Society for the Quantitative Analyses of Behavior

44th Annual Meeting, May 26 - May 27, 2022

Convention and Exhibition Center, Boston, MA

The Society for the Quantitative Analyses of Behavior (SQAB) was founded in 1978 by M. L. Commons and J. A. Nevin to present symposia and publish material which bring a quantitative analysis to bear on the understanding of behavior. Talks at SQAB focus on the development and use of mathematical formulations to characterize one or more dimensions of an obtained data set, derive predictions to be compared with data, and generate novel data analyses. You can retrieve more information about SQAB at our website, www.sqab.org

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SQAB holds its annual meeting in conjunction with the Association for Behavior Analysis International (ABAI).

SQAB thanks the Association for Behavior Analysis International (ABAI) for generous support that helps to make this meeting possible, and encourages SQAB participants to take advantage of the ABAI convention that begins immediately following the SQAB program. The ABAI Program includes many presentations on experimental and applied behavior science. A separate registration fee and badge are required to attend the ABAI meeting.

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Key locations:

Registration desk is outside room 205AB at the Convention and Exhibition Center

General sessions are in room 205AB

Poster sessions are in room 205C.

Thursday, May 26: Registration, 11:30 am -1:00 pm

1:00 **Suzanne H. Mitchell, Oregon Health & Science University**: *President's Introduction*

1:15 **Ruth M. Colwill, Brown University**: *Habituation: The Cinderella of Learning*

1:55 **Mark E. Bouton, University of Vermont**: *Context, Behavior Change, and Habit Learning*

Break and Refreshments: 2:35 – 2:50

2:50 **Ralph R. Miller, Binghamton University**: *Researcher Heuristics as an Obstacle to Understanding Learning*

3:30 **Bryan Klapes, Philadelphia College of Osteopathic Medicine – Georgia Campus; John M. Falligant and Louis P. Hagopian; Kennedy Krieger Institute and Johns Hopkins University School of Medicine**: *Modeling and Quantifying Resurgence in an Evolutionary Theory of Behavior Dynamics*

Break and Refreshments: 4:10 – 4:25

4:25 **Samuel J. Gershman, Harvard University**: *Policy Compression*

5:05 **Juliet Y. Davidow, Northeastern University**: *Age-Related Differences in Learning: Considerations for Cross-Sectional Modeling of Age in Regression and Computational Models.*

– First Poster Session & Cash Bar: 7:00–9:30 pm –

Friday, May 27: Registration, Coffee, & Pastries, 7:45 – 9:00 am

9:00 **John W. Krakauer, Johns Hopkins University**: *The Cognitive-Motor Interface: Deliberation vs. Intelligence*

9:40 **Alireza Soltani, Dartmouth College**: *Information Theory for Behaviorism: Predicting Matching Behavior based on Entropy in the Response to Reward Feedback*

Break and Refreshments: 10:20 – 10:35

10:35 **Armando Machado, Universidade de Aveiro**: *A Dialog between Two Models of Timing, Scalar Expectancy Theory (SET) and Learning-to-Time (LeT)*

11:15 **Andrew R. Delamater, Brooklyn College**: *Learning about Reward Identities and Time*

Lunch: 11:55 – 1:30

1:30 **Michael E. Young and Brian Howatt, Kansas State University**: *Response Limitations: How Depletion and Replenishment Cliffs affect Waiting.*

2:10 **Shawn Gilroy, Louisiana State University**: *The Operant Behavioral Economics of Fad, Questionable, and Pseudoscientific Treatment Consumption*

Break and Refreshments: 2:50 – 3:10

3:10 **Gene Heyman, Boston College**: *Choice Principles (the Matching Law and Global Maximizing) help Explain many of Addiction's Defining Features*

3:50 **The Tony Nevin Invited Student Presentation Series**

João Lucas Bernardy, University of São Paulo: *Computational Simulation and the Search for a Quantitative Description of Simple Reinforcement Schedules*

Marielena Eudave-Patiño, Universidad de Guadalajara: *A Parametric Replication of the Effect on Performance and Timing of Delayed Reinforcement in a Fixed-Interval Schedule*

Haoran Wan, Washington University in St. Louis: *Comparison of the Adjusting-Amount Procedure and the Monetary Choice Questionnaire for Measuring Delay Discounting*

Maria Otero, University of North Texas: *Multidimensional Visual Analyses: Performance Mapping of Verbal Behavior using Permutated Radar Charts*

Jorge Mallea, Columbia University: *Dissociating the Effect of Reinforcement Probability and Rate in Sign and Goal Tracking Behavior*

4:30 **Awards & Closing Remarks**

4:35 **Business Meeting**

– Second Poster Session & Cash Bar: 7:00–9:30 pm –

SQAB ~~ TUTORIALS

Saturday, May 28: Meeting Level 1; Room 151A/B

10:00 – 10:50 **David P. Jarmolowicz, The University of Kansas and Cofrin Logan Center for Addiction Research and Treatment:**
Applying Behavioral Economics to Health Behavior: A Case Study
Chair: Yusuke Hayashi, Pennsylvania State University, Hazleton

11:00 – 11:50 **Jack J. McDowell, Emory University:**
Creating Artificial Organisms Animated by a Selectionist Theory of Adaptive Behavior Dynamics
Chair: Peter R. Killeen, Arizona State University

12:00 – 12:50 **Mary Elizabeth Hunter, Behavior Explorer:**
The PORTL Laboratory
Chair: Claire C. St. Peter, West Virginia University

3:00 – 3:50 **Peter R. Killeen, Arizona State University:**
What Is MPR and How Has It Evolved?
Chair: M. Christopher Newland, Auburn University

4:00 – 4:50 **Mathematical Principles of Reinforcement: A Panel with Discussion:**
John Falligant, Kennedy Krieger Institute and Johns Hopkins University School of Medicine
Brent Kaplan, University of Kentucky
M. Christopher Newland, Auburn University
Chair: M. Christopher Newland, Auburn University

SQAB Invited Preeminent Tutorials are recorded and made available on iTunes and YouTube: youtube.com/c/SocietyfortheQuantitativeAnalysesofBehavior

Welcome to SQAB 2022

11:30 am -1:00 pm Registration, outside room 205AB.

1:00 pm **President's Introduction**
Suzanne H. Mitchell
Oregon Health & Science University

1:15 - 1:55 pm **Habituation: The Cinderella of Learning**
Ruth M. Colwill
Brown University (USA)

Traditional descriptions of habituation as a decline in the response to a repeatedly presented stimulus are inadequate. They fail to distinguish between learning and performance, draw erroneous conclusions about the conditions that produce habituation, and mistakenly attribute habituation to a nonassociative learning process. In this talk, I will describe some data from my laboratory using the startle response in larval zebrafish (Danio rerio) to study the interstimulus interval, stimulus specificity, and dishabituation. I will discuss them within the framework of the dual memory model of habituation pioneered by Wagner and his colleagues.

1:55 - 2:35 pm **Context, Behavior Change, and Habit Learning**
Mark E. Bouton
University of Vermont (USA)

We have been studying the basic learning processes that underlie behavior change for many years. Research has established that behavior change can be remarkably context-dependent; for example, when a behavior is eliminated by extinction, punishment, or incentivizing abstinence, it can return or relapse when the context is changed. Recent work has extended the analysis to goal-directed actions and habits. Goal-directed actions become habits with lots of repetition and practice, as theories of addiction often suppose. One reason for the conversion to habit is that the organism pays less attention to its behavior as the reinforcer becomes more predictable. And, contrary to the idea that habits are fixed and rigid, the transition from action to habit is like other types of behavior change: Habit learning does not erase goal direction, but interferes with it in a context-dependent way.

2:35 - 2:50 pm Break

2:50 – 3:30 pm **Researcher Heuristics as an Obstacle to Understanding Learning**
Ralph R. Miller
Binghamton University (USA)

Cognitive psychology has abundantly demonstrated that people often use subconscious heuristics (aka, thumb rules), as opposed to conscious, data-driven reasoning, to make decisions. Two well-known heuristics are (1) people attribute greater validity to more frequently repeated assertions (i.e., the repetition-induced truth), and (2) once views are formed, people are resistant to disconfirming evidence (i.e., belief perseverance). Researchers are trained to rely on data-driven reasoning in their conscious information processing, but much information processing occurs below the level of consciousness. Below the level of conscious awareness, scientists are like laypeople and often revert to heuristics such as the repetition-induced truth effect and belief perseverance. The consequences of this will be examined with respect to prevailing wisdom concerning the necessity of prediction-error for learning to occur, and consolidation-disruption and reconsolidation-disruption accounts of experimentally-induced amnesia.

3:30 - 4:10 pm **Modeling and Quantifying Resurgence in an Evolutionary Theory of Behavior Dynamics**
Bryan Klapes
Philadelphia College of Osteopathic Medicine – Georgia Campus (USA)
John M. Falligant and Louis P. Hagopian
Kennedy Krieger Institute and Johns Hopkins University School of Medicine (USA)

McDowell's (2004) Evolutionary Theory of Behavior Dynamics (ETBD) has been shown to model a wide range of live organism behavior with excellent descriptive accuracy (McDowell, 2013, 2019). In this presentation, we will discuss the recent discovery that artificial organisms (AOs) animated by ETBD display resurgence of a previously extinguished behavior (Falligant et al., 2022). Further, we will show that the AOs' resurgence can be accurately and adequately described by the prevailing quantitative description of resurgence: Shahan and Craig's (2017) Resurgence as Choice (RaC) model. Finally, we will discuss future directions for ETBD studies of resurgence, such as the replication and extension of live-organism studies using punishment within resurgence experimental paradigms to help derive a quantitative model of resurgence under punishing contingencies.

4:10 – 4:25 pm Break

4:25 - 5:05 pm **Policy Compression**
Samuel J. Gershman
Harvard University (USA)

The brain has evolved to produce a diversity of behaviors under stringent computational resource constraints. Given this limited capacity, how do biological agents balance reward maximization against the costs of representing complex action policies? To understand this trade-off, I introduce the theoretical framework of policy compression, or the reduction in cognitive cost of representing action policies by making them simpler. A wide range of behavioral phenomena, including stochasticity, perseveration, response time, state and action chunking, and navigation, are brought together under this framework.

5:05 – 5:45 pm **Age-Related Differences in Learning: Considerations for Cross-Sectional Modeling of Age in Regression and Computational Models.**
Juliet Y. Davidow
Northeastern University (USA)

A central focus in the discovery of the underpinnings of human behavior has been the investigation of associations between performance and subject specific features. For example, relating an individual's working memory capacity to their IQ. Developmental psychologists are commonly interested in understanding how age relates to cognition and behavior. This simple, seemingly straightforward pursuit is brimming with cascading decision points which have consequences for analysis (e.g., violation of statistical test assumptions), and interpretation (e.g., ability to make inferences about age-related change). In my program of research, potential pitfalls are avoided with techniques implemented before data are acquired (i.e., study design and sample distribution) and during analysis. In my talk, I will use age-related differences in learning and goal-directed behavior during adolescence to provide an overview of best practices and alternative approaches. I will present two cases of analytic approach for how age can be modeled. The first, considers regression for how to best address inferences about age associations with cognition such as learning and inhibitory control. The second, considers reinforcement learning for inferences about age associations with estimated parameters from hierarchical and non-hierarchical computational models of learning and decision making. My talk will focus on age as an example, but these fundamental principles generalize to other domains, such as studies of individual differences and comparisons of groups, such as patients vs. healthy controls.

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7 - 9:30 pm **First Poster Session & Cash Bar, Room 205C**

All posters have been assigned a number.

For even-numbered posters – presenters will be standing by the poster from 7:30 pm – 8:15 pm.
For odd-numbered posters - presenters will be standing by the poster from 8:15 pm – 9:30 pm.

9:00 - 9:40 am **The Cognitive-Motor Interface: Deliberation vs. Intelligence**
John W. Krakauer
Johns Hopkins University (USA)

Neuroscience seems to have more explanatory traction when it comes to sensorimotor behavior than it does with cognition, where psychological constructs seem more useful. Why should this be and will it change?

9:40 – 10:20 am **Information Theory for Behaviorism: Predicting Matching Behavior based on Entropy in the Response to Reward Feedback**
Alireza Soltani
Dartmouth College (USA)

For decades, psychologists and behavioral neuroscientists have used the matching law to quantify how animals distribute their choices between multiple options in response to reinforcement they receive. On the other hand, many reinforcement learning (RL) models have been developed to explain choice behavior based on the integration of reward feedback over time. Despite reasonable success of RL models in capturing choice on a trial-by-trial basis, these models cannot capture variability in matching behavior adequately. In this talk, I show how new behavioral metrics based on information theory can be used to better understand matching behavior and to construct better RL models. Specifically, using choice data from dynamic learning tasks in mice and monkeys, I show that a single entropy-based metric can explain 50% and 41% of variance in matching in mice and monkeys, respectively. I then demonstrate how limitations of existing RL models in capturing these metrics can be used to construct more accurate models of choice behavior. Together, the entropy-based metrics provide a model-free tool to study adaptive choice behavior and reveal its underlying neural mechanisms.

10:20 – 10:35 am Break

10:35 – 11:15 am **A Dialog between Two Models of Timing, Scalar Expectancy Theory (SET) and Learning-to-Time (LeT)**
Armando Machado
Universidade de Aveiro (Portugal)

We distinguish three periods in the study of timing in animals, each characterized by a modal activity. In the first, researchers brought timing into the laboratory and explored empirically its multiple expressions. In the second, the growing body of empirical generalizations inspired researchers to develop a plethora of timing models that vary in theoretical orientation, scope, depth, and quantitative explicitness. We argue that we have entered a third period, wherein researchers select models by comparing them with one another and with data. We make the case by comparing the Scalar Expectancy Theory and the Learning-to-Time model, paying attention to how each conceives of temporal memory and learning in concurrent timing tasks and in retrospective timing tasks. We identify four problems related to the structure of temporal memory and to the rules of

temporal learning that challenge these models and that should drive the next steps in modelling the timing abilities of animals

11:15 – 11:55 am **Learning about Reward Identities and Time**
Andrew R. Delamater
Brooklyn College (USA)

Organisms learn to anticipate rewards in the presence of different environmental cues. In this talk I will review some of our studies using the peak procedure indicating that rodents can learn to anticipate which of two specific rewards will occur, as well as when these rewards will occur. Furthermore, I address the question of whether learning about a reward's identity and its time of occurrence might involve dissociable systems. We have shown, for instance, that manipulations that undermine learning about reward identity have little effect on reward timing. However, temporal computations in a temporal averaging task may sometimes depend, at least partly, on reward identity. Finally, I will discuss some of our work on temporal patterning and show how these studies, collectively, raise important challenges for computational models of interval timing and for models that attempt to integrate learning about reward identities and time. This will be discussed in the context of feedforward and recurrent connectionist network approaches.

11:55 - 1:30 pm Lunch – SQAB Executive Committee Meeting

1:30 – 2:10 pm **Response Limitations: How Depletion and Replenishment Cliffs affect Waiting**
Michael E. Young and Brian Howatt
Kansas State University (USA)

Generally speaking, the larger and more proximal a valenced outcome, the stronger its behavioral control. We have been studying a situation in which repeatedly choosing to receive a reward sooner, which is also under the control of a proximal contingency that encourages or discourages such behavior, will more rapidly deplete a response pool thus producing a distal consequence. Once the response pool is depleted, no further reward is available (a depletion cliff) until a programmed delay has passed at which point the pool is fully replenished (a replenishment cliff). Our research program is examining the effects of the size of this pool and its delay to replenishment (i.e., the distal consequences of choice) under proximal conditions that encourage versus discourage fast harvest rates (i.e., short interresponse times). Our research will be placed within the larger context of other research involving limited resources: foraging and the tragedy of the commons.

2:10 – 2:50 pm **The Operant Behavioral Economics of Fad, Questionable, and Pseudoscientific Treatment Consumption**
Shawn Gilroy
Louisiana State University (USA)

Behavior analysts regularly advocate for the use of methods and procedures that are supported in applied research with children. Efforts to advocate for treatments based on established principles of behavior are necessary because parents and caregivers seldom select treatments based on scientific evidence alone. This presentation reviews a series of works that have applied the Operant Demand Framework and Consumer Behavior Analysis to the consumption of fad, questionable, and pseudoscientific treatments marketed to young populations. Consumer Behavior Analysis applied to decisions made by caregivers interested in parent-mediated behavior therapy indicated a greater overall sensitivity to the informational consequences of specific treatments, which are mediated by the local verbal community (e.g., family, peer group), than the utilitarian consequences of specific treatments, which directly result from the efficacy of the approach. These results converge with current perspectives on the salience of evidence and highlight the relevance of increasing the mainstream acceptability of evidence-based practices. Findings from these studies are discussed with recommendations for better advocating for evidence-based treatments.

2:50 – 3:10 pm Break

3:10 – 3:50 pm **Choice Principles (the Matching Law and Global Maximizing) help Explain many of Addiction's Defining Features**
Gene Heyman
Boston College (USA)

The matching law describes how individuals make choices in many situations; global maximizing, of the sort that appears in economic textbooks, describes how individuals should make choices. I demonstrate that by themselves and together, these two choice principles help explain several key features of addiction. The list includes the persistence of drug use despite negative consequence (its essential diagnostic feature, according to the American Psychiatric Association), alternating periods of drug use and abstinence, high remission rates, some features of Alcoholics Anonymous, such as taking an inventory of the harms linked to drinking, and why addictions typically involve drugs as opposed to the many other commodities we choose to consume. The major competing view of addiction is the idea that addiction is a disease. The choice approach summarized in this talk is both more comprehensive and more detailed.

3:50 – 4:30 pm **The Tony Nevin Invited Student Presentation Series**

Computational Simulation and the Search for a Quantitative Description of Simple Reinforcement Schedules [Poster #1]
Paulo Sergio Panse Silveira, José de Oliveira Siqueira, João Lucas Bernardy, Jessica Santiago, Thiago Cersosimo Meneses, Bianca Sanches Portela, Marcelo Frota Benvenuti
University of São Paulo (Brazil)

We aim to discuss schedules of reinforcement in its theoretical and practical terms pointing to practical limitations on implementing those schedules. We present a R script built to cover a large

range of rates of behavior interacting with schedules of reinforcement.The sistematic variation of behavior rate and reinforcement schedules lead to mapping of all possible outcomes for each scenario, thus providing normative rules of behavior. We've compared different RFF for RI schedules, using as criteria: meaning, precision, parsimony and generality. Our results indicate that the best feedback function for the RI schedule was published by Baum (1981). We also propose that the model used by Killeen (1975) is a viable feedback function for the RDRL schedule.

A Parametric Replication of the Effect on Performance and Timing of Delayed Reinforcement in a Fixed-Interval Schedule [Poster #2]

Marielena Eudave-Patiño, Emmanuel Alcalá, Brian Numpaque, J. Camilo Parra-Cruz, Alberto Tavera-Galicia, Gloria Ochoa-Zendejas, Tania Campos-Ordoñez, Jonathan Buriticá
Universidad de Guadalajara (Mexico)

Delayed reinforcement changes performance (diminish response rates) and timing (increase time generalization) in Fixed-Interval schedules. To replicate the effect with different delayed-reinforcement durations, four groups of rats were trained with a multiple schedule of two components: at baseline the same FI was scheduled in both components, in the experimental phase one component maintained the same average time to reinforcement but with delayed reinforcement while the intervals in the second component were yoked to the first component but with immediate reinforcement. IRTs durations modelled using loess regression changed from long to short at a proportion of the FI and that proportion increased in the delayed component. Longer delays changed the performance to negative accelerated curves instead of the scalloped patterns.

Comparison of the Adjusting-Amount Procedure and the Monetary Choice Questionnaire for Measuring Delay Discounting [Poster #3]

Haoran Wan, Joel Myerson, Leonard Green
Washington University in St. Louis (USA)

The Adjusting-Amount Procedure and the Monetary Choice Questionnaire (MCQ) are often used to assess group and individual differences in delay discounting. This study compared these two measurement procedures in order to determine whether they measure the same underlying construct. 425 participants from MTurk and Prolific each completed both procedures. Regardless of the source of the participants, the correlation between the adjusting-amount procedure (area under the curve) and the MCQ (proportion of choices of the delayed reward) was greater than .80, and significant amount effects were observed with both procedures. These results suggest that the two procedures measure the same construct. It should be noted, however, that MTurk participants tended to discount more steeply than Prolific participants.

Multidimensional Visual Analyses: Performance Mapping of Verbal Behavior using Permutated Radar Charts [Poster #4]

Maria Otero
University of North Texas (USA)
Lee Mason
Cook Children's Health Care System (USA)

Alonzo Andrews
University of Texas at San Antonio (USA)

The functional analysis of verbal behavior requires an evaluation of responses across multiple sources of control. These data are typically arranged for visual analysis using time-series graphs or pie charts that treat each verbal operant independently of one another. Here, we extend the work of Porter and Niksiar (2018) by exploring the use of a multidimensional visualization strategy to compare the relative performance distributions of verbal behavior across $N \geq 3$ properties on a radial, multi-axis radar chart. The polygonal profiles of data plotted on a radar chart afford the use of shape descriptors for precise quantitative comparisons. We demonstrate the potential of radar charts as a visual display for multidimensional models of the gestalt verbal repertoire.

Dissociating the Effect of Reinforcement Probability and Rate in Sign and Goal Tracking Behavior [Poster #5]

Jorge Mallea, Peter Balsam
Columbia University (USA)

In Pavlovian learning, when objects are used as cues predictive of reward, two distinctive forms of conditioned responses are observed: subjects approach and interact with the cue (i.e., sign-tracking) or the reward port (i.e., goal-tracking). Previous studies have shown higher levels of sign-tracking under uncertain conditions, like probabilistic reinforcement. However, changes in probability are often confounded with changes in reinforcement rate. Two experiments analyzed the effect of probabilistic or continuous reinforcement when it's either accompanied (Experiment 1) or not (Experiment 2) by differences in reinforcement rate, under low and high temporal uncertainty conditions. Results showed more sign-tracking under probabilistic reinforcement only when probability and rate were confounded, and this effect was present only under low temporal uncertainty conditions.

4:30 - 4:35 pm **Joseph V. Brady Impactful Research Award**
Presented by Mark Galizio, *JEAB* Editor
University of North Carolina Wilmington (USA)

Closing Remarks
Suzanne H. Mitchell
Oregon Health & Science University (USA)

4:35 – 5:15 pm **Business Meeting**
All SQAB members welcome – Room 205AB

7:00 - 9:30 pm **Second Poster Session & Cash Bar, Room 205C**

All posters have been assigned a number.
For even-numbered posters – presenters will be standing by the poster from 7:30 pm – 8:15 pm.
For odd-numbered posters - presenters will be standing by the poster from 8:15 pm – 9:30 pm.

SQABThursday Evening Room 205C

7 - 9:30 pm **First Poster Session & Cash Bar**

1. **Children's Compliance Function and Subjective Reinforcement Value**
Silvia Morales Chainé (Universidad Nacional Autónoma de México); Lizeth Santos Torres (Universidad Nacional Autónoma de México); Luz María Cortes Larios (Universidad Nacional Autónoma de México); Gisel G. Escobar (Universidad Nacional Autónoma de México); Leonard Green (Washington University in St. Louis)

2. **Renewal During Dense and Lean Schedules of Differential Alternative Reinforcement: A Human Operant Investigation**
Ryan Kimball (University of Saint Joseph); Emily Ferris (University of Nebraska Medical Center's Munroe-Meyer Institute); Lindsay Day (University of Saint Joseph); Rebecca Karis (University of Saint Joseph); John Silveira Jr. (University of Saint Joseph)

3. **Spontaneous Recovery of Choice: A Scaled Temporal Weighting Rule Outperforms a EWMA**
Jack Van Allsburg (Utah State University); Timothy A. Shahan (Utah State University)

4. **Bias for Information: Learning Mechanisms and Frontocortical Contributions**
Valeria V. Gonzalez (University of California Los Angeles); Aaron P. Blaisdell (University of California Los Angeles); Alicia Izquierdo (University of California Los Angeles)

5. **The Effects of Operant Variability on Insightful Problem-Solving**
Rafael Rodrigues (University of São Paulo); Miriam Garcia-Mijares (University of São Paulo); Lourenço Barba (Pontifical Catholic University of São Paulo)

6. **Further Application of the Matching Law to Point-after-Touchdown Selection in American Football**
Ryan Benson (Kennedy Krieger Institute); Ian Cero (University of Rochester Medical Center); John Michael Falligant (Kennedy Krieger Institute & Johns Hopkins University School of Medicine)

7. **An Associative Learning Account of Collective Learning**
Cristina Santos (Arizona State University), Federico Sanabria (Arizona State University)

8. **Categorical Analyses of Raw Data Outperformed Linear Regression in Simulated 4-Choice Data**
Michelle Frankot (West Virginia University); Michael Young (Kansas State University); Cole Vonder Haar (Ohio State University)

9. **Varying Undiscounted Costs and Socially Discounted Benefits of Cooperating in One-Shot Prisoner's Dilemma Games**
Aldo C. Toledo (National Autonomous University of Mexico); Raul Avila (National Autonomous University of Mexico)

10. A Component Analysis of Mindful Eating on Delay Discounting for Food
Sierra Baca-Zeff (Idaho State University); Erin B. Rasmussen (Idaho State University)

11. Behavioral Performance Against Model-Based Learning Algorithms in a Competitive Game
Brian C. Howatt (Kansas State University); Michael E. Young (Kansas State University)

12. Behavior and Bacteria: Effects of Dietary Fat on Impulsive Choice and Gut Microbial Diversity
Kourtney Rumback (Kansas State University); Travis Smith (Kansas State University); Brandi Feehan (Kansas State University); Aubrey Deavours (Kansas State University); Qinghong Ran (Kansas State University); Sonny Lee (Kansas State University); Kimberly Kirkpatrick (Kansas State University)

13. Effects of Food Cue Exposure on Food Consumption and Delay Discounting in Binge Eating Prone and Binge Eating Resistant Rats
Morgan Musquez (Idaho State University); Alam Alvarado (Idaho State University); Erin B. Rasmussen (Idaho State University)

14. RescueRATS: Training African Giant Pouched Rats to Detect Trapped Human "Survivors" in a Simulated Environment
Donna Kean (APOPO); Said Mshana (APOPO); Venance Kiria (APOPO); Christophe Cox (APOPO); Umut Dinēŗahin (GEA); Can Cengiz (GEA); Cynthia D. Fast (APOPO

15. Are the Attention Checks Embedded in the Adjusting Delay Discounting Task a Valid Marker for Online Data Quality?
Shahar Almog (University of Florida); Jillian M. Rung (University of Florida); Andrea Vásquez Ferreiro (University of Florida); Meredith S. Berry (University of Florida)

16. Effects of an Abbreviated Time-Based Intervention on Interval Timing
Lexe West (Kansas State University); Kelsey Panfil (Kansas State University); Travis Smith (Kansas State University); Kourtney Rumback (Kansas State University); Robert Southern (Kansas State University); Kimberly Kirkpatrick (Kansas State University)

17. Social Discounting, Social Distance and Altruistic Giving to Ukrainians
Vasiliy Safin (Simpson College)

18. Greater Extinction with Increases in the Frequency but not the Duration of Streamed Extinction Trials
James E. Witnauer (SUNY Brockport); Dennis J. Elengickal (SUNY Binghamton); Santiago Castiello (University of Oxford); Robin A. Murphy (University of Oxford); Ralph R. Miller (SUNY Binghamton)

19. The Relationship Between Substance Use and Impulsive Choices in a Novel Choice Task
Robert Southern (Kansas State University); Travis Smith (Kansas State University); Salil Patel (NXTech); Kimberly Kirkpatrick (Kansas State University)

20. Comparison of SHR, WKY and Wistar Rats on Acquisition of Operant Behavior
Fábio Leyser Gonçalves (UNESP)

21. Effects of the Response Requirement on Rats' Choice Between Probabilistic Reinforcers
Nataly Yáñez (Universidad de Guadalajara) ; Arturo Bouzas (Universidad Nacional Autónoma de México); Alejandro Segura (Universidad de Guadalajara)

22. Holding on to Hull: Response Mediation in a Matching-to-Sample-Task
J. Mark Cleaveland (Vassar College); Samantha Dorf (Vassar College); Formosa Huang (Vassar College); Hannah Maver (Vassar College)

23. Conditioned Reinforcement: Effects of Trial Spacing on Acquisition of a New Response
Gabrielle Sutton (Utah State University); Timothy Shahan (Utah State University)

24. Effects of the Delay Confound in an Effort Discounting Task
Sara Peck (Utah State University); Gregory J. Madden (Utah State University)

25. A Binge-Eating Disposition Increases Impulsive Choices and High-Fat/Sugar Food Preferences: A Rodent Model
Travis Smith (Kansas State University); Lexe West (Kansas State University); Kourtney Rumback (Kansas State University); Kelsey Panfil (Kansas State University); Robert Southern (Kansas State University); Kimberly Kirkpatrick (Kansas State University)

26. Framing Effects in Pigeons' Preference for Risky or Safe Alternatives
Wilson Clayton (McDaniel College), Peyton Mueller (University of Kentucky), Daniel Peng (University of Kentucky), and Thomas Zentall (University of Kentucky)

SQABFriday Evening Room 205C

7 - 9:30 pm **Second Poster Session & Cash Bar**

27. For Review Only Computational Simulation and the Search for a Quantitative Description of Simple Reinforcement Schedules
Paulo Sergio Panse Silveira (University of São Paulo); José de Oliveira Siqueira (University of São Paulo); João Lucas Bernardy (University of São Paulo); Jessica Santiago (University of São Paulo); Thiago Cersosimo Meneses (University of São Paulo); Bianca Sanches Portela (University of São Paulo); Marcelo Frota Benvenuti (University of São Paulo)

28. A Parametric Replication of the Effect in Performance and Timing of Delayed Reinforcement in a Fixed-Interval Schedule
Marielena Eudave-Patiño (Universidad de Guadalajara); Emmanuel Alcalá (Universidad de Guadalajara); Brian Numpaque (Universidad de Guadalajara); J. Camilo Parra- Cruz (Universidad de Guadalajara); Alberto Tavera-Galicia (Universidad de Guadalajara); Gloria Ochoa-Zendejas (Universidad de Guadalajara); Tania Campos-Ordoñez (Universidad de Guadalajara); Jonathan Buriticá (Universidad de Guadalajara)

29. Comparison of the Adjusting-Amount Procedure and the Monetary Choice Questionnaire for Measuring Delay Discounting
Haoran Wan (Washington University in St. Louis); Joel Myerson (Washington University in St. Louis); Leonard Green (Washington University in St. Louis)

30. Multidimensional Visual Analyses: Performance Mapping of Verbal Behavior using Permutated Radar Charts
Maria Otero, University of North Texas; Lee Mason, Cook Children's Health Care System; Alonzo Andrews, University of Texas at San Antonio

31. Dissociating the Effect of Reinforcement Probability and Rate in Sign and Goal Tracking Behavior
Jorge Mallea (Columbia University); Peter Balsam (Columbia University; Barnard College; New York State Psychiatric Institute)

32. Reverse Contingency and Percieved Loss/Gain in Pigeons
Daniel Peng, University of Kentucky; Thomas R Zentall, University of Kentucky; Jacelyn Sturgill, University of Kentucky; Cameron Bergeron, University of Kentucky; Thomas Ransdell, University of Kentucky; Tatum Colvin, University of Kentucky; Gia Joshi, University of Kentucky

33. Relations Between Adverse Childhood Experiences and Behavioral Economic Demand for Opioids in an Online Sample
Andrea Vásquez Ferreiro (University of Florida); Shahar Almog (University of Florida); Jillian M. Rung (University of Florida); 4. Meredith S. Berry (University of Florida)

34. Pigeons Hit the Slots: Modeling Gambling Behavior in a Token Economy
Michael Losi (Reed College); Cyrus Kirkman (UCLA); Timothy Hackenberg (Reed College)

35. When Do Extinction Bursts Happen?: Investigating Three Potential Predictors of Bursts
Kyleigh Montague (Marcus Autism Center); Kimberly Nicole Palmer (Marcus Autism Center); Catherine Williams (Emory University, Marcus Autism Center); Colin Muething (Emory University, Marcus Autism Center); Tom Carivaeu (University of North Carolina Wilmington); Summer Bottini (Emory University, Marcus Autism Center); Sarah Slocum (Emory University, Marcus Autism Center); Scott Gillespie (Emory University); Mindy Scheithauer (Emory University, Marcus Autism Center)

36. Acquisition of Long-Interval Timing in Mice
Basak Akdogan (Columbia University; New York State Psychiatric Institute); Charles Randy Gallistel (Rutgers University); Peter D Balsam (Barnard College; Columbia University; New York State Psychiatric Institute)

37. Video Game Dependence Symptoms: Relation Between Genre and Impulsive Behavior
Alexandre Rimar Cintra (UNESP); Fábio Leyser Gonçalves (UNESP)

38. Using a Quantitative Theoretical Framework to Evaluate a Potential Strategy for Mitigating Resurgence
Carla N. Martinez-Perez (Auburn University); Carolyn M. Ritchey (Auburn University); Toshikazu Kuroda (Aichi Bunkyo University); Christopher A. Podlesnik (Auburn University);

39. Timing and Impulsive Choice in the FMR1 Knockout Rat
Abbie Cooper (St. Lawrence University); Bryana Thieret (St. Lawrence University); Hannah Tobias-Wallingford (St. Lawrence University); William E. DeCoteau (St. Lawrence University); Adam E. Fox (St. Lawrence University)

40. **Alternative-Reinforcer Magnitude Effects on Resurgence Across Successive Relapse Tests in Mice**
Beatriz E. Arroyo (Universidad de Guadalajara); Kate E. Derrenbacker (SUNY Upstate Medical University); Charlene N. Agnew (SUNY Upstate Medical University); William E. Sullivan (SUNY Upstate Medical University); Henry S. Roane (SUNY Upstate Medical University); Andrew R. Craig (SUNY Upstate Medical University)

41. The Scalar Property of Schedule-Induced Drinking Depends on a Time-Based Contingency
Antonio J. Reina-Hidalgo (UNED); Gabriela E. López-Tolsa (UNED); Ricardo Pellón (UNED)

42. The Effects of Circadian Time and Motivational Processes on Delay Discounting
Enedina Zepcan (OHSU); Jessica Faraca (OHSU); Suzanne H. Mitchell (OHSU)

43. Multidimensional Analysis of Behavior Assisted by Machine Learning: Spatiotemporal Features under Concurrent Time-Schedules of Food and Water
Alejandro León (Universidad Veracruzana); Varsovia Hernández-Eslava (Universidad Veracruzana); Isiris Guzmán (Universidad Veracruzana); Víctor Quintero (Universidad Veracruzana); Juan López (Universidad Veracruzana); Porfirio Toledo (Universidad Veracruzana); Martha Lorena Avendaño (Universidad Veracruzana); Carlos Hernández-Linares (Universidad Veracruzana); Esteban Escamilla (Universidad Anáhuac)

44. Some Behavioral Effects of Acute Exposure to Glyphosate in Male and Female Rats
Emily Eshleman (Allegheny College); Stephen Cullinan (Allegheny College); Olivia Kraus (Allegheny College); Rodney D. Clark (Allegheny College)

45. Preference and Persistence of Gambling Behavior as a Result of Changes in Volatility
Gonzalo Fernández (Center for Studies in Social and Health Sciences); Concepción Cisneros (Universidad Panamericana); Kenneth D. Madrigal (University of Sonora)

46. A Comparison of Social Discounting Across 5-Trial and Adjusting-Amount Tasks
Cynthia J. Pietras (Western Michigan University); Justin E. Myers (Western Michigan University)

47. Use the Force: Investigation of Cost-Benefit Decision-Making Using a Load Cell Operandum
Tala Sohrabi (Columbia University); Peter Balsam (Barnard College); Eleanor Simpson (Columbia University)

48. Own- And Cross-Price Demand Elasticity with Specific and Generalized Conditioned Reinforcers in a Token Economy with Pigeons
Anan Cao (Reed College); Lavinia Tan (Reed College); Haoran Wan (Washington University in St. Louis); Tim Hackenberg (Reed College)

49. Implementation of a Suboptimal Choice Procedure in a Simulation of Rats' Natural Foraging
Fernanda González-Barriga (UNAM); Vladimir Orduña (UNAM)

50. History-dependent expectation about reward environment shapes local choice strategy in mice
Jae Hyung Woo (Dartmouth College); Mehran Spitman (Dartmouth College, New York University); Bilal A. Bari (Johns Hopkins University School of Medicine); Jeremiah Y. Cohen (Johns Hopkins University School of Medicine); Alireza Soltani (Dartmouth College)

51. Tracking Eye Fixations during Stimulus Generalization Tests
Juliano Setsuo Violin Kanamota (Universidade Federal de Mato Grosso do Sul – Campus de Paranaíba); Gerson Yukio Tomanari (Universidade de São Paulo)

52. Force Discrimination Using a Load Cell Operandum
Tala Sohrabi (Columbia University), Lynxie Voorhees (Barnard College), Eleanor Simpson (Columbia University), Peter Balsam (Barnard College)


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