Fall Meeting of the Comparative Cognition Society 2010

November 18, 2010
Millennium Hotel
St. Louis, MO

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Fall Meeting of the Comparative Cognition Society 2010

All Sessions Held in Meramec Ballroom

9:00	Anticipation and Change Detection
10:20	Associative Processes, Attention & Cue Competition
1:00	Category and Relational Discriminations
2:10	Social Cognition
3:00	Value, Number, & Sequence
4:00 – 5:00	Keynote Presentation – Mark McDaniel

Important Note to Presenters: Talks should be no longer than ten minutes (two additional minutes scheduled for discussion and transition)

Comparative Cognition Society

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Anticipation and Change Detection

Session Chair: Michael Brown

9:00	**Welcome and Introduction**
9:10	**A. George Wilson & Jonathon D. Crystal (Indiana University, Bloomington)** ***Prospection in the Rat*** Prospective memory in people is defined as holding an intention to act in the future. A hallmark of prospective memory is that a future intention has a deleterious effect on current ongoing activity. We tested the hypothesis that rats would show a similar deleterious effect of prospective memory. Rats (n=20) were trained in a standard temporal bisection task (90 min/day). Immediately after the bisection task, half of the rats received an 8-g meal (meal group) and other rats received no additional food (no-meal group). The meal was earned by breaking a food-trough photobeam. Sensitivity to time in the bisection task was reduced as the 90-min interval elapsed for the meal group but not for the no-meal group. This time-based prospective memory effect was not based on response competition or an attentional limit. Rats form an intention to act in the future, which produces a negative side effect on ongoing activity.
9:22	**Wenyi Zhou & Jonathon D. Crystal (Indiana University, Bloomington)** ***Validation of a Rodent Model of Episodic Memory*** Putative evidence of episodic-like memory may be based on encoding failure or semantic memory. In Experiment 1, rats were tested in a radial maze with study and test phases separated by a retention interval. The replenishment of chocolate (at its study-phase location) depended on two factors: time of day (morning vs. afternoon) and the presence or absence of chocolate pellets at the start of the test phase. Because replenishment could not be decoded until the test phase, rats were required to encode the study episode. Success in this task rules out encoding failure. In Exp 2, two identical mazes in different rooms were used. Chocolate replenishment was trained in one room, and then they were asked to report about a recent event in a different room, where they had no expectation that the memory assessment would occur. Rats successfully answered the unexpected question, ruling out semantic memory.
9:34	**Caitlin Elmore, Anthony A. Wright, Antony Passaro (UT Medical School at Houston) John Magnotti (Auburn University), Timothy Ellmore (UT Medical School at Houston), Kenneth Leising (Texas Christian University, and Jeffrey Katz (Auburn University)** ***Comparing Object and Location Memory in Change Detection*** Change detection has risen in popularity over the past decade as a task to study human visual working memory (VWM). Recent work from our laboratories has developed change detection as a task for the study of object and location memory in humans and animals. In addition to using change detection to understand the cognitive processes involved in VWM, we have also adapted the task for fMRI in order to understand the neural correlates in humans. While our behavioral studies have highlighted some interesting differences between object and location memory in change detection, fMRI results point to striking similarities in terms of the brain regions involved. These similarities and differences will be discussed.
9:46	**Kate M. Chapman & Daniel J. Weiss (The Pennsylvania State University)** ***Multi-action Planning in Cotton-top Tamarins (Saguinus oedipus)*** Cotton-top tamarins exhibit sophisticated anticipatory motor planning in a single-action task (Weiss, Wark & Rosenbaum, 2007). We extend this research to a multi-action task in effort to determine the scope of their motor planning abilities. Tamarins extracted food from a movable box whose opening was rotated 45 degrees to either side by using a rope to bring it close and then reaching with the other hand. Food could be obtained in any manner, though analyses were confined to two-action trials. The dependent variable was which hand the tamarins initially used to pull the rope; that choice dictated whether the hand used to retrieve the food would be easy (the hand ipsilateral to the opening) or difficult (contralateral). We found the tamarins always spontaneously selected an initial hand grasp consistent with end-state comfort in two-action trials. We discuss whether such planning may forebode the evolution of more complex cognitive abilities.

9:58	**Mariana V. C. Coutinho, Joshua S. Redford, Justin J. Couchman, & J. David Smith (University at Buffalo, The State University of New York)** ***The Role of Attentional Resources in Uncertainty Responding*** Recent research—using a nonverbal, behavioral uncertainty response—has explored whether animals and humans share some capacities for metacognition. Beran et al. (2009) suggested that capuchin monkeys (*Cebus apella*) may lack a metacognitive capacity because they will not use an uncertainty response but will use a middle response. The present study explored the mechanisms underlying the use of the uncertainty and middle responses in other primates (e.g. *Homo sapiens*). Participants —with or without a concurrent cognitive load—performed a perceptual-categorization task with an uncertainty response that let them decline difficult trials or a middle response that asked them to perceptually distinguish the difficult middle region. The results showed that concurrent load decreased the use of the uncertainty response but not the use of the middle response. The results are discussed in terms of the possible role of higher –order cognitive processes in mediating uncertainty responses.
10:10	**Ten Minute Break**

Associative Processes, Attention, & Cue Competition

Session Chair: Marcia Spetch

10:20	**Mario A. Laborda, Gonzalo Miguez, James E. Witnauer, & Ralph R. Miller (SUNY–Binghamton)** ***Partial Reinforcement Acquisition Deficit: The Role of Contextual Associations*** Degraded stimulus control by a CS is observed following partial reinforcement relative to continuous reinforcement training. In two conditioned suppression experiments with rats as subjects, the contributions of the CS-context and context-US associations were evaluated. In Experiment 1, posttraining associative deflation (i.e., extinction) of the training context after partial reinforcement restored responding to a level comparable to the one produced by continuous reinforcement. In Experiment 2, posttraining associative inflation of the context (achieved by administering unsignaled outcome presentations in the context) enhanced the detrimental effect of partial reinforcement.
10:32	**Bridget L. McConnell & Ralph R. Miller, SUNY-Binghamton** ***Attenuated Deepened Extinction with Additional Conditioned Excitors During Extinction*** Three experiments examined the effect on renewal of increasing conditioned excitation during extinction. Deepened extinction was observed when two conditioned excitors were extinguished in compound relative to when only one excitor was extinguished, but attenuated deepened extinction was observed when three conditioned excitors were extinguished in compound. These results are not explicable in terms of differential generalization decrement. Moreover, this is contrary to the predictions of a total error reduction approach (e.g., Rescorla-Wagner, 1972 model). In subsequent experiments, the attenuated deepened extinction effect was reduced, resulting in a re-emergence of deepened extinction, when the association between the two additional excitors was weakened or when the association between one of the additional excitors and the US was attenuated. These results challenge total error reduction models and provide support for a comparator approach.
10:44	**W. David Stahlman & Aaron P. Blaisdell (University of California, Los Angeles)** ***Reinforcement Schedules and Response Variability in Pigeons*** Behavioral variability decreases as reward draws near (e.g., Cherot, Jones, & Neuringer, 1996). This suggests that response variability may increase as the animal approaches explicit non-reinforcement, as in an omission schedule. We report results from two experiments to investigate the effect of three distinct reinforcement schedules (omission, Pavlovian, and positive reinforcement) on screen-pecking variability in pigeons. We found that behavior was dependent on the relationship between reinforcement schedule and the time-in-trial; as predicted, certain measures of behavioral variability increased over the course of omission trials. We compare these findings to earlier work that demonstrates that behavioral variability has a negative relationship with reward expectation (e.g., Stahlman, Young, & Blaisdell, 2010).

10:56	**Bradley R. Sturz & Katherine A. Gaskin (Armstrong Atlantic State University)** ***Reorienting when Cues Conflict: A Role for Information Content in Spatial Learning?*** Human participants searched in dynamic three-dimensional virtual-environment rectangular enclosures. Unlike previous studies involving learning of features and geometry, we trained features and geometry separately before placing them in conflict. Specifically, participants learned to respond to rewarded features located along the principal axis of a rectangular search space and to respond to rewarded geometry of a rectangular search space in separate training phases followed by a single test trial. During the Test trial, features and geometry were placed in conflict by situating rewarded bins during feature training in unrewarded geometric corners from geometry training and unrewarded bins during feature training in rewarded geometric corners from geometry training. Results provide converging evidence against a view-based matching account of spatial learning, appear inconsistent with standard associative-based accounts of spatial learning, and suggest that information content of spatial cues may play an important role in spatial learning.
11:08	**Alvin Aaden Yim-Hol Chan, W. David Stahlman, Daniel T. Blumstein, Dennis Garlick, Cynthia D. Fast, & Aaron P. Blaisdell (UCLA)** ***Auditory Stimuli Compromise Risk Assessment in the Hermit Crab (Coenobita clypeatus)*** Extraneous noise may negatively affect predator vigilance by capturing attention. A recent field study (Chan et al., 2010) showed that anthropogenic noise (a motor boat sound) affected a hermit crab's ability to respond to an approaching threat. We replicated this effect in a laboratory setting using an automated system. Subjects viewed the looming image of a hawk on a computer screen, causing them to withdraw into their shells. On some trials subjects heard a 30-s broad band noise prior to the presentation of the hawk, while no noise was presented on other trials. Latencies to hide were longer on trials with the noise, suggesting it distracted the crabs and impaired their detection of the hawk. Further experiments revealed that a 90-s noise was more distracting than a 10-s noise, and a loud noise was more distracting than a quieter noise. Future research is underway to dissect the psychological mechanisms of distraction.
11:20	**Marina Menez (Universidad Nacional Autónoma de México, Brown University), Russell Church (Brown University), Paulo Guilhardi (Brown University and New England Center for Children) & Florente López (Universidad Nacional Autónoma de México)** ***Simultaneous Timing and Re-allocation of Attentional Resources in a Peak Procedure with Gaps*** Previous research has shown that the maximum response rate of rats in a reversed peak procedure with gaps depends on both the time at which there is a gap in the stimulus and the salience of the gap. These findings are well explained by the time-sharing hypothesis (Buhusi & Meck, 2006), which states that the internal clock shares attentional and working-memory resources with other processes. In this experiment, we explore the effects of salience of the gap using a peak procedure with a wider distribution of the times of a gap, in rats. The response gradients obtained support a simultaneous-timing interpretation with multiple time markers and corroborate the re-allocation of the attentional resources in the processing of time.
Lunch	

Category and Relational Discriminations

Session Chair: Jeff Katz

1:00 **Fabian A. Soto & Edward A. Wasserman (University of Iowa)**
Pigeons' Use of Spatial Frequency Information in the Discrimination of Identity and Emotion of Human Faces

We trained two groups of pigeons to categorize 16 photographs of human faces that resulted from all combinations of four identities and four emotional expressions. One group was trained to categorize the photographs according to their identity, whereas the other group according to their emotional expression. After learning the task, the birds were tested using a modification of the "bubbles" procedure in which each test image contained only part of the spatial frequency information in the original training image. Correlating response accuracy with the presence of spatial frequency information allowed us to build profiles showing the relative use of different spatial frequencies in each task. We found differences between the groups both in how easily they solved the categorization task and in the spatial frequency information they used to solve it.

1:12 **John McInnerney, Olga Lazareva, & Joyce Yuen (Drake University)**
An Application of Multiple-Object Tracking Task to Study Implicit Relational Learning in Adult Humans

In a modified multiple-object tracking task, college students were instructed to track 4 out of 8 objects and report at the end of the trial whether a single cued object was among those they tracked (yes/no task). The display also contained two strips of different width. In Informative condition, the location of the cued object predicted the correct choice. If the answer was "yes", then the object was located next to the narrower strip; otherwise, it was located next to the wider strip (or vice versa). In Random condition, the location of the cued object did not predict the correct choice. Informative condition produced significantly more accurate performance (67.4%) than Random condition (50.6%). However, participants in Informative condition were unaware of predictive role of object location, demonstrating implicit relational learning.

1:24 **Jessica P. Stagner, Rebecca Rayburn-Reeves, Chelsea R. Kirk & Thomas R. Zentall (University of Kentucky)**
Strategies for Learning Simultaneous-Discrimination Once-per-Session Reversals: Pigeons, Rats, and Humans

We trained pigeons on a simple, simultaneous color discrimination with one color correct for half of the 80-trial session and the other color correct for the remainder of the session. After many sessions of training, the pigeons continued to anticipate the reversal well before it occurred and perseverated well after the reversal occurred. Similar results were obtained with a spatial discrimination. When new pigeons were trained with the reversal occurring at a variable point in the session, although the pigeons were more sensitive to the reversal when it occurred, they continued to make both anticipatory and perseverative errors as if they were expecting the reversal to occur at the average of the switch points. Unlike humans who show win-stay/lose-shift behavior, pigeons make errors by failing to wait until the reversal begins and they persist in making errors after they have received feedback that the reversal has taken place.

1:36 **Magnotti, J. F., Schmidtke, K. (Auburn University), Wright, A. A (UT Medical School at Houston), & Katz, J. S. (Auburn University).**
Set Size Selects Strategy in Human Same/Different Judgments

Early research on abstract-concept learning confined the ability solely to humans. Work in our laboratories has shown that nonhuman primates and pigeons can learn the abstract concept of same/different. Training set size is crucial in determining the kind of learning (item-specific v. relational) and thus degree of transfer to novel stimuli. The current experiment assessed human acquisition of a same/different discrimination under three training set sizes: 2, 8, and trial unique. The experimental parameters mimicked those used for nonhuman animals as closely as possible, including no instructions about the nature of the task. Some, but not all of the human participants were able to apply the abstract same/different concept. Our results suggest that the training environment influences strategy usage, and animals may not apply "higher" processes, even if available.

1:48	**Adam M. Goodman (Auburn University), Anthony A. Wright (University of Texas Medical School at Houston), & Jeffrey S. Katz (Auburn University)** ***Transfer of Same/Different Reversal Learning in Pigeons*** Reversal learning is a common procedure for studying discrimination learning, but has yet to be studied in a same/different abstract-concept learning task. The ability of 4 pigeons in a two-item same/different task was assessed with repeated contingency reversals. Correct responses were pecks to the lower picture if the items were the same and a rectangle if they were different. Once steady-state performance was obtained, the contingency was reversed. Upon reaching criterion with the reversed contingency, the initial contingency was reinstated followed by subsequent reversals. After 12 reversals, a transfer test was given to assess responding to novel stimuli. Pigeons flexibly learn reversals and fully transfer to novel stimuli indicating they continue to solve the same/different task relationally.
2:00	**Ten Minute Break**

Social Cognition

Session Chair: Tom Zentall

2:10	**Jeffrey R. Stevens, Julian N. Marewski, Lael J. Schooler (Max Planck Institute for Human Development), Ian C. Gilby (Duke University), & Richard W. Wrangham (Harvard University)** ***The Past Predicts the Future: Regularities in Chimpanzee Social Contact*** Patterns of social contact are critical forces shaping behavior and cognition. In human social networks, frequent and recent past social contact highly predicts future contact. Here, we provide a similar analysis of social contact in wild chimpanzees, using 19 years of observational data. Like humans, chimpanzees show a pattern of future contact strongly depending on the frequency and recency of past interactions: frequency of contact follows a linear relationship, and recency of contact follows a power-law relationship. This finding matches patterns seen in not only human social contact but also human memory performance. Our results raise interesting questions about chimpanzee cognition in the areas of memory, social learning, and cooperation.
2:22	**Elliot A. Ludvig & Marcia L. Spetch (University of Alberta)** ***Dynamic Imitation in Pigeons*** Many imitation studies present animals with extended exposure to the to-be-imitated behavior before testing for successful learning. Here, instead, we trained pigeons on a dynamic imitation task in a novel two-bird operant box, where pigeons shared a single touchscreen and were separated by a clear or opaque barrier. On each trial, leader pigeons were rewarded for pecking one of two stimuli, while follower pigeons were only rewarded for pecking that same stimulus. Most pigeons learned to peck the same stimulus as the leader with the clear barrier, while showing chance performance with the opaque barrier. Our results cannot be explained by social facilitation of stimulus enhancement, but may be an instance of discriminated following. In addition, the technique provides a new means for exploring social components of operant behavior, which is usually tested in isolated pigeons, despite the fact that pigeons forage in flocks.

2:34 **Alexandra Horowitz (Barnard College)**
Empirical Investigation of Anthropomorphisms of the Domestic Dog

Domestic dog behavior is often explained with anthropomorphisms: attributions that would hold if the actor were human. Our project is to systematically test anthropomorphisms made of dogs. Herein we describe work testing three attributions: of guilt, the perception of fairness, and irrationality. Three-quarters of owners believe that their dogs experience "guilt"; the behavioral manifestation is the "guilty look" (lowered head, ears, and tail; averted gaze). Fourteen dogs were tested to determine the strength and context of the look. Dog obedience and owner knowledge of dog behavior were manipulated across trials. Results found dogs showed more "guilty look" when the dogs were scolded, regardless of whether they were disobedient. Preliminary results are presented from a protocol extrapolated from human studies of justice, asking if dogs identify and associate with a "fair" trainer over an "unfair" one, when the subject's reward is unchanging. Finally, we present a methodology for studying irrationality in dogs. Anthropomorphisms are rife in dog-human interaction; empirical work can help determine where they are appropriate.

2:46 **Helen Marie Graves & Daniel J. Weiss (The Pennsylvania State University)**
Visual Access Alters Mate Preference Behavior

In a phonotaxis procedure, cotton-top tamarin monkeys (*Saguinus oedipus*) preferentially approached recorded calls produced by a mate versus those produced by a novel individual (Miller et al., 2001). We investigate how visual access among physically present monkeys modulates this effect. Five male and 5 female tamarins explored a Y-maze in which the focal monkey's mate and an unfamiliar monkey (of opposite sex) were housed on opposing arms. When an occluder prevented visual access between the nonfocal monkeys (Condition 1), the focal monkey spent equal time with both nonfocal animals. In Condition 2, all monkeys had full visual access to each other. Here, the focal monkey preferred its mate to the unfamiliar monkey. These data indicate that triadic visual access alters social behavior in tamarins and therefore visual perspective might impact departures from monogamy in callitrichids.

Value, Number, & Sequence

Session Chair: Jon Crystal

3:00 **Damian K. Scarf & Michael Colombo (University of Otago)**
Representation of Serial Order in Pigeons (Columba livia)

In Experiment 1, two groups of pigeons were trained to respond to either a four-item (A→B→C→D) or five-item (A→B→C→D→E) list. After learning their respective list, half of the subjects were trained on a positive pair with reinforcement provided when pairs were responded to in the order true to that of the original sequence (Four-item: B→C; Five-item: B→D). The remaining subjects were trained on a negative pair with reinforcement provided for responding to the pairs in the order opposite to that learned in the original sequence (Four-item: C→B; Five-item: D→B). Subjects in the positive pair condition learned their respective pair faster than subjects in the negative pair condition. In Experiment 2, after reaching criterion on a four-item list, subjects received 16 BC probe trials spread across four sessions of training. Subjects performed significantly above chance on the probe trials. The performance of our subjects in Experiments 1 and 2 demonstrates that, similar to monkeys, pigeons form a representation of the lists they learn.

3:12 **Michael J. Beran (Georgia State University)**
Quantity Judgments of Auditory Stimuli by Chimpanzees (Pan troglodytes)

Many species can choose between two visual sets of stimuli on the basis of quantity. This is true when sets are both visible, or are presented one set at a time or even one item at a time. However, fewer quantity comparison studies have used auditory stimuli. Here, chimpanzees (n=3) chose between two sets of food items when they only heard each item fall into different containers rather than seeing those items. This method prevented the chimpanzees from summing the amount of visible food they saw because there were no visual cues. Chimpanzees performed well. They transferred performance to comparisons between a sequentially presented auditory set and a fully visible set, demonstrating that duration of presentation was not being used as a cue. Performance matched that of previous experiments with regard to obeying Weber's law.

3:24	**Kristina F. Pattison & Thomas Zentall (University of Kentucky)** ***Further Investigations of Sunk Cost in Pigeons*** The sunk cost effect involves staying with an alternative even when there is a better alternative available ("should I stay or should I switch"). At various points during responding on a Fixed Ratio (FR30) schedule (5, 10, 15, 20, 25 pecks) we gave pigeons a choice between completing the FR30 schedule and switching to an FR15 schedule in which the "cost" of staying or switching was exactly the same. One explanation of positive results is a preference for variability. A control procedure investigating alternate explanations is described.
3:36	**Marco Vasconcelos, Justine Aw, Tiago Monteiro (University of Oxford), Dolores May, Juan Reboreda (University of Buenos Aires), Jackie Chappell (University of Birmingham), & Alex Kacelnik (University of Oxford)** ***Risky Choice and Indifference: Three Species, Three Experiments, One Conclusion*** Unpredictable environments are common in nature but it is debatable whether or not specific mechanisms have evolved to respond adaptively to environmental variance. We studied risky choice with European starlings (*Sturnus vulgaris*), magpies (*Pica pica*) and shiny cowbirds (*Molothrus bonariensis*). They faced choices between one cue predicting a fixed delay to reward and another predicting either of two equiprobable delays. We identified the point of indifference for each species and compared them to the predictions of several algorithms. The point of indifference should be (1) at the arithmetic mean of the two possible variable outcomes under unconstrained rate maximization, (2) at the harmonic mean under rate maximization computing only the times between action and outcome, and (3) at the geometric mean under Weber's Law. Results across the three species reject unconstrained maximization and suggest that the presence of specific adaptations for risky choice should not be assumed.
	10 Minute Break

Keynote Address
Mark McDaniel (Washington University)

Introduced by Jon Crystal

4:00 -5:00	***Prospective Memory: Cue-Driven Spontaneous Retrieval and Contextual Control of Implementing Retrieved Intentions*** We have argued that prospective memories can be retrieved through spontaneous retrieval processes stimulated by the presence of a target cue. To support this claim, I review several lines of evidence, with an emphasis on our newer paradigms in which we investigate whether presenting a prospective memory cue during a task that does *not* require an intention to be performed spontaneously triggers remembering of the intention. In just-completed experiments, we have extended these paradigms to manipulate the overlap between the context/cues encoded during intention formation and the context/cues present in a task being performed after participants are told that their intention is finished. The intriguing finding is that participants sometimes continue to perform the prospective memory task when the contextual overlap is high, suggesting contextual cues may exert (automatic) control of execution of prospective memory intentions.

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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