesis plays a crucial role for pattern separation and for spatial long-term memory. I will show different examples of sex differences in hippocampal neurogenesis in response to sex and stress hormones but also in response to spatial training. It is important to establish how neurogenesis in the hippocampus may be involved in hippocampus-dependent cognition in both males and females given the sex differences in cognitive disruptions following diseases that impact the hippocampus. Work in my laboratory has shown that there are sex differences, favoring males, in spatial navigation and pattern separation. Furthermore, male spatial strategy users had greater neurogenesis in response to pattern separation training than all other groups consistent with findings in the Morris Water Maze. Despite this, neurogenesis was positively correlated with performance females but not in males in both cognitive tasks. These results suggest that the survival of new neurons may play an important positive role for pattern separation of similar patterns in females. Finally, I will speak briefly, on how, a uniquely female event, motherhood, can have long lasting effects on the hippocampus and cognition that last into middle age. These findings emphasize the importance of studying biological sex on hippocampal function and neural plasticity and have implications for neurodegenerative and psychiatric disorders that target the hippocampus and affect cognition differentially in women versus men.

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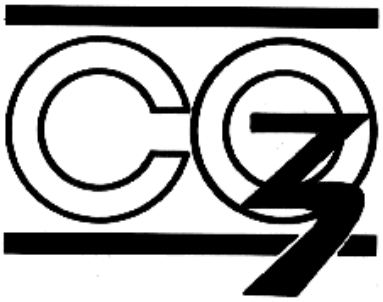

Fall Meeting of the Comparative Cognition Society
Student Travel Fellowships

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Two Student Travel Fellowships ($400 each)
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Congratulations!

Anastasiya Kobrina
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and
Nicole Muszynski
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SEPCS Early Career Presentation Award

The Society for Experimental Psychology and Cognitive Science
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Jointly sponsor a presentation award to be judged during the conference.

Society for Experimental Psychology and Cognitive Science DIVISION 3

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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