Nevin Awardees

SQAB2021

All times are Eastern Daylight Time (UTC –4)

11:50 - 12:30 pm **Poster spotlights/Nevin awards (alphabetized by 1st author's last name)**

Tagging components of behavior entrained to long intervals: An opportunity-cost model of interval timing

Tanya A. Gupta, Federico Sanabria
Department of Psychology, Arizona State University

Interpretation of interval timing data from animal models is complicated by motivational effects, arising from the delay-to-reward imposed by interval timing tasks, as well as overlap between timed and non-timed responses. Response-initiated timing tasks, in which animals initiate each trial, allow for dissociation of motivation- and timing-related behaviors. When intervals are particularly long (>40 s), response-initiation in often results in schedule strain, leading to a decrease in the number of initiated trials. The current study utilizes a timing-with-opportunity-task in which animals were trained to seek food at one location based on time (fixed-interval) and at another location based on probability (random ratio). This design facilitated response-initiated timing behavior at increasingly long delays.

Experiencing Delayed Punishments Reduces Impulsivity

Brian C. Howatt, Michael E. Young
Kansas State University

We examined the degree to which delayed punishments impact impulsive choice using an Escalating Interest task. Participants navigated a virtual 3D environment presenting repeated choices between responding sooner for less reward or later for more. Additionally, each participant was randomly supplied with a limited number of responses (25-100). Once the supply was empty, further responses were ineffective until a replenishment delay had elapsed. Preliminary results revealed a trend that participants supplied with fewer responses to replenishment were less likely to respond sooner (i.e., make fewer impulsive choices). Participants were also less likely to respond sooner as their remaining responses depleted (i.e., approached contact with the replenishment delay). These results suggest experiencing delayed punishments can reduce impulsive choice.

Just how effective is Direct Instruction?

Maria Otero[1,2], Lee Mason[1,2]
Cook Children's Health Care System; Texas Christian University

Despite overwhelming evidence supporting Direct Instruction, it has never been widely embraced by schools. Direct Instruction, developed and refined by Engelmann and colleagues over the past 50 years, has been the focus of numerous research studies, systematic reviews, and meta-analyses. While its efficacy is certain, the significance of Direct Instruction's impact may be misunderstood. We attempt to clarify the importance of Direct Instruction with help from the binomial effect size display (BESD). The BESD allows for intuitive and informative data-based decision making by clearly conveying the real-world importance of treatment outcomes through a juxtaposition of the relative proportions of success. Using the BESD as a framework, we attempt to answer the question: Just how effective is Direct Instruction?

Phase Duration and Resurgence

Sean Smith[1,3], Brian D. Greer[2,3]
University of Nebraska Medical Center, CSH-RUCARES, Rutgers RWJ Medical School

Resurgence is the recurrence of responding due to a worsening of reinforcement conditions for current behavior. Resurgence as Choice in Context predicts that increasing the duration of exposure to reinforcement for target responding during Phase 1 will increase resurgence magnitude, whereas increasing the duration of exposure to reinforcement for alternative responding and extinction for target responding during Phase 2 will decrease resurgence magnitude. We conducted an experiment evaluating these predictions with human participants recruited through Amazon's Mechanical Turk platform. We varied Phase 1 and Phase 2 durations across four experimental groups. Resurgence as Choice in Context successfully predicted the differences in resurgence magnitude across groups, and fitting the quantitative model to the obtained data yielded an exceptional coefficient of determination.

Effects of the Shock-Shock Interval on the Punishment of Avoidance Responding

Catherine Williams, *Michael Perone*
West Virginia University

Few experiments have investigated contingencies in which lever pressing (a) postpones shock on Sidman's free-operant avoidance schedule and (b) produces a shock of lesser intensity (punishment shock). We investigated the role of the shock-shock interval on the punishment of avoidance responding across four different shock-shock intervals. We reasoned that punishment of avoidance responding would be most effective when the shock-shock interval lasted longer than the response-shock interval (30-s in our case). For three of four rats, response rate decreased as the shock-shock interval was raised, but the effect was observed only if the punishment shocks were relatively long and intense.

12:30 - 1:45 pm **Second Poster Session (alphabetized by 1st author's last name)**

Temporal organization of resurgence following shifts in reinforcer magnitude

Charlene Agnew, Kate E. Derrenbacker, Andrew Craig
SUNY Upstate Medical University

In this study, we investigated resurgence of a target behavior when an alternative behavior experiences a downshift in reinforcer magnitude to either extinction or lower magnitude reinforcement. During reinforcement downshifting, resurgence of the target behavior occurred for both the extinction and lower magnitude group, but temporal and rate variability occurred between groups. In the extinction group, resurgence of target behavior occurred at lower rates immediately following extinction, then plateaued relatively quickly in comparison to the magnitude shift group. In the magnitude shift group, resurgence occurred immediately and at high rates following downshift, then responding continued throughout the resurgence test phase. We will discuss implications of these results for the conceptualization of current resurgence models.

On the relation between the matching law and the ideal free distribution - a selectionist approach

Matthias Borgstede[1], Alex S. Rieger[2]
[1]*University of Bamberg, Germany,* [2]*Technische Univertität Braunschweig, Germany*

In concurrent VI/VI schedules the distribution of behavior over choice options can be described by means of the ratio of obtained reinforcements. In the context of individual choice behavior, the corresponding quantitative relation is known as the matching law (ML). When applied to the behavior of groups of individuals, the same quantitative relation is known as the ideal free distribution (IFD). We approach the formal similarity between the ML and the IFD from the perspective of the multilevel model of behavioral selection (MLBS). Using an extended Price equation, we show how the ML and the IFD can both be conceptualized as the result of an abstract selection principle acting on different aggregate levels and hence follow from the MLBS.

Effects of Dyadic Collaboration on Intertemporal Preference

Emily Edgington, Daniel Holt
James Madison University

Intertemporal choices have been researched extensively in the context of individual choices. However, empirical evidence is absent regarding intertemporal preferences when two individuals collaborate on a choice task. This study aimed to compare the rates of discounting under the condition of dyadic collaboration and individual decisions. Furthermore, this study examined the collaboration sessions in an online video conferencing platform. Results showed a strong, positive correlation between average individual discounting rates and corresponding dyad rates of discounting. The findings of this study should be considered when making intertemporal decisions.

Attention to Delay: The Effects of Fixed-Interval and Fixed-Time Interventions on Impulsive Choice and Timing

Anderson Fitch, Travis Smith, Aubrey Deavours, Kimberly Kirkpatrick
Kansas State University

Impulsive choices are made between smaller-sooner (impulsive) and larger-later rewards (self-controlled). Delay-exposure interventions, featuring fixed-interval (FI) and fixed-time (FT) schedules of reinforcement, improve self-control. The present study examined FI and FT impulsive choice tasks and interventions on impulsive choice and timing. Rats were assigned to FI or FT impulsive choice tasks before and after an FI or FT intervention. Both interventions increased self-control. FI choice and FT intervention rats were most self-controlled and most accurate on a temporal bisection task. FT choice and FT intervention rats were least accurate in the bisection task. Results suggest that FI choice improves attention to delays and timing, while FT intervention exposure improves delay tolerance.

Are you sure: Preference and ambivalence in delay discounting

Sergej Grunevski, Aaron Smith, Richard Yi
University of Kansas

Delay discounting (DD) tasks typically consist of multiple binary choices indicating preference between an immediate and delayed reward used to derive individual discount rates. However, binary scoring of DD data assumes each choice is equally preferred. Instead, we explored whether ambivalence for a choice varied across trials and was predictive of choice using the Monetary Choice Questionnaire. Ambivalence was variable across trials and maximized around the point of preference change. Moreover, adding trial-level ambivalence to models predicting choice via magnitude and delay sensitivity generally improved fits. From these results, we suggest ambivalence may be relevant when measuring, and seeking to alter, individual DD rates.

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Department of Psychology, Arizona State University

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Effects of Non-Contingent Aversive Visual Stimulation on Choice Behavior

Karen Henao[1], Arturo Clavijo-Álvarez[1], Camilo Hurtado-Parrado[2]
[1]Department of Psychology, Universidad Nacional de Colombia, Bogotá, Colombia,
[2]Department of Psychology, Troy University, AL, USA

High-intensity noise, as aversive non-contingent stimulation, decreases self-controlled responses in humans. This study evaluated whether aversive visual stimuli produced similar effects on self-control responses. Non-contingent aversive visual stimuli resulted just in a pattern of impulsive responses in the short term. Before exposing participants to the choice task, we obtained the delay sensitivity (k) and Area Under the Curve (AUC) values for each participant. The k and AUC values described the subsequent participants' behavior in the task only for some of the participants. Although the k value has proved to be a reliable factor to indicate self-control choices in people, k values should be evaluated with caution in alternative situations.

An Akaike and Bayesian Information Criterion analysis of aperiodic and periodic concurrent-chains research

Jay Hinnenkamp
Middle Tennesse State University

The concurrent-chains procedure has been used to study conditioned reinforcement for over 60 years. During this time, several different models have been proposed to explain how stimuli become conditioned reinforcers. This poster will use the Akaike Information Criterion (AICc) and Bayesian Information Criterion (BIC) to analyze the necessity and role of free parameters in several prominent models (Contextual Choice, Cumulative Decision, Delay Reduction, Hyperbolic Value Addition) of conditioned reinforcement. In particular, this poster will focus on concurrent-chains research that has studied choice between one aperiodic and one periodic terminal link schedule of reinforcement. For all calculations, programmed initial-link durations, terminal-link durations, and rates of reinforcement were used.

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replenishment delay). These results suggest experiencing delayed punishments can reduce impulsive choice.

Effects of delay on the establishment of conditioned reinforcers in spontaneously hypertensive rats (SHR)

Lukas Ziegler Justino, Fábio Leyser Gonçalves
UNESP - São Paulo State University

SHR is a lineage widely used as an animal model to study ADHD. Hyposensitivity to reinforcers due to a hypofunctional dopaminergic system has been suggested as an important variable to understand ADHD. Alterations in the dopaminergic system of SHR affect the function of positive reinforcement in this strain, such as difficulty in acquiring behavior through reinforcers, establishing conditioned reinforcers and increased resistance to extinction. The goal of this research is to verify the effect of different delays in a trace conditioning procedure on the establishment of conditioned reinforcers in SHR and WIS. Results didn't indicate an effect of lineage or delay. The trace conditioning procedure used was not effective in established conditioned reinforcement. Changes in the procedure are suggested.

The role of discriminability in suboptimal choice

Gabriela E. López-Tolsa[1,2], Vladimir Orduña[1]
[1]*Universidad Nacional Autónoma de México,* [2]*Universidad Nacional de Educación a Distancia*

Suboptimal choice is a preference for an alternative with a lower probability of reinforcement over another with a higher probability of reinforcement that occurs when the former has discriminative stimuli that signals in which trials a reinforcer will be delivered. Given that it has been demonstrated that suboptimal choice disappears when there is no discriminability, we were interested in evaluating the effect on pigeons' suboptimal choice of different degrees of discriminability. In the present experiment, we manipulated the discriminability of the suboptimal alternative, while the optimal alternative was non-discriminative in all conditions. The preference for the suboptimal alternative was higher as its discriminability increased. There was a positive correlation between discrimination index and preference for the suboptimal alternative.

Consumer Choices with Variations in Item Price, Delay, and Opportunity Cost

Todd L. McKerchar[1], James E. Mazur[2]
[1]*Jacksonville State University,* [2]*Southern Connecticut State University*

Tversky and Kahneman (1981) asked participants if they would be willing to drive 20 minutes to another store to receive a $5 discount on an item's price. Most participants were willing, but only when the original price of the item was small ($15); when the original price was relatively large ($125), most said they would not drive 20 minutes for a $5 discount. We examined this framing effect in 296 participants, but instead used a psychophysical-adjustment procedure to obtain quantitative estimates of the discount required at different (a) item prices, (b) delays until the item's receipt, and (c) opportunity costs (in "waiting" versus "postponing" tasks). We systematically

replicated Tversky and Kahneman, but also extend their findings with important parametric variations.

Sex-Dependent Effects of Activity Level and Anxiety on Delay Discounting

Skyler McShane, Katherine Garland, Deborah Sevigny-Resetco, Suzanne H. Mitchell
Behavioral Neuroscience, Oregon Health & Science University

High locomotor activity is associated with greater impulsivity and risk-taking, but anxiety is associated with less risk-taking. We examined whether anxiety alters the activity-delay discounting (DD) relationship. We hypothesized less anxious, more exploratory behavior would be associated with greater DD. We assessed activity in 396 genetically-heterogeneous rats over two sessions, measuring anxiety (fecal boli counts, center time in an arena) and exploration (distance moved, movement time), then assessed DD using an adjusting amount task. Females that defecated less, traveled larger distances, and spent more time moving discounted more. Males that spent more time in the center discounted more. Males with greater movement time discounted less. Future research will examine the genetics behind locomotor behavior and DD.

Just how effective is Direct Instruction?

Maria Otero[1,2], Lee Mason[1,2]
Cook Children's Health Care System; Texas Christian University

Despite overwhelming evidence supporting Direct Instruction, it has never been widely embraced by schools. Direct Instruction, developed and refined by Engelmann and colleagues over the past 50 years, has been the focus of numerous research studies, systematic reviews, and meta-analyses. While its efficacy is certain, the significance of Direct Instruction's impact may be misunderstood. We attempt to clarify the importance of Direct Instruction with help from the binomial effect size display (BESD). The BESD allows for intuitive and informative data-based decision making by clearly conveying the real-world importance of treatment outcomes through a juxtaposition of the relative proportions of success. Using the BESD as a framework, we attempt to answer the question: Just how effective is Direct Instruction?

Novel Insights from Modeling Responsiveness to COVID-19 Prevalence Testing Incentive Structures

Nicholas J. Pfeiff[1], Fernanda S. Oda[1], Justin C. Strickland[2], Shawn P. Gilroy[3], Brent A. Kaplan[4], Derek D. Reed[1]
[1]*University of Kansas,* [2]*Johns Hopkins University School of Medicine,* [3]*Louisiana State University,* [4]*University of Kentucky*

In Fall 2020, the University of Kansas began prevalence testing for COVID-19. This study aimed to inform the University approach, after they reported limited engagement. In a survey of 187 undergraduate students, participants indicated yes/no to potential testing in either a fixed (guaranteed) or lottery (probabilistic) system, where expected values (EV) were yoked. Findings suggest students would be 18% more likely to get tested if given access to a probabilistic incentive with an EV of (e.g., $5 as a 1-in-

20 chance of $100), over a guaranteed (e.g., $5) gift card. We used a Padé Approximant function to model decisions across the various incentive arrangements. Additionally, participants demonstrated stronger preference for more generalized conditioned reinforcers, over less generalizable monetary reinforcers.

A quantitative model of temporal joint stimulus control

Carlos Pinto, Ana Sousa
University of Minho, Portugal

In the present work we tried to tackle how more than one stimulus can be used jointly to learn a temporal discrimination task. Fifteen pigeons learned a symbolic matching-to-sample task with three durations as samples (2, 6, and 18 s of keylight) and two colors as comparisons. A 30-s intertrial interval (ITI), illuminated with a houselight, separated the trials. To understand which stimulus – keylight or houselight – controlled responding, two tests were introduced. In the no-sample test, the keylight was not illuminated and the comparisons immediately followed the ITI; in the dark-ITI test, the houselight was not illuminated. Results suggest that both stimuli controlled choice. Additionally, the more a pigeon relied on one stimulus, the less it relied on the other.

What counts as a choice? Replication of a cross-cultural study on choice and agency by Savani et al. (2010) with online participants

Vasiliy Safin
Reed College

We recruited a diverse online sample of 448 participants to replicate a cross-cultural in-lab study with college students in the U.S. and in India. We found the same effect, with a remarkable similar effect size, specifically that American participants were more likely to construe actions as choices than Indian participants. The poster discusses potential explanations for the finding, as well as the value and challenge of running online studies with a diverse international sample.

Partial reinforcement increases the saliency of the outcome of the previous response

Cristina Santos, Cristiano dos Santos
University of Guadalajara

We used a midsession reversal task to set up a situation in which at least two sources could gain control of behavior: the outcome of the previous response, and the time into the session at which contingencies reversed. In every trial, rats had a choice between two levers, responses to one of them were reinforced during the first part of the session, and responses to the other one were reinforced during the second part. Regardless of the predictability of the reversal (fixed or variable), anticipatory errors suggested that performance was under temporal control, except when the rats had previous experience with partial reinforcement. Thus, non-reliable outcomes seemed to encourage the use of a win-stay/lose-shift strategy under continuous reinforcement.

The Effects of Task Type and Magnitude on Probability Discounting of Plea Bargains

Megan Small, Sofia Perez, Jonathan E. Friedel
Georgia Southern University

Decision-making is studied in various aspects of life and can be especially important in the context of the criminal justice system, such as plea bargains. We used probability discounting to study the choice between accepting a plea bargain for a shorter incarceration or risking a jury trial with a longer incarceration. We compared three magnitudes (25 years, 5 years, 1 year) across a fill-in-the-blank measure and an adjusting amount task. The fill-in-the-blank measure produced higher ln(k) values than the adjusting amount task ($F=6.128$, $p=0.016$). No magnitude effect was found ($F=1.345$, $p=0.2543$). It appears that impulsivity was measured differently between the fill-in-the-blank task and the adjusting amount task.

Phase Duration and Resurgence

Sean Smith[1,3], Brian D. Greer[2,3]
University of Nebraska Medical Center, CSH-RUCARES, Rutgers RWJ Medical School

Resurgence is the recurrence of responding due to a worsening of reinforcement conditions for current behavior. Resurgence as Choice in Context predicts that increasing the duration of exposure to reinforcement for target responding during Phase 1 will increase resurgence magnitude, whereas increasing the duration of exposure to reinforcement for alternative responding and extinction for target responding during Phase 2 will decrease resurgence magnitude. We conducted an experiment evaluating these predictions with human participants recruited through Amazon's Mechanical Turk platform. We varied Phase 1 and Phase 2 durations across four experimental groups. Resurgence as Choice in Context successfully predicted the differences in resurgence magnitude across groups, and fitting the quantitative model to the obtained data yielded an exceptional coefficient of determination.

Social Dilemma, Social Discounting, and Delay Discounting in Adult Humans.

Michiko Sorama[1], Aya Katayama[2]
[1]*Kyoto Notre Dame University,* [2]*Osaka City University*

Adult humans' selfishness in a social dilemma task is correlated with degree of social discounting (e.g., Jones & Rachlin, 2009). Delay discounting which has been shown to have a relationship with social discounting may also be correlated with selfishness in a social dilemma task. The present study aimed to clarify the relationship between altruism and self-control through the examination of relationship between social and delay discounting in adult humans. Preliminary analysis of 107 college students, ages 19-26 years, suggests that there were small but statistically significant positive correlations between social and delay discounting. Gender differences in results of the social dilemma, social discounting and delay discounting tasks are also discussed.

Social discounting in pairs of people beyond the choosing individual

Aldo Toledo, Raul Avila
School of Psychology, National Autonomous University of Mexico

We aimed to show a special case of social discounting, in which the willingness of individuals to give a reward to a socially distant person (PA+B) -rather than giving it to a socially nearer person (PA)- decreases as the social distance between PA and PA+B increases. A social-discounting procedure, which consisted of choices between a smaller reward for PA and a larger reward for PA+B, was tested in 100 students. Social distances varied between PA and PA+B and between the participant and PA, and were expressed as ordinal and ratio scales. The participants' willingness to give a reward to PA+B hyperbolically decreased as the social distance between PA and PA+B increased, which suggests altruism is a continuous and relative phenomenon.

Fractal Time-Series Analysis in Operant Research

Johan Viklund, Sarah Cowie
University of Auckland, New Zealand

My PhD project explores the relationship between behavior-analytic research and dynamical systems. Specifically, I look at how fractal statistics can be applied to operant data in the time dimension, for example inter-response times and choice. Time-series data has often been assumed to constitute white noise in both behavioral and cognitive psychology. However, approximately three decades of human research suggests that reaction and time estimation tasks are not independent events and can exhibit complex long-range correlations across thousands of trials. These systematic fluctuations are currently known as pink noise, or fractal noise, power-law noise, and other names. My aim is to explore the occurrence of pink noise in an operant research setting and its implications.

Economic Analysis of Pigeons' Token Accumulation, Exchange, and Production in a Laboratory-Based Token Economy

Haoran Wan[1], Lavinia Tan[2], Timothy Hackenberg[2]
[1]Washington Univeristy at St. Louis, [2]Reed College

This study examined pigeons' behavior in a token economy from an economic perspective. Five experiments were conducted in all, examining various combinations of token-exchange ratio, token-production ratio, free tokens, and exchange-production ratio. We found that: (1) token accumulation varied inversely with the token-production ratio and directly with the exchange-production ratio; (2) token production responses varied inversely with the token-production ratio at low ratios but directly at high ratios; (3) token production responses varied directly with the number of non-labor tokens at low amounts but inversely at high amounts; and (4) food consumption decreased as food prices increased. This study contributes to an economic understanding of behavior in a token economy, using concepts of consumer demand and labor supply.

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West Virginia University

Few experiments have investigated contingencies in which lever pressing (a) postpones shock on Sidman's free-operant avoidance schedule and (b) produces a shock of lesser intensity (punishment shock). We investigated the role of the shock-shock interval on the punishment of avoidance responding across four different shock-shock intervals. We reasoned that punishment of avoidance responding would be most effective when the shock-shock interval lasted longer than the response-shock interval (30-s in our case). For three of four rats, response rate decreased as the shock-shock interval was raised, but the effect was observed only if the punishment shocks were relatively long and intense.

Delay Discounting of Differing Magnitudes: Does Order Matter?

Mariah Willis, Hannah M. Johnson, Jeremy M. Haynes, Amy L. Odum
Utah State University

One prominent tenet of delay discounting is the magnitude effect, or the tendency for humans to discount smaller outcomes more steeply than larger outcomes. Although such a tendency is evident across various amounts and outcomes, it has yet to be determined if the presentation order of magnitudes impacts discounting. Participants in the present study completed two identical hypothetical monetary delay discounting tasks (one with small magnitudes, the other with large magnitudes). The order of tasks was counterbalanced. We found that individuals discounted smaller orders of magnitudes more steeply when they preceded larger magnitudes, whereas the magnitude effect was less pronounced when small amounts followed larger amounts. These results further extend previous research that delay discounting is sensitive to state influences.