

39. Revisiting Locations in Interval Time-Place Learning: Effects of a 16 Periods/4 Locations Task

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Previous research has shown that having to respond on any location for more than one availability period during an interval Time Place Learning (TPL) task has a detrimental effect on performance, particularly after the first time that subjects respond on each location. Two hypotheses have been considered: 1) Revisiting a site poses a challenge because subjects code it as “depleted”. 2) Since previous experiments have used heterogeneous sequences (e.g. First sequence is 1-2-3-4 and second sequence is 2-4-3-1), subjects could face uncertainty as to the next correct feeder in the sequence. Therefore, the present study assessed the effects of having to revisit each food location on an interval TPL task involving homogeneous sequences. 8 Pigeons (*Columba Livia*) were trained in a 16 periods/4 locations interval TPL task that entailed the following: Head entry responses were reinforced according to a 25 sec. Random Interval (RI) schedule of reinforcement in one of 4 feeders. The correct feeder changed every 3 minutes following the sequence: 1-2-3-4. This sequence was repeated 4 times during each 48 minutes session. After 50 training sessions, all birds were exposed to an Open Hopper Test (OHT). During tests, the RI 25 schedule was operational in all 4 feeders throughout the entire 48 minutes session. Percent correct responses, anticipation, and anticipation of depletion showed little difference in each visit to the four feeders, which suggests the lack of a detrimental effect of revisiting locations. On the other hand, persistence of patterns was observed only during the first 12 minutes of the OHT, which would be equivalent to the first iteration of the sequence during training sessions. Our data support the “uncertainty” hypothesis showing that the mere revisiting of a location does not entail a detrimental effect when homogeneous sequences are used.

40. Adaptive Learning In Competitive Games

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Human decision-making strategies are shaped by complex interactions within a dynamic environment. While various models of dynamic choice exist, reinforcement learning theorizes the value of an action is adjusted strictly through experience. However, this updating scheme tends to bias individuals towards repeating reinforced actions and avoiding unrewarded or punished actions. In environments that include other people with conflicting goals, an observant adversary will likely be able to exploit these simple learning rules. For such situations, frequently selecting historically less valuable, but unexpected choices may help maximize long-term rewards. Across two studies we investigated the nature of competitive decision-making by having participants play ‘Rock Paper Scissors’ against computerized

opponents programmed using a Q-learning reinforcement algorithm. To simulate different opponent strategies, algorithms were assigned unique pairs of learning rate and decisiveness parameters. In Study 1, model parameters were sampled only at extreme values, while model parameters in Study 2 were sampled across a continuum using a Halton sequence. Bayesian multilevel logistic regressions revealed participants' responding in both studies was highly sensitive to their opponent's strategy, specifically when the algorithm's learning rate and decisiveness were large (which produces a predictable pattern of choices). For example, participants showed a substantial increase in their probability of winning as the session progressed. Furthermore, after losing a trial, participants' probability of repeating that choice was considerably lower than chance. Interestingly, participants in the first study did not exhibit a bias to repeat reinforced actions, whereas participants in the second study did show a marked bias to repeat reinforced actions; this discrepancy possibly emerging from the different parameter distributions. These results provide evidence that individuals can reliably exploit salient choice patterns in their adversaries, and may be able to inhibit similar biases in their own strategies. Thus, a pure reinforcement learning model may not entirely describe competitive decision-making.

41. The Extinction of an Alternative Response Does not Always Generate Resurgence

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The resurgence has been defined as the reappearance of a response previously reinforced and extinguished, when the reinforcement of an alternative response is discontinued. This phenomenon has been evaluated through procedures that involve: a) the reinforcement of a target response (TR), b) the extinction of the TR simultaneously to the training of an alternative response (AR) and c) the resurgence test. However, the effects of explicit elimination of the AR before the test have not been evaluated. The purpose of the present study was to test the hypothesis of induction by extinction of AR assessing the effect of extinguish the AR prior to the test. In a first phase the TR was trained, next in a second phase TR was extinguished. During the third phase AR was reinforced and in a fourth phase half of the rats were exposed to extinction of the AR before the test (explicit extinction) while the other half were exposed directly to the resurgence test. Resurgence was not observed in any group, however subjects with explicit extinction showed less resistance to extinction of TR during the test. The findings are discussed according the hypothesis of induction by extinction as an explanation for resurgence and its implications.

42. Asymmetries in Delay Discounting of Gains and Losses: Stability and Heritability

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Delay discounting refers to the decrease in subjective value of an outcome as time until its occurrence increases. Previous studies have provided evidence for the stability and

heritability of the discounting of delayed gains, but there are no comparable studies of the discounting of losses. The present effort evaluated both the stability and heritability of the discounting of a delayed reward and the discounting of a delayed loss within the same group of individuals. An incomplete longitudinal sample was analyzed that included 522 participants (122 MZ and 139 DZ pairs) who completed two delay discounting tasks that differed in the outcome evaluated (a gain and a loss) at ages 16, 18, and 20. A sign effect was observed (i.e., the gain was discounted more steeply than the loss) at each age level. Degree of discounting was stable across age for both delayed gains and losses (r s ranged from .45 to .73). Heritability was apparent with gains ($r_{MZ}=.54$; $r_{DZ}=.18$) but not with losses ($r_{MZ}=.10$; $r_{DZ}=.06$), consistent with the view that different processes are involved in the discounting of positive and negative future outcomes, although the finding relating to the heritability of losses must be interpreted with caution due to the skewness of the area under the curves used to measure loss discounting.

43. Shifting and Discounting Functions in Adolescents Drug Users

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The current research on executive functions has contributed to the neuropsychological understanding of the frontal lobe. The damage of this area causes problems in the control and behavior regulation. Therefore the aim of this study was to compare performance patterns by adolescents (clinical and community sample) in three shifting tasks (Plus-Minus, Number-Letter, Local-Global) and six tasks of delay discounting with monetary gains and losses (3000, 6000, 9000). We worked with 20 adolescents (10 drug users and 10 controls). The control subjects were in school settings, while the clinical sample was in residential centers. It was observed positive correlation between shifting tasks and discounting tasks. The community sample had a magnitude effect for discounting of gains but not for losses. The clinical sample did not show any magnitude effect. It was found a low performance in the three shifting tasks and steeply discounting of gains in drug users. These findings suggest that discounting tasks could be associated with the same executive function process that shifting tasks, which converts the discounting into an objective indicator that could give evidence of dysfunction in the frontal lobe.

44. Differences in Cognitive Effort Discounting and Delay Discounting Processes

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Heightened preferences for small, immediate over larger, later rewards (delay discounting) have been associated with numerous psychopathologies including substance use disorders and ADHD, but a similar choice structure focused on cognitive effort is less studied; despite its possible association with grit and perseverance. To compare these two decision

paradigms, we compared discount curve fits, decision times, and eye tracking data for a delay discounting task and a novel cognitive effort discounting task. Fifty-seven male and female volunteers practiced an effortful, sustained attentional task for 1 minute, then answered hypothetical questions about their preferences between money earned after 0-min effort on the attention task or \$25 after 1, 5, 10, or 20 minutes. They also answered hypothetical delay discounting questions. From each participant, we inferred indifference points at each level of delay or effort, and hyperbolic curves were fit to these indifference points. Despite exhibiting similar discounting functions and fit indices, delay discounting rates did not correlate significantly with effort discounting rates, suggesting that the two discounting mechanisms do not share the same psychological or biological processes. Further, times spent looking at the different alternatives and decision reaction times increased as effort levels increased but were unrelated to delay length. A greater portion of time was spent looking at the chosen effortful reward than the chosen delayed reward, though not chosen alternatives were neglected similarly in both tasks, suggesting that participants not only favored the chosen option more strongly, but also were more attentive when choosing the effortful reward than when choosing the delayed reward. In light of the differences in discounting rates and looking and response time effects, we conclude that delay discounting and cognitive effort discounting mostly likely operate through similar, but distinct decision making mechanisms engaging different levels of attention.

45. A Comparison of Responding During Three and Four Phase Resurgence Paradigms

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Resurgence, or the reemergence of a previously reinforced response following extinction, is a well-documented phenomenon in Behavior Analysis. Basic research studies specifically examining patterns of resurgence often employ a three-phase framework wherein (1) a particular response is reinforced; (2) that response is extinguished while another response is concurrently reinforced; and (3) both responses are placed on extinction and the reemergence of the first reinforced response is observed. This approach, however, may have some limitations given that extinction may not occur for the initially reinforced response. Rather, responding may simply be reallocated in the second phase. The current study compared resurgence in this three-phase framework to that obtained in a four-phase framework wherein responding is extinguished before establishing the alternative response with 12 male Long Evans rats. In dual lever chambers, (1) responses on the right lever are reinforced while left responses are not; (2) both responses are extinguished; (3) responses on the left lever are reinforced while right responses are extinguished; and (4) both responses are placed on extinction and patterns of resurgence are observed. To underscore the difference between the three-phase and four-phase paradigm, one group of rats experiences extinction of both responses in phase 2 while another group is yoked by session time, but only experiences a blackout with no opportunity to respond (i.e., the levers remain retracted). Preliminary results show marked differences in patterns of resurgence for animals that experienced extinction in phase two versus their yoked counterparts. This suggests the utility of a four-phase paradigm when studying resurgence.

46. How to Attach Value to Various Degrees of Matches Between Individuals and Jobs

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It has been proven that The Model of Hierarchical Complexity is highly effective in presenting an individual's developmental stage. Along with their results of The a behavioral developmental version of the Holland Interest Test, the instruments can serve as an evaluation tool as to how good a match an individual is with prospective careers and/or romantic partners. In this paper, we report on data of how individuals how well we can predict career in monetary terms, and data on their stages. We then show the money value of matches and mismatches between an individual and their career. We set a base value and ask how much more or how much less it would take for them to take a particular job.

47. Repeated Consumption of Saccharin Did not Affect Operant Responding for Sugar Pellets in Rats

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Repeated consumption of artificial sweetener increases food intake and body weight gain in rats. This study tested the hypothesis that experience of saccharin consumption affects operant responding for sugar pellets. Rats (N=16) were trained to press a lever to obtain sugar pellets in an operant chamber for 5 days. The subjects were then provided with yogurt for 3 weeks in home cages (yogurt period). Chow (MF, Oriental Yeast Co., LTD, Japan) and water were provided ad libitum during the yogurt period. The rats were divided into two groups. For the saccharin group, rats received yogurt sweetened with saccharin on some days and plain yogurt on other days. For the plain group, only plain yogurt was provided. Over the following 3 days, rats were exposed to the consumption tests in which each lever press was reinforced by a sugar pellet. Chow consumption and body weight gain were similar in both groups during the 3-week yogurt period. The number of lever responses in the consumption tests was slightly larger in the saccharin group than the plain group. However, the difference was not statistically significant. Within-session changes in operant responding could be well described as linear functions of cumulative number of pellet presentations in both groups ($r^2 > .94$). Parameters of the linear equation were similar in both groups. Results of the present study were different from our previous experiment in which different chow (Lab Diet 5001, Bio Serve, USA) was provided in home cages. These results suggest that maintenance diet (chow) may be an important factor in determining the effects of saccharin consumption on food intake and body weight gain.

48. Genistein as a Preventative Treatment for Alzheimer's Disease in the Female Rat

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Alzheimer's disease (AD) is a neurodegenerative disorder marked by the presentation of abnormal accumulations of amyloid- β plaques and gradual memory loss. Women are twice as likely to develop AD later in life due to the decline in estrogen production after menopause. This study explored alternative hormone replacement therapy (HRT) using a phytoestrogen, genistein, and its effects on two different Alzheimer rat models. The two models used, were an insulin deficient model from streptozotocin (STZ) administration and a model injected with misfolded amyloid- β fragments (25-35). All rats were ovariectomized and subsequently fed a soy-free diet. Conversely, rats in the treatment group received genistein orally for two months, before intraventricular injections of STZ or amyloid- β (25-35). The rats, including a control group, were tested for spatial memory in a modified Morris water maze and spontaneous alternation behavior (SAB) in a y-maze. After completion of testing all rats were perfused and their brains were harvested for a silver staining protocol. Of the two models tested only the STZ model showed a response to the treatment. On the other hand, silver staining of neurons was very apparent in the hippocampal regions of rats that did not receive genistein treatment. The results of the present study show a difference between Alzheimer's models and how they respond to preventative treatment, relative to controls.

49. Investigations of Operant ABA Renewal During Differential Alternative Reinforcement

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Operant renewal is a form of relapse in which a previously extinguished response reemerges due to a context change. We designed two experiments to examine the impact of differential alternative reinforcement on ABA renewal in a translational model of relapse with 12 children either diagnosed with autism spectrum disorder, intellectual disabilities, or who were neurotypical. We compared levels of renewal in two, three-phase arrangements. In one arrangement we reinforced an arbitrary target response in Context A, extinguished responding in Context B, and extinction continued during the renewal test in Context A. In a second arrangement we delivered reinforcement for an arbitrary response in Context A, differentially reinforced an arbitrary alternative response in Context B, and alternative responding continued to produce reinforcement during a return to Context A. Results indicated three important findings. First, extinction plus differential alternative reinforcement was more effective at disrupting target behavior in Context B relative to extinction alone. Second, renewal tended to be greater during extinction alone relative to renewal tests with extinction plus differential alternative reinforcement. Third, the magnitude of renewal depended on a history of extinction for the alternative response in Context A. We discuss methodological implications for the treatment of severe destructive behavior.

50. Comparing Analysis Methodologies: R Tutorial for Nonlinear Repeated Measures Analyses

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Traditionally, a two-stage approach is used to analyze nonlinear data such as peak-interval timing functions. Nonlinear functions are fit to individuals, and then analyses are conducted on the parameters from the individual fits. However, this approach is more vulnerable to convergence failure at the individual level, which typically results in removal of those subjects from the group analyses. In addition, the statistical model does not have information on the quality of fits of the nonlinear model, so error variance estimates are not calculated with the full set of information. These issues can be resolved by using a nonlinear repeated measures mixed effects regression. The analyses are conducted using an iterative method in the nlme package in R, a freely available statistical computing software package with graphical capabilities. The technique is similar to repeated measures mixed effects analyses in that fixed and random effects are estimated at both the group and individual-subject levels. This approach preserves individual variability because parameter values can be estimated for all subjects including those with non-systematic variation. To highlight the advantages, peak-interval data from 24 rats was analyzed with nonlinear repeated measures mixed effects modeling and the two-stage approach. The same four parameter modified Gaussian distribution was specified for both techniques. The two-stage approach resulted in five fit failures. The comparison of models indicates that the nonlinear repeated measures mixed effects method is more robust and resistant to non-systematic variation than the two-stage approach.

51. Cue-Induced Craving Increases Demand for Junk-Food

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Even after long periods abstinence, the Pavlovian associations between environmental stimuli and drug-taking behavior remain. Activation of associations can increase the likelihood of relapse years after drug-taking behavior has ceased. In broader psychological terms, the drug orienting behaviors that result from these associations are referred to as “craving.” Craving encompasses both the cue-induced affective states and behaviors that result from drug-associated stimuli exposure. Importantly, similar processes may apply to the craving for high-caloric foods, particularly in obese individuals. We tested the effects of a newly developed craving induction procedure on the behavioral economic demand for healthy and junk-foods in one-hundred and sixty obese and healthy-weight individuals. First, participants were asked to rank-order a list of healthy (e.g., fruits and vegetables) and junk (e.g., chips, candy) foods. Next, participants were assigned to either the healthy-food or junk-food conditions and their preferred food from their assigned category was displayed. Participants were then asked to vividly remember a previous experience consuming that food including how it tasted and

how it made them feel. Finally, after completing the cue induction task, participants completed two demand tasks: one for their preferred health-food and one for their preferred junk-food. Obese individuals in the junk-food cue induction group reported greater demand for junk-food compared to healthy-weight individuals in the junk-food cue group. Cue-induced craving had no effect on demand for healthy-foods in any group. Our findings suggest that exposure to junk-food related stimuli in obese individuals can transiently increase demand for those foods, providing one explanation for the exhibited challenges of caloric self-control that obese individuals exhibit.

52. Perception of Causality and Risky Choice in Humans

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It has been suggested that people who perceive less risk from dangerous behaviors tend to make more risky choices than people who perceive more risk from the same behaviors. In this study, the contribution of the perception of the relationship between a response and a consequence to risky choice in college students was assessed. Thirty participants were exposed to a perception-of-causality and a risky-choice task. The perception-of-causality task consisted on a chained procedure; in the first link, participants responded according to a random-ratio (RR) 20 schedule. Responses were recorded and emitted as pseudo-responses at the same response rate as the participant. Responses and pseudo-responses counted for the RR 20 requirement; afterwards, a change of stimuli was produced. In the terminal link, participants had to choose the cause of the change of stimuli by clicking one of two buttons: one button was associated with a change of stimuli by a pseudo-response; the other one was associated with a change of stimuli produced by a response of the participant. Participants could gain points if they responded correctly; otherwise, a blackout was produced. In the risky-choice task, participants had to choose between an option that always delivered two points (fixed option) and an option that delivered one or three points ($p=0.5$). Within five trials, participants had to gain 10 points; otherwise, they lost the points accumulated in that block of trials. This procedure was repeated six times. It was found that participants who had more mistakes in the perception-of-causality task chose more frequently the variable option in the risky-choice procedure over the fixed one; participants who had less mistakes in the perception-of-causality task distributed their choices between both options. These preliminary results suggest that the perception of events contingent or non-contingent to a response may modulate risky choice.

53. Time-Based Interventions to Promote Self-Control: Effects of the Hazard Function of Variable Interval Schedules

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The hazard function of a distribution is the conditional probability of an event occurring given that it has not yet occurred. The distribution of intervals determines the hazard function for the variable interval (VI) schedule and hazard functions can be increasing, decreasing, or constant in nature. Two experiments examined how differences in the hazard function of VI schedules during a time-based intervention affected subsequent impulsive choice. We specifically aimed to assess the contribution of the hazard function property of delay of reinforcement gradients to modifying impulsive choice. In Experiment 1, rats completed a baseline impulsive choice task in which they chose between a smaller-sooner (SS) and a larger-later (LL) reward, with choices of the SS indicating impulsivity. Next, they were exposed to increasing, decreasing, or constant hazard function VI schedules and then were subsequently reassessed on the impulsive choice task. Experiment 2 followed the same design except that we compared steep and shallow decreasing hazard functions. Increases in LL choices were observed in impulsive choice following all interventions. However, the decreasing hazard function led to the greatest increases in LL choices, suggesting that exposure to short LL delays may be the most effective means of promoting self-control.

54. Structural Equation Modeling with Co-Twin Control: A Behavioral Genetic Analysis on the Relationship between Stress and Sleep

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Stress is a strong predictor for poor sleep quality. However, little is known about the mechanism of this association or the respective contribution of genetic and environmental factors. This study aims to investigate general distress as a mediator and cognitive/emotional control as a moderator in the stress-sleep relationship and estimate the influence of gene and environment in this mechanism. We used a national representative sample drawn from the MIDUS Biomarker Project (Midlife in the United States: A National Longitudinal Study of Health & Well-Being), consisting of 1,255 middle-aged and elderly Americans and a subset of 296 twins (82 MZ pairs, 65 DZ pairs and 1 pair unable to determine zygosity). Structural equation modeling was used to test the hypothesized moderated mediation model. Falconer's formula and ACE models on MZ and DZ twins were performed to separate the contribution of genetic and environmental factors. Finally, a co-twin design was nested in the SEM to control for the genetic and familial confounds in the stress-sleep relationship. Results indicated that general distress fully mediated the relationship between stress and sleep while emotional/cognitive control buffered the impact of stress on general distress. 7.69% of the variance in sleep quality was explained by twin-shared factors and 8.26% was explained by individual-specific factors. Emotional/cognitive control only moderated the individual-specific association between stress and sleep. These findings imply that twin-shared factors and individual-specific factors explain an equivalent proportion of the stress-sleep relationship. The genetic and familial association between stress and sleep is more robust, whereas the individual-specific association can be buffered by regulation strategies.

55. Using Generalized Linear Mixed-Effects Models to Analyze Data from a Common-Pool Resources Task

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We consider the advantages of using generalized linear models and their mixed-effects variants to analyze and draw conclusions from a data-intensive, dynamic common-pool resources task. The task consists of a virtual fishing video game in which participants dealt with the conflict between short- and long-term consequences (i.e., catch fish to stay alive versus maintaining resources necessary to complete the game); this tradeoff was best managed by producing intermediate fishing rates. Computer bots represented competitors for resources. Participants were 77 college students assigned to three conditions that differed in the presence or type of feedback that signaled optimal versus non-optimal consumption. Participants in the Bonuses condition received extra-points following optimal interresponse times (IRTs; i.e., between 3 and 5 seconds), while participants in the Penalties condition lost points due to overconsumption (i.e., IRTs shorter than 2 seconds). Participants in the Control condition did not receive additional feedback. Data analysis included a Poisson regression to estimate the number of attempts needed to complete the game and its mixed-effects variant to predict the number of fish caught across each attempt at the game. A mixed-effects gamma regression was used to track the changes in IRTs over time, and a mixed-effects logistic regression was used to estimate the probability of sequential optimal responses during the game. We discovered that participants receiving feedback (Bonuses or Penalties) needed fewer attempts to complete the game when compared to the Control. Furthermore, participants moved more quickly toward an optimal and stable pattern of consumption during the game, which allowed them to maximize their earnings. When there was only a more distal consequence (i.e., lose the game) to guide their behavior, participants in the Control condition had more difficulty tracking the game contingencies, resulting in suboptimal consumption and an increase in the number of attempts needed to complete the task.

56. Conditional Discrimination in Rats: The Role of Response Topography

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Two groups of rats were exposed to a two-choice conditional discrimination procedure using lights as conditional signals. Responses to one of two available operandi were reinforced given the correct stimulus-response combinations. For both groups operandi were located to the left and right of the centered food/water receptacle. Two levers were used as operandi for one group, whereas two food-receptacles served as operandi for a second group. Acquisition of the conditional discrimination responding was higher for rats that were reinforced for

lever-pressing than rats reinforced for nose-poking. Results are discussed by attending to the role of the response-produced feedback in conditional discrimination learning.

57. The Impact of Caloric Densities on Demand for Food

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Researchers recruited participants (N=150) via Amazon Mechanical Turk to complete a hypothetical purchase task assessing likelihood of purchasing a preferred sandwich at 17 prices (\$0 - \$500). Participants were then randomized into three conditions: a “high” calorie condition, a “low” calorie condition, or a control group. Participants in the “high” and “low” calorie conditions were provided the same purchase task as first administered, however, they also received either high or low caloric contents of the sandwich they chose. Analyses examine if providing this caloric information significantly impacts demand for a preferred sandwich. Additionally, all participants completed the Three Factor Eating Questionnaire, the Power of Foods Scale, and the Yale Food Addiction Scale; mixed effects modeling examines the degree to which these scales predict operant demand (Omax, Pmax, Q0, or breakpoint) for sandwiches in all conditions.

58. Effects of Skewed Probe Distributions in Temporal Bisection in Rats: Evidence for Within-session Shifts in Responding

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Temporal bisection is a common procedure for the study of interval timing in humans and non-human animals, in which participants are trained to discriminate between a “short” and a “long” interval of time. Following stable and accurate discrimination, unreinforced probe intervals between the two values are tested. In temporal bisection studies, intermediate non-reinforced probe intervals are typically arithmetically- or geometrically-spaced, yielding point of subjective equality at the arithmetic and geometric mean of the trained anchor intervals. Brown et al. (2005) suggest that judgement of the length of an interval, even when not reinforced, is influenced by its subjective length in comparison to that of other intervals. This hypothesis predicts that skewing the distribution of probe intervals shifts the psychophysical function relating interval length to the probability of reporting that interval as “long.” Data from the present temporal bisection study, using rats, suggest that there may be a within-session shift in temporal bisection responding which accounts for observed shifts in the psychophysical functions, and that this may also influence how rats categorize ambiguous intervals. These effects were also modeled using simulations of a state-based model of interval timing.

59. Elemental and Configural Odor Discrimination in the APP/PS1 Mouse, an Animal Model of Alzheimer's Disease

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Alzheimer's disease (AD) involves marked cell loss and tau pathology in the olfactory bulb, leading to diverse deficits in olfactory identification and discrimination. The current study investigates potential deficits in the elemental and configural learning in the APP/PS1 mouse model of Alzheimer's disease, using a novel olfactory patterning paradigm. Wild-type and mutant APP/PS1 mice (ages 4-months, 7-months, and 11-months) were trained in an olfactory instrumental patterning task. In an operant chamber fitted with olfactometers, mice were trained with 6 trial types, four of which involved presentation of a single binary mixture, and two of which involved presentation of a double binary mixture. In single binary mixture trials mice received mixture A, B, C, or D. In compound trials, they received compound AB or compound CD. Importantly the reinforced response for a given set of elements (e.g., element A or element B = left head entry) was the opposite of that for its compound (compound AB = right head entry). This design ensures that the mice cannot use the element-response association to learn the compound-response association. Despite the apparent role of the hippocampus in configural learning in multiple modalities, and the presence of amyloid pathology in the hippocampi of APP/PS1 mice (Puolvali et al., 2002), preliminary analyses indicate no significant deficits in elemental or configural olfactory discrimination in mutant APP/PS1 mice across age cohorts. Results of the current study suggest that discrimination of olfactory mixtures may not be subject to the same hippocampal dependence as configural learning in other stimulus modalities. Future research may investigate the role of other structures, such as the piriform cortex, which receives the majority of olfactory bulb projections.

60. Comparison of probability discounting between overweight and normal weight adolescents through a video game

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Choices made by adolescents (e.g., eat of high-calorie density food) could result in unhealthy outcomes as obesity or overweight. In Mexico, 4.1 millions of adolescents present overweight and obesity, considered as a public health problem. Research suggests that probability discounting could support to understand these unhealthy choices. There are mixed results about comparisons of the degree of probability discounting between overweight and normal weight people. Also, tasks of probability discounting through a video game have been useful to evaluate the degree of probability discounting. The purpose of the study was to compare the probability discounting degree between overweight and normal weight people. Seventy-one adolescents (between twelve and fifteen years old) were classified as overweight (n= 30) or normal weight (n = 41) based on BMI levels of the Mexican Social Insurance Institute.

Participants performed a probability discounting task through a video game. The task used the adjusting-amount procedure, with 90%, 75%, 50%, 25%, 10% of probabilities. The standard amount was 16, and four trials with each probability were presented. Order of presentation of probabilities and the side of each option-choice were randomized. Rewards and probabilities were delivered contingent on each choice trial. Results suggest that there were statistically significant differences between groups. Normal weight group showed more degree of probability discounting than the overweight group. This study was consistent with previous research in which the hyperboloid model ($R^2 > .90$) adjusted in high levels than the hyperbolic model ($R^2 < .50$). Although in this study the use of a video game to evaluate probability discounting were useful with the adolescent population, it is necessary more research that supports these findings.

61. A Ratio Scale for Social Distance

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Choosing a larger-later reward over a smaller-sooner reward may be thought of as altruism toward one's future self. A question that arises in this connection is: What is the relation between delay and social discounting (between altruism and impulsivity)? To begin to answer this question, social and delay discount functions need to be comparable. Delay is ordinarily measured on a ratio scale (time), which allows for meaningful division and addition. Social distance is ordinarily measured on an ordinal scale (rank order of social closeness). To convert social distance to a ratio scale we use a psychophysical distance function obtained via magnitude estimation (Stevens, 1956). The distance functions obtained are well described by a power function (median exponent = 1.8); we show how they may be used to rescale ordinal to ratio social discount functions.

62. Cross-Price Elasticity and Unsafe Choice Allocation in Decision for Late Night Transportation

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Behavioral economics presents a robust package of quantitative methods by which researchers can better understand factors that modulate subjective value of reinforcers as they occur in contrived or natural settings. Within the purview of operant demand, measures wherein reinforcers of interest are presented concurrent with viable substitutes – commodities that fulfill similar functions – can yield insight for decision making by participants when facing potentially problematic choices, as in deciding between a more ideal response allocation and that which presents problematic long-term outcomes (e.g., deciding between soda and water). To our knowledge, relatively few studies have applied this conceptual framing to problems of broad societal concern. The current study thereby seeks to model

decision making under potentially troublesome conditions. Undergraduates from a Midwestern U.S. university made hypothetical decisions regarding late night transportation by indicating their subjective likelihood of waiting for a free SafeRide (a free-for-use program offered by the university to ensure students' safe transport) at increasing delays, or choosing an alternative: walking home, paying for a taxi (e.g., Uber, Lyft), or riding with an intoxicated driver. Assessment via Hursh's (2014) cross-price demand equation provided evidence to suggest unsafe alternatives serve as substitutes when presented as options concurrent with more desirable transportation. Analyses underscore the importance of making available low-effort, safe transport options for undergraduate students, and highlight the application of cross-price modeling to further understand influence of troublesome decision making.

63. Food Probability, but not ITI, Affects Latency and Preference in a Discrete-Trials Discrimination Task

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In prior experiments conducted in our lab, lever press latencies in rats were unexpectedly invariant across both reinforcement probability and inter-trial interval (ITI) duration manipulations using both single and two-lever discrimination procedures. In the current two experiments, the role of reinforcer immediacy together with reinforcement probability (Experiment 1) and ITI duration (Experiment 2) on both latency and preference was evaluated using a two-lever discrimination procedure. In these experiments, trials began with the illumination of either a left or right stimulus light above the active response lever. A single lever press to the active lever probabilistically (depending on the experiment) produced a food pellet after a 5-s signaled, nonresetting delay, followed by an ITI. The left and right trials were randomly presented within the session. Both experiments used an ABA design; the 5-s delay was removed during the B condition. Preference assessments, where both levers were concurrently active, were conducted at the end of each condition. In Experiment 1, a left or right lever press on the active lever produced a pellet on 40% and 100% of the trials, respectively. A 45-s ITI separated each trial. In Experiment 2, lever presses on the active lever always produced a pellet; however, the ITI was 45 s on left trials and 10 s on right trials. The 5-s reinforcer delay was expected to enhance any latency or preference differences between the two levers and their associated contingencies. In Experiment 1 the 100% lever generated shorter latencies and a greater preference than the 40% lever only when the 5-s delay was in effect. In Experiment 2, there were no systematic differences between levers in latency and preference. In the current context, reinforcement omission appears to be more impactful on lever press latency and preference than the rate of reinforcement.

64. Delay Exposure Training: Procedures, Effects, & Potential Mechanisms

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Because impulsive decision-making is correlated with several maladaptive proclivities (e.g. drug use; over-eating), a vast literature is dedicated to developing methods aimed at reducing impulsive choice (i.e. increasing preference for larger, more-delayed rewards). The current effort contributes an overview of one method which has been successful in reducing impulsive choice in nonhumans; effect sizes will be compared across studies. Delay-exposure (DE) training involves providing rats with extended exposure to delayed reinforcement. After 120 sessions of training, DE rats make fewer impulsive choices than rats exposed to immediate reinforcement, and those that received no training. DE training has consistently and robustly reduced impulsive choice in nonhumans, with lasting effects. However, the mechanism by which this reduction is accomplished remains unknown. Recent research has explored potential mechanisms of DE training; namely, the role of timing, delay aversion, and acquisition of novel delayed contingencies. Current basic research in this area may inform the development of effective self-control interventions for humans. Future directions include extension of DE effects to female rats, exploration of the effects of DE training on drug self-administration, and the translation of DE training to preventative interventions for children.

65. The Effect of Multiple-Context Training on Resurgence in Children with Autism Spectrum Disorder

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Resurgence is a form of treatment relapse observed when a previously extinguished response returns following a reduction in reinforcement conditions for a more recently reinforced response. This study evaluated whether training alternative responding across multiple contexts would reduce resurgence of a target response when eliminating alternative reinforcement and changing stimulus context in children diagnosed with Autism Spectrum Disorder (ASD). In two experiments, we recorded responding with Montessori Object Permanence Boxes (Experiment 1) or a touchscreen interface (Experiment 2). In Phase 1, we reinforced target responding with edibles in a training context. In Phase 2, we differentially reinforced alternative responding on a continuous schedule and discontinued reinforcement for the target response. In addition, differential reinforcement occurred either in one novel context or across multiple novel contexts. In Phase 3, we eliminated differential reinforcement while returning to the training context (Experiments 1 and 2) or transitioning to a novel context (Experiment 2 only). All participants experienced both single- and multiple-context training in Phase 2 successively. In both experiments, multiple-context training did not reliably mitigate resurgence of the target response in Phase 3. The current study and other translational examinations of treatment relapse provide a method to evaluate techniques to enhance the generality and durability of behavioral interventions.

66. Delay Discounting in Adolescents with Overweight Through a Video Game

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In Mexico, obesity is a public health problem that affects 4 out of 10 adolescents. Research had indicated that the choice for immediate, smaller rewards over the larger, delayed rewards, has been related to overweight. Video games had been used to assess the delay discounting degree and could be useful to the interest population. The purpose of the current study was to compare the delay discounting degree among adolescents with overweight ($n = 30$) and normal weight ($n = 41$). The participants were exposed to a task of delay discounting through a video game. The task used the adjusting-amount procedure, using five delays, 5, 10, 20, 40 and 80 seconds, presented in four trials each. The standard amount was 16 rewards. The order of presentation of the values of the delay was random. Rewards and delays values were presented contingent to the choice in each trial. Data adjusted to the hyperboloid model ($R^2 > 0.90$) at higher levels than the hyperbolic model ($R^2 < .70$) with both groups. Concerning the AUC values, data suggested the delay discounting degree was higher with overweight participants than normal weight participants. However, this difference was non-statistical significance. In this study, the video game was a useful tool to evaluate the delay discounting. However, future research is needed to assess the reliability of the video game.

67. Person Who?: Investigating the Effects of an Instructional Prompt on Social Discounting

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The present study examines the effects of varying social distance tasks on social discounting rates across participants. Social discounting investigates how the subjective value of a reward changes given an increase in social distance of the recipient. Previous research typically prompts the participant to imagine a social distance list of person 1 to 100 and few studies have strayed far away from this instructional prompt of imagining the list prior to discounting. The current study prompted participants to type three different social distance lists prior to social discounting with varying levels of specificity to the task; (A) a full 100-person list, (B) a truncated (7-person) list only including those asked about during the social discounting questionnaire, and (C) a truncated (7-person) list of individuals not asked about during the social discounting questionnaire. All participants were also presented with the standard social discounting questionnaire with the standard prompt to imagine the list (condition D). Results indicate a difference in social discounting across groups based on the first instructional prompt, with shallower discounting rates for condition A and B – the two conditions in which participants generated the names of the individuals for whom they were answering discounting questions. . Moreover, indifference points shifted across N-values across the two truncated lists. Future research should extend the current findings into other forms of instructional prompts.

68. Punishment in a Procedure for Rapidly Establishing Steady-State Behavior

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The Procedure for Rapidly Establishing Steady-State Behavior [PressB; Klapes, Calvin, & McDowell, manuscript submitted for publication, (2019)] is a discriminated rapid-acquisition laboratory procedure for human continuous choice. Here, we display PressB's ability to assess human continuous choice behavior when both gains and losses are associated with operant performance. We replicated an experiment by Critchfield, Paletz, MacAleese, and Newland [Journal of the Experimental Analysis of Behavior, 80, 1-27 (2003)] during which variable-interval (VI) punishment schedules were superimposed on equivalent concurrent VI VI reinforcement schedules. Nineteen undergraduate students were run on three sets of concurrent random-interval random-interval (RI RI) reinforcement schedules of decreasing richness using PressB. In each set, the participants were exposed to a baseline (i.e., no punishment) condition, and then two punishment conditions during which an RI punishment schedule was superimposed on one of the alternatives. One punishment condition superimposed an RI punishment schedule that was 50% as dense as the reinforcement schedule upon which it was superimposed (P50), while the other punishment condition superimposed an RI punishment schedule that was 80% as dense as the reinforcement schedule upon which it was superimposed (P80). Compared to the baseline condition, participants responded less on the punished alternative and more on the unpunished alternative in all punishment conditions, as seen with Critchfield et al.'s (2003) participants. This successful replication indicates that PressB can effectively generate continuous choice behavior under both reinforcing and punishing contingencies.

69. Further Evaluation of a Non-sequential Approach to Studying Operant Renewal

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Basic-laboratory assessments of renewal may inform clinical efforts to maintain reduction of severe destructive behavior when clients transition between contexts. The contextual changes arranged during standard renewal procedures, however, do not necessarily align with those that clients experience during outpatient behavioral therapy. More specifically, clients transition between clinical (associated with extinction for target behavior) and home/community (associated with reinforcement for target behavior) contexts during outpatient treatment. Standard renewal assessments do not incorporate these context alternations during treatment. The present experiment aimed to directly compare renewal of rats' lever pressing following a standard ("sequential") ABA renewal procedure (i.e., baseline in Context A, extinction in Context B, renewal test in Context A) and a "non-sequential" renewal assessment wherein treatment consisted of frequent alternation between Context A (associated with reinforcement for lever pressing) and Context B (associated with extinction). Lever pressing renewed to a greater extent for rats in the Non-sequential group than for rats

in the Sequential group, suggesting the contextual changes that clients experience during outpatient treatment for severe destructive behavior may be a variable that is important to consider in translational research on renewal. Potential implications of these findings for basic and clinical research on renewal are discussed.

70. Conditioned Inhibition in Overexpectation: Adding Negative Values?

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There are several procedures to reduce a conditioned response, however, there is no clarity on how these strategies can interact with stimulus control. For instance, overexpectation and Pavlovian conditioned inhibition decrease responding by different means after training a compound stimulus to signal the delivery of an unconditioned stimulus (US). The Rescorla-Wagner model explains both effects with the summation of associative values from more than one conditioned stimulus (CS). In overexpectation the associative strengths have been downsized until their summated value can be supported by the US. As a consequence, this devaluation may enhance the inhibition effect or change associative value. To test these effects, two experiments were designed with an autoshaping procedure for 10% sugar-water solution. In Experiment 1, rats had an overexpectation training prior to a Pavlovian conditioned inhibition training. On Experiment 2, rats were trained simultaneously in overexpectation and inhibition. A control group for overexpectation, summation with a transfer excitator and retardation tests were conducted in each experiment. Rats with overexpectation training showed less intense responding to the cue on retardation sessions in both experiments, while overexpectation did not affect the response on the summation trials. These results are discussed as interference effects in the performance of inhibition.

71. A Quantitative Analysis of Cumulative Records Depicting Google Trends: Novel Insights into Health Promotion Campaigns

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Cumulative records served as primary analyses of operant behavior in both ABA and EAB for many decades. Despite a relative decline of these analyses in peer-reviewed journals over the past 40 years, the use of cumulative records in mainstream media is on the rise, especially in social media news briefs. The increase in mass media use of cumulative records to convey information to the public suggests newfound appreciation for these analyses, underscoring the elegant simplicity of these approaches advocated by early behavior analysts. The current study examines the degree to which cumulative records of Google Trends data are sensitive to constituent web-search interests regarding content and coverage of National Health Observances (NHOs; specific days, weeks, or months dedicated to recognizing particular health issues). The purpose of this analysis is two-fold. First, we illustrate the sensitivity of cumulative records in capturing health promotion campaigns using indices of curvature and

quarter-life analyses to quantify acceleration of search trends in NHO months. Second, we use these analyses of cumulative search trends to quantitatively describe how relative surges in search queries regarding NHO topics align with NHO rollout dates or occur at other times. In cases in which surges occur outside NHO rollout dates, we use cumulative records to prescribe better rollout windows to most effectively leverage consumers' interest when launching public health campaigns. A discussion of how cumulative records can be resurrected to capture consumers' attention in mainstream media is provided.

72. The Effect of Reinforcement Probabilities and Reversal Predictability in a Contingency Reversal Task

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The goal of this study was to assess how time and consequences acquire behavioral control when (1) they are both good predictors of reinforcement, (2) one of them is a better predictor than the other, or (3) they are both poor predictors of reinforcement. We used a contingency 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, subjects had a choice between two stimuli, responses to one of them (S1) were reinforced during the first part of the session, and responses to the other one (S2) were reinforced during the second part. For one group of pigeons the contingency reversal was fixed half way through the session, and for another group the trial at which contingencies reversed was randomly selected on every session. All subjects experienced four different conditions in which the probability of reinforcement of S1 and S2 varied determining the reliability of the consequences. Birds' performance resembled a win-stay/lose-shift strategy, when reinforcement was higher for S1 and lower for S2, independently of the variability of the reversal. In the remaining three conditions both groups showed a characteristic performance pattern of anticipatory and perseverative errors that suggested strong temporal control of behavior.

73. Can a Single Model Describe Discounting Across Amounts, Signs, and Commodities? A Quantitative and Machine Learning Attempt

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Delay discounting is sometimes discussed as a trait variable – a pre-existing characteristic people bring to a situation. A trait approach suggests an association between discounting across outcomes characteristics (e.g., amount, commodity, and gain/loss). A trait approach would predict related, but not necessarily equivalent, discounting across characteristics. In contrast, a specificity approach suggests people do not possess an underlying discounting trait and there should be little-to-no relationship between discounting across outcome characteristics. In this study, we used traditional quantitative analyses and novel machine

learning analyses to describe data obtained from 23 cocaine- and 24 never-using individuals. Participants completed a total of 20 (cocaine users) or 18 (never users) discounting tasks spanning: gains and losses; money, health, and cocaine; and, amounts of \$10, \$100, and \$1000. When traditional models incorporate independent parameters for amount, commodity, gain/loss, and discount rate, we found that a single discount parameter described discounting well only across amounts, but not across the other domains (commodity, gain/loss). Unsupervised machine learning suggested a single discounting parameter could describe discounting across all domains. However, optimal cluster sizes largely mirrored the quantitative analyses – discounting clustered across differing amounts, but not other domains. The results presented here suggest discounting is choice and context specific.

74. Evaluation of a Novel Procedure to Describe Group Foraging in Canines

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The Ideal Free Distribution (IFD) describes behavior of organisms in groups and is an extension of the matching law that suggests the allocation of the number of organisms across two or more resource sites will be distributed equally across those resource sites. This initial project sought to develop a new method of foraging research for canines through validation of a novel dispenser in basic behavioral research. The purpose of this study was twofold: to evaluate if the Treat-&-Train ® dispenser could function as a viable method to deliver treats on a variable time schedule and to determine if the IFD could describe the behavior of the domesticated canine in a daycare setting. Canine behavior was recorded in a free operant arrangement on various variable time schedules of reinforcement. Results indicate the Treat-&-Train ® dispenser offers a novel and effective method to study basic behavioral processes in canines without compromising data quality. Additionally, the IFD adequately describes canine foraging behavior in controlled environments. Results indicate undermatching occurred in the canine sample, which is consistent with other group foraging research. Implications include using the framework of EAB as an opportunity to inform other disciplines, such as ecology, of ways to study foraging behavior with a high degree of experimental control. Additional implications and future directions will be discussed such as expanding the use of the Treat-&-Train ® dispenser to study additional behavioral processes and extending foraging research in the domesticated canine.

75. Behavioral Economics of the “Bottomless Cup:” Alcohol Demand at Off-Campus Parties

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Among college students who drink alcohol, off-campus parties represent a prevalent and high-risk drinking environment (Clapp et al., 2006; Harford et al., 2002; Miller et al., 2017). Although the alcohol purchase task (APT) reliably reveals high alcohol consumption at low

prices, little is known about demand at off-campus parties, where alcohol may be consumed from a refillable cup purchased at the entrance. This study piloted a new hypothetical purchase task (HPT), the Cup-Price Purchase Task (CPPT), which assessed the probability of purchasing a refillable 16-oz. "Solo" cup at 9 prices (\$0-\$60) at an off-campus party. A final sample of 131 undergraduate college students (78.6% female, 72.5% White; mean age of 19.47, SD = 1.666; past-6-months alcohol consumption, and systematic HPT data) completed the CPPT, APT, and other alcohol-related measures (e.g., AUDIT) in an Internet-based survey. The CPPT data revealed that students reported high probability of cup purchase at low prices, and that as price increased, demand for the refillable cup became more elastic. The fit of the exponential demand equation (Q_0 constrained to 0.97817, $k = 2$) to the aggregate data was excellent ($R^2 = .94$), and produced a derived elasticity (alpha) of 0.03090. The analytical P_{max} value (Gilroy et al., 2019) was \$9.60, and observed P_{max} and O_{max} values were \$10 and \$4.68, respectively. Preliminary construct validity analyses revealed that observed breakpoint (BP1) on the CPPT was significantly positively correlated with the observed intensity on the APT ($p < .05$), AUDIT total ($p < .05$), mean drinks/week ($p < .01$), and BYAACQ total ($p < .05$). These findings suggest high intensity of demand for a cup at off-campus parties (but also elastic demand above \$10), and provide further support for the use of HPTs to assess demand for alcohol-related commodities among college students.