

INTERNATIONAL MEETING OF
THE SPANISH SOCIETY FOR
COMPARATIVE PSYCHOLOGY

SEPC 2023

XXXIII International Conference of the Spanish Society for Comparative Psychology



September 20th, 21st and 22nd Granada, Spain

ABSTRACT BOOK

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Collaborators













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PROGRAM

	20-sep			
8:30-9:30	Registration			
9:30-10:00	Official Opening			
10:00-11:30	Opening Lecture			
10:00-11:30	Rob Honey			
11:30-12:30	Coffee break &			
11.50-12.50	Poster Session 1			
12:30-13:45	Symposium !			
12:30-13:43	Symposium I			
13:45-15:15	Lunch			
13:45-15:15 15:15-16:45	Lunch Oral session 1			
15:15-16:45 16:45-17:00	Oral session 1 Coffee break			
15:15-16:45	Oral session 1			
15:15-16:45 16:45-17:00	Oral session 1 Coffee break			

	21-sep			22-sep
9:00-10:00	Oral session 3	9	9:00-10:00	Oral session 6
10:00-11:15	Symposium II	1	0:00-11:15	Symposium III
11:15-12:15	Coffee break & Poster Session 2	11:15-12:15	Coffee break & Poster Session 3	
12:15-13:30	Plenary Lecture Shauna Parkes	1	2:15-13:30	Plenary Lecture Anita Jansen
13:30-15:00	Lunch	1	3:30-15:00	Lunch
15:00-16:15	Oral session 4	1	5:00-16:30	Oral session 7
16:15-17:30	Oral session 5	10	6:30-18:00	Oral session 8
17:30-17:45	Coffee break			
17:45-19:00	SEPEX Lecture Jose Prados	1	18:00-18:45	SOCIETY MEETING
			21:00	Gala Dinner
21:00	Flamenco show and aperitif	L		

Oral Communications

Session 1 Wednesday 20th - 15:15 to 16:45

1. AAB Renewal Appears Regardless of Context-Outcome Associations or Differential Experience of Interference in a VR Spatial Learning Task

Jesús Moreno, José E. Callejas-Aguilera, J. Roberto Jiménez-Pérez, Juan M. Jurado & Juan M. Rosas

2. Renewal from extinction learning in an insect

Kanta Terao, Yukihisa Matsumto, Beatriz Alvarez, Yutaka Kosaki & Makoto Mizunami

3. Applying linear mixed models to analyze renewal in choice behaviour

Livia Sánchez-Carrasco, Tania Chávez & Salvador Zamora

4. Reinstatement as a change in arousal

James Byron Nelson & Maria del Carmen Sanjuan

5. Extinction of a previous acquired response in goal and sign trackers rats
Nora Calle-Villa, Antonio Pérez-Colorado, Manuel Potavella & Juan Carlos López

Session 2 Wednesday 20th - 17:00 to 18:30

6. Effects of habituation to different light intensities on the head retraction response in earthworm

M. del Mar Carpio-Cruz, Lucía García-Torres, Sara Pérez-Vílchez, David Reyes-Jiménez, Sergio Iglesias-Parro, M. José F. Abad & Concepción Paredes-Olay

7. Individual differences in habituation: comparing instruments to predict individuals' readiness to habituate

Paula Nogueiras, Unai Liberal & Gabriel Rodríguez

8. Rapid alternating exposure to similar butterflies enhances later recognition but hinders learning new events about them

Jesús Sánchez, Ana González & Isabel de Brugada

9. Investigating the Inhibitory Properties of a Latent Inhibitor with the Protection from Extinction Paradigm

Unai Liberal, Paula Nogueiras & Gabriel Rodríguez

10. To learn or to defend, that is the question

Gabriel Rodríguez

Session 3 Thursday 21st - 9:00 to 10:00

11. Unveiling the Power of Drug-Induced Classical Conditioning

Luis Gonzalo De la Casa, Lucía Cárcel, María de los Ángeles Cintado, Daniel Santos-Carrasco & Gabriel Gonzalez

12. Testing the anxiolityc effect of Valproic Acid on fear conditioning, context-induced neophobia, and responses in elevated plus maze

María Ángeles Cintado, Gabriel González, Daniel Santos-Carrasco & Luis Gonzalo de la Casa

- 13. Effects of chronic methylphenidate consumption on a sustained attention task and its consequences impairing neuronal network using an animal model of impulsivity

 Antonio Pérez-Colorado, Reyes Martínez, Fátima Montiel, Luis Miguel Traverso, Estrella Díaz
- **14. Cognitive effects of chronic methylphenidate administration in adolescent rats**Reyes Martínez, Antonio Pérez-Colorado, Adela Batanero-Geraldo, Esperanza Quintero & Estrella Díaz Argandoña

Session 4 Thursday 21st - 15:00 to 16:15

- **15.** A systematic review of occasional reinforced extinction as a method for relapse prevention María J. Quintero, Francisco J. López, Miguel A. Vadillo & Joaquín Morís
- 16. An effective procedure for the induction of physiological and psychological acute stress in human participants

Daniel Santos-Carrasco, María de los Ángeles Cintado, Gabriel González & Luis Gonzalo De la Casa

17. Cognitive inflexibility in patients with chronic fronto-striatal stroke

Cristina Uceda-Sánchez, José García-Pinteño, Rocío Rodríguez-Herrera, Pilar Fernández-Martín, José Juan León-Domene, Miguel Soto-Ontoso, Laura Amaya-Pascasio, Patricia Martínez-Sánchez, Pilar Flores & Ana Sánchez-Kuhn

18. Inhibitory control in Giraffes

Alvaro L. Caicoya, Montserrat Colell & Federica Amici

Session 5 Thursday 21st - 16:15 to 17:30

19. Differential effect of extinction of different response alternatives as a function of their location in the inter-reinforcement interval

Fernando Molines & Ricardo Pellon

20. Sex and age differences in mice models of effort-based decision-making: studies of dopamine depletion and the CDNF

Paula Matas-Navarro, Carla Carratalá-Ros, Régulo Olivares-García, Andrea Martínez-Verdú, John Salamone & Mercè Correa

21. Dopamine markers and behavioral correlates of individual differences in effort-based decision making in rats

Andrea Martínez-Verdú, Régulo Olivares-García, Paula Matas-Navarro, Carla Carratalá-Ros, Noemí SanMiguel, John D. Salamone & Mercè Correa

22. Differences in cerebral dopamine neurotrophic factor (CDNF) in nucleus accumbens of male and female rodents after dopamine depletion

Carla Carratalá-Ros, Paula Matas-Navarro, Andrea Martínez-Verdú, Régulo Olivares-García, Edgar Arias-Sandoval, John D. Salamone & Mercè Correa

Session 6 Friday 22nd – 9:00 to 10:00

- **23.** Time-based behavioral interventions at early ages to reduce impulsive choice Gloria Ochoa-Zendejas, Cristiano Valerio dos Santos & Jonathan Buriticá
- 24. Dimensional analysis of cognitive flexibility in impulsive-compulsive disorders

Rocío Rodríguez-Herrer, Pilar Fernández-Martín, Ana Sánchez-Kuhn, Cristina Uceda-Sánchez, Miguel Soto-Ontoso, Laura Amaya-Pascasio, Patricia Martínez-Sánchez, José Juan León & Pilar Flores

25. Testing the Negative Conditioned Magazine Approach paradigm as an animal impulsivity procedure

Luis E. Gómez Sancho & Gonzalo de la Casa Rivas

26. Exploring the implication of vulnerability to compulsive alcohol drinking in the development of pathological gambling and social dominance

Manuela Olmedo-Córdoba, Ángeles Prados-Pardo, Elena Martín-González & Margarita Moreno-Montoya

Session 7 Friday 22nd – 15:00 to 16:30

27. Starlings in the midsession reversal task: A test of the timing hypothesis

Armando Machado & Marco Vasconcelos

28. Giving Time a Chance in the MidSession Reversal Task

Catarina Soares, Carlos Pinto & Armando Machado

29. Discrimination Reversal on a Delay Discounting Task

Juliana Johnston & Jake Hebert

30. Subjective relief and the avoidance of aversive stimuli: a Bayesian approach using Reinforcement learning

Antonio González-Rodríguez & Bram Vervliet

31. Trial order in human learning – evidence for a primacy effect

Sophie Cattalini, Grace Williams & Dominic Dwyer

Session 8 Friday 22nd – 16:30 to 18:00

32. Uncertainty increases generalization of human predictive learning

Gonzalo P. Urcelay, Tara Hulley & José A. Alcalá

33. The role of prediction in social categorization

José A. Alcalá, Nadia Loulidi, Rocio Calviño, Tamara Giménez-Fernández, Miguel A. Vadillo & José A. Hinojosa

- **34.** Prediction error produced by extinction attenuates overshadowing: An eye-tracking study Roberto Jiménez, Alejandra Vázquez & Javier Vila
- **35. Satiety modulates attentional capture of food images but not food brand logos** Irene Ruiz, Ana González & Isabel de Brugada
- **36.** Episodic or episodic-like? Why we should care about the definition of episodic memory Christopher R. Madan

Posters

Session 1 Wednesday 20th - 11:30 to 12:30

- 1. Inconsistent pre-exposure to the sweet-calorie relationship alters conditioned satiety
 Ana González & Isabel de Brugada
- 2. Nutritional labels and intake regulation an assessment from a food attentional bias approach

Fernando Ojedo, Ana González, Irene Ruiz, Marta Gil, Pedro Macizo & Isabel de Brugada

3. Effects of nutrition labels on attentional bias to food pictures

Adrián Castro, Irene Ruiz, Ana González, Fernando Ojedo & Isabel de Brugada

4. Exploratory Factor Analysis of the Diener SWLS scale for children and adolescents in the Mexican population

Ferran Padrós-Blázquez

5. Factors fostering resilience and post-traumatic growth during the Covid-19 pandemic: A systematic review

T Sayed & H Malan

6. Effects of the incentive salience of stimuli on conditioned inhibition in the suboptimal choice procedure in pigeons

Angel M. Villalobos & Cristiano Valerio dos Santos

7. There is still hope: higher relative frequency does not lead to preference for ineffective compared to effective treatments

Marta N. Torres, Fernando Blanco, Manuela Moreno-Fernández, Javier Rodríguez-Ferreiro, & Itxaso Barberia

8. Saline is neither aversive nor rewarding for planarians (Girardia Dorotocephala) in a conditioned place preparation; however, it seems to interfere with the normal process of habituation to environmental stimuli

Toru Tazumi, Gonzalo P. Urcelay & José Prados

9. Spontaneous recovery in Primary School children

Rosalia Baiamonte & A. Matías Gámez

10. Characterization of green spaces for the study of ADHD symptom decrease in adolescents in urban and rural contexts: Theoretical and experimental approach

Jesus Adrián Pérez Reales

11. Metatiming Assesment based on Performance

Oscar Zamora-Arevalo, Yina Hernández-Espinosa & Gustavo Ortiz-Lagunes

12. "Consummatory successive negative contrast effect: differences between male and female rats in absolute vs. relative reward processing

David Zafra Morillas, Antonio David Rodríguez Agüera & Carmen Torres Bares

13. A systematic review on sex differences in prepulse inhibition of startle response Daniel Santos-Carrasco, Lucía Cárcel & Luis Gonzalo De la Casa

14. The anxiolityc effect of Valproate Acid reduces fear-potentiated startle
Gabriel González, María Ángeles Cintado, Lucía Cárcel & Luis Gonzalo De la Casa

15. Exploring neuroplasticity changes in a compulsive phenotype selected by Schedule-Induced Polydipsia: insights from Diffusion MRI

Elena Martín-González, Manuela Olmedo-Córdoba, Ángeles Prados-Pardo, Daniel Padro, Pedro Ramos-Cabrer, Santiago Mora & Margarita Moreno

16. Preliminary studies on the effects of context familiarity on light habituation learning in earthworms (Dendrobaena Veneta)

Sara Pérez-Vílchez, Lucía García-Torres, M. del Mar Carpio-Cruz, Sergio Iglesias-Parro, M. José F. Abad & Concepción Paredes-Olay

17. Behavioural profiles of temporal discounting in Attention-Deficit Hyperactivity Disorder (ADHD)

Daniela Tovar Suárez, Pilar Fernández-Martín, Rocio Rodríguez-Herrera, Rosa Cánovas & Pilar Flores

18. Ambiguity processing in young adult Decision Making

Edmundo Molina-Pérez, Fernanda Sobrino, Isaac Molina, Fátima Rojas-Iturria, Yessica Orozco and Alejandra M. Castellón-Flores

19. Effect of methylphenidate on sustained attention in male and female rats
Adela Batanero-Geraldo, Fátima Montiel-Herrera, Reyes Martínez, Nora Calle-Villa & Juan
Pedro Vargas

20. Effects of MPH Consumption on Extinction Conditioned Response in Wistar Rats
Fátima Montiel-Herrera, Adela Batanero-Geraldo, Nora Calle-Villa & Estrella Díaz Argandoña

Session 2 Thursday 21st - 11:15 to 12:15

21. The role of self-esteem, self-concept, academic performance and frustration intolerance on the impact of reward devaluation in humans

Loida E. Morillo-Rivero, Irene Mata, Antonio J. Ibáñez-Molina & Carmen Torres Bares

22. A new virtual reality task for studying response recovery-from-extinction effects in human instrumental learning: Spontaneous recovery

A. Matías Gámez, Jesús Moreno, Juan M. Rosas & José E. Callejas-Aguilera

23. The Influence of Affective Dimensions on Generalization Gradients

José A. Alcalá, Celia Martínez-Tomás, Gonzalo P. Urcelay & José A. Hinojosa

24. In vivo microdialisys technique to register dopamine concentration in the striatum Cristina Valera, Lucía Cárcel & Luis Gonzalo De la Casa

25. Modulation of the US-Preexposure effect by food deprivation with a flavor preference conditioning procedure

Luis Miguel Traverso, Juan Carlos López, Luis Gonzalo de la Casa, Estrella Díaz & Juan Pedro Vargas

26. Preferences conditioned to orthonasal odors and CS-preexposure effects with satiated rats and caloric and non-caloric reinforcement

Luis Miguel Traverso, Luis Eladio Gómez-Sancho & Luis Gonzalo de la Casa

27. Patients under treatments with delayed effectiveness are more vulnerable to pseudomedicine

Fernando Blanco

28. The green halo effect: The role of eco-friendly labelling on environmental impact estimations

Fernando Blanco & Helena Matute

29. Adolescent alcohol exposure induces microRNA-182 overexpression and increases amygdala activity in adult rats

Ana Vázquez-Ágredos, Marta Valero, Raquel García-Rodríguez, Fernando Gámiz & Milagros Gallo

30. How individual differences influence attentional sign-tracking?

Pablo Martínez-López, Adriana Ariza, Francisco Garre-Frutos & Felisa González

31. ABC Renewal in a Virtual Reality Spatial Learning Task

Jesús Moreno, Juan M. Rosas, Juan M. Jurado, J. Roberto Jiménez-Pérez & José E. Callejas-Aguilera

32. Differences in control in a Conditional Magazine Approach do not covary with differences in control in a Differential Reinforcement of Low rate Schedule

Luis E. Gómez Sancho, Gonzalo de la Casa Rivas & María F. Arias

- **33.** Pavlovian-to-instrumental transfer: Individual differences in implicit emotional regulation Adriana Ariza, Pablo Martínez-López, Francisco Garre-Frutos & Felisa González
- **34.** Role of Lobule VII Cerebellar Perineuronal Nets on Relapse of Drug Seeking
 Aitor Sanchez-Hernández, Patricia Ibáñez-Marín, Abel Fábrega-Leal, Elisa Marín-Sampietro,
 Olga Rodríguez-Borillo, Laura Font, Marcello Solinas & Marta Miquel
- 35. Cerebellar Correlates of Female Sensitivity to Reward Devaluation

Patricia Ibáñez-Marín, Elisa Marín-Sampietro, Aitor Sanchez-Hernández, Lorena Roselló-Jiménez, Laura Font & Marta Miquel

36. How Goal-Landmark Distances Impact Overshadowing: a replication in humans of Goodyear & Kamil (2004)

Estibaliz Herrera, Joe M. Austen & Gonzalo Pablo Urcelay

37. Effects of prediction error produced by partial and delayed reinforcement on overshadowing

Roberto Jiménez, Daniel Romero, Frida Daniela Compián-Sánchez & Javier Vila

38. Alcohol consumption in Lewis and Fischer male rats after reinforcer devaluation and the modulatory role of exercising

Elena Castejón, Ricardo Pellón, Emilio Ambrosio & Carmen Torres

39. Analyzing variance components in different procedures and reinforcement schedules in instrumental conditioning

Livia Sánchez-Carrasco

40. Behavioral Analysis of the Drug "Ephenidine" for the Treatment of Depression

Teresa Aparicio Mescua, Leandro Ruiz Leyva, Sergio Cuesta Martínez, Osvaldo Giorgi, Cruz Miguel Cendán & Ignacio Morón Henche

Session 3 Friday 22nd – 11:15 to 12:15

- **41.** Ethanol as a context for habituation response in the earthworm (Dendrobaena Veneta) Roberto Álvarez, Cristina Aragón, Jairo Parras & José Manuel Lerma-Cabrera
- 42. Please don't stop the music the effect of changes in background music on the recovery of an extinguished response in human predictive learning

Sahar Aghajari, Harald Lachnit & Metin Uengoer

43. Ethanol-induced place conditioning in earthworms (Dendrobaena Veneta)

José Manuel Lerma-Cabrera, Jairo Parras, Cristina Aragón & Roberto Álvarez

44. Extinction of avoidance behaviour with and without response preventionCourteney Fisher, Hazem Toutounji & Gonzalo Urcelay

45. New procedures and operational registers for assessing learned behavioural changes in earthworms (Eisenia Fetida)

Fernando Rodríguez-San Juan, WuYou Chen & Gabriel Rodríguez

46. Noradrenergic stimulation facilitates Novel Object Recognition (NOR) in Swiss mice: sexdependent differences in learning and memory processes

Lorena Roselló-Jiménez, Olga Rodríguez-Borillo, Raúl Pastor & Laura Font

47. Reinstatement of extinguished cocaine-induced conditioned place preference and c-Fos expression depends on contextual cue configuration

Olga Rodríguez-Borillo, Lorena Roselló-Jiménez, Aitor Sánchez-Hernández, Raúl Pastor, Marta Miquel & Laura Font

48. Association Between Individual Differences in Extinction of Flavor Aversion and Anxiety

Trait in Rats

Paula Nogueiras, Gabriel Rodríguez & Unai Liberal

- **49.** Exposure to beer prior to extinction reduces ABA and AAB renewal of beer seeking in rats
 Tere A. Mason, Metin Uengoer & Rodolfo Bernal-Gamboa
- 50. No sex differences in attenuation of neophobia despite differences in hedonic reactions to novel flavours

Sergio Menchén-Márquez, Marta Valero, Patricia Gasalla, Fernando Gámiz, Milagros Gallo & Dominic Dwyer

51. Sex Differences in the Expression of Taste Neophobia as a Function of the Deprivation State

Unai Liberal, Paula Nogueiras, Fernando Rodríguez-San Juan, Ixone Badiola & Gabriel Rodríguez

52. ABA renewal is reduced by a focused attention intervention

Mariel Almaguer-Azpeitia, A. Matías Gámez, Javier Vila & Rodolfo Bernal-Gamboa

- **53.** Effects of the NMDA Receptor Antagonist MK-801 on Social Deficits and Synaptic Plasticity Patricia Gasalla Canto & Marta Mendez-Couz
- **54.** Neophobia and pre-exposure effects in conditioned taste aversion with Hidango ewes Rocio Angulo, Marcelo Quezada, Laura Quezada, Miguel González & Jaime Figueroa
- 55. Singleton detection mode prevents habituation of the attentional capture by color singleton distractors

Tatiana Fernández Marcos, Diego Iglesias Olivares, Carolina Mirete Juan, Cristina Arévalo Pedrosa & Alejandra Villalba Villalba

56. The Signal for Good News (SiGN) model of suboptimal choice

Jeffrey Pisklak, Roger Dunn, Margaret McDevitt & Marcia Spetch

57. Initial-link Schedule Affects Suboptimal Choice

Margaret A. McDevitt, Jeffrey M. Pisklak, Roger M. Dunn & Marcia L. Spetch

58. Therapy focused on the reduction of threat perception (TFRTP) to reduce pathological worry

Ferran Padrós-Blázquez

59. Ability of Musical Stimuli in the Generation or Modification of Emotional States: A Systematic Review

Braulio Bruna, Isabella Fioravant & Johanna Kreither

60. How does having experienced anxiogenic situations affect alcohol consumption? A pilot study in rats

David Torras, Adrián Castro Ruiz, Adriana Ariza, Erick Espinoza Martínez & Ignacio Morón Henche

PLENARY LECTURES



PL 1:

OPENING LECTURE

Prediction error in models of associative learning and behaviour

Rob Honey

Cardiff University

Pavlovian conditioning is evident in every species in which it has been assessed, and there is a consensus about its interpretation across behavioural, brain and computational analyses: Conditioned behaviour reflects the formation of a directional associative link from the memory of one stimulus (e.g., a visual stimulus) to another (e.g., food), with learning stopping when there is no error between the prediction generated by the visual stimulus and what happens next (e.g., food). However, this consensus has also faced challenges from behavioural, brain and computational considerations, which have provided the impetus for a shift in how Pavlovian conditioning is interpreted: Animals learn(reciprocal) associations between two stimuli (e.g., a visual stimulus and food) irrespective of the order in which they are presented, but they express this knowledge in different ways. This interpretation is broadly consistent with the need for animals to represent the fact that the impact of a cause (e.g., the ingestion of nutrients or the bite of a predator) can be felt *before or after* that cause has been perceived.

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PL 2:

Cued overeating and its implications for the treatment of eating and weight disorders

Anita Jansen

Maastricht University

"Eat less, eat better, exercise more: change your lifestyle". This is the advice usually given to overweight people. However, most overweight people know this and if they could change their lifestyle, obesity would not be a problem. It turns out to be extremely difficult to change a person's lifestyle and eating habits. Learned appetitive responding, or food cue reactivity, is a strong motivator to eat, even in the absence of hunger. Cued desires and cued cravings can sabotage healthy eating, cause weight gain, and hinder weight loss or the maintenance of lost weight. Extinguishing appetitive responding can be helpful to eat less and lose weight. This presentation will discuss procedures to extinguish food cue reactivity and translate them to exposure treatments for people with eating and weight disorders.

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PL 3:

SEPEX LECTURE

Tolman revisited: "There is more than one kind of learning" driven by associations

Jose Prados

University of Derby

Seventy-five years ago, Edward Chace Tolman addressed the members of the American Psychological Association with the intention of perhaps resolving "our familiar theoretical disputes about learning" if we "can agree that there are really a number of different kinds of learning". In his provocative talk, Tolman identified six different forms of learning, suggesting that the conditions and laws that apply to one might very well not apply to the others. Of particular interest is the third kind of learning, Field Expectancy(also referred to by Tolman as Cognitive Map, Tolman, 1948), an interconnected network of mental representations of different aspects of a particular environmental set up. In the published version of his talk (Tolman, 1949), he states that "reinforcement per se is not valid for the acquisition of field expectancies and I also emphasize that Gestalt principles of learning and forgetting, rather than associationistic principles, are of prime importance in the acquisition of such field expectancies". This sentence has had a huge impact in the way we perceive spatial learning and navigation. John O'Keefe and Lynn Nadel, for example, used it as the foundation for their highly influential theory of the role of the hippocampus in spatial learning and navigation (O'Keefe & Nadel, 1978). In this talk I will critically review the evidence in favour and against the notion that spatial learning is independent from associative learning. In contrast with the original statement by Tolman, I aim to show that associative learning plays a key role in the building up and use of cognitive maps.

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PL 4:

Ventral hippocampus and the contextual control of goal-directed actions

Shauna Parkes

University of Bordeaux

Much research has been dedicated to understanding the psychological and neural bases of goal-directed action. Yet, the relationship between context and goal-directed action is not well understood. Here, we used chemogenetics and circuit-specific manipulations to demonstrate a role for ventral hippocampus (vHPC) in the contextual learning that supports sensitivity to action-outcome contingencies, a hallmark of goal-directed action. We found that chemogenetic inhibition of ventral, but not dorsal, hippocampus abolished sensitivity to instrumental contingency degradation. We then tested the hypothesis that this deficit was due to an inability to discern the relative validity of the action compared with the context as a predictor of reward. Using latent inhibition and Pavlovian context conditioning, we confirm that sensitivity to degradation relies on intact context-outcome learning and show that this learning is dependent on activation of vHPC. Finally, we show that inhibition of vHPC efferents in the medial prefrontal cortex also impairs both instrumental contingency degradation and context-outcome learning. These results implicate a hippocampo-cortical pathway in adapting to changes in instrumental contingencies and indicate that the psychological basis of this deficit is an inability to learn the predictive value of the context.

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SYMPOSIA



Symposium 1: Perspectives on suboptimal choice

Wednesday 20th - 12:30 to 13:45

Topic: Choice behavior

Chair: Dr. Marcia Spetch, University of Alberta

Talk 1:

The Signal for Good News (SiGN) model of suboptimal choice

Marcia Spetch¹, Jeff Pisklak¹, Margaret McDevitt² and Roger Dunn³

¹University of Alberta ²McDaniel College ³San Diego State University

As first reported almost half a century ago, pigeons (Columba livia) sometimes choose options that provide less food over options that provide more food. This behaviour has been variously referred to as suboptimal, maladaptive, or paradoxical because it lowers overall food intake. Considerable research has been directed at understanding the conditions under which animals and people make suboptimal choices and the mechanisms that drive this behaviour. Pigeons are most likely to show suboptimal choice when the outcomes following a choice are uncertain, when the outcomes are delayed after the choice, and when the outcomes are signalled only on the option that provides food less often. An early theoretical explanation of suboptimal choice suggested that signals for a reduction in delay to food reinforce choice, and this explanation was later expanded and named the signal for good news (SiGN) model. We have recently published a mathematical formalization of the SiGN model. Here we will describe the key features of the SiGN model and show that, even in the absence of free parameters, it provides an excellent fit to the data from a large set of conditions in pigeons across studies from numerous researchers. Although species differences appear to exist, our approach may have some general applicability to understanding how rewards and signals for reward combine to reinforce behaviour.

Keywords: suboptimal choice, conditioned reinforcement, delay reduction, SiGN model

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Talk 2:

Time, uncertainty, and suboptimal choice

Marco Vasconcelos and Armando Machado

University of Aveiro

Recent research has shown that, under certain circumstances, some species behave suboptimally by "trading" food for information. Suppose animals choose between two options, one Informative and the other Non-informative. If they choose the Informative option, on 20% of the trials a stimulus (SG) is presented and after 10 s food always ensues; on the other 80% of the trials, a different stimulus (SR) is presented for 10 s but always ends without food. If they choose the Noninformative option instead, one of two stimuli is presented (SB or SY), and after a 10-s delay, food is delivered on 50% of the trials regardless of the stimulus shown. Even though the overall probability of food in the Informative Option is 2.5 times lower than in the Non-informative option (20% vs. 50%, respectively), pigeons and starlings strongly prefer the Informative option. In the first two experiments, we examined whether such preference occurs because SG and SR disambiguate the trial outcome upon choice by delaying this event. In Experiment 1, when the Informative option was chosen, SG always ensued for t seconds of a 10-s delay, and then the standard contingencies followed. Experiment 2 was similar, except that SR always ensued for t seconds. Across conditions, t varied from 0 to 10 sec. In both experiments, preference for the Informative option decreased with t, but the effect was stronger in Experiment 1. In the third experiment, we asked whether animals would still prefer the informative option when the information it conveys is not about the trial outcome (food vs. no food) but the delay to the outcome. In this adapted procedure, SG and SR signaled a short and long delay to food, respectively, whereas SB and SY were both followed by the same short or long delay with equal probability. Overall, pigeons continued to prefer the informative option, but preference varied with the ratio of the long to short delay. Both functional and mechanistic models are used to discuss our findings.

Keywords: suboptimal choice, reinforcement rate, probability of reinforcement, maximization

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Talk 3:

Rats value information when it allows optimality

Vladimir Orduña and Fernanda González-Barriga

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We present three sets of experiments conducted to investigate some variables that have been suggested as relevant in the study of rats' preferences in the "Suboptimal choice procedure". We designed an apparatus that allowed rats to display behaviors related to their natural foraging; the alternatives -discriminative and non-discriminative- were presented in different spatial locations as entrances to tunnels, and the different stimuli associated with the procedure (positive, negative, and non-discriminative (ND) stimuli) were presented as additional tunnels 2.5 meterslong, which rats had to traverse to finally get the outcome. In the first set of experiments, one of the alternatives (discriminative) presented informative stimuli, and a lower probability (Exp 1a) or expected amount (Exp 1b) of reinforcement than the non-discriminative alternative. The results indicated a strong preference for the non-discriminative alternative in both experiments. In experiments 2a and 2b, these procedures were modified so that both alternatives provided the same rate of reinforcement, and the only difference between alternatives was that the discriminative alternative provided informative stimuli that signaled the outcome that would be obtained in that particular trial. We found that rats showed a preference for the nondiscriminative alternative, which suggests that the negative stimulus associated with the discriminative alternative acquired aversive properties, which diminished the value of the informative alternative. In experiments 3a and 3b, rats were allowed to escape from the particular outcome found in each trial by traversing a new tunnel that was presented as soon as the positive, negative, ND1 or ND 2 tunnels were open. Traversing this escape-tunnel initiated a new trial. Two results are important to highlight: a) rats escaped only from the negative stimulus, and with high probability, and b) the escape condition was associated with a marked increase in the preference for the informative alternative. The present results increase the external validity of previous findings of rats' optimality in the "suboptimal choice procedure". Rats' optimality seems to be facilitated by aversion to the negative stimuli. When the negative stimulus can be avoided, the value of the informative alternative is increased, consistent with an ecological approach to the suboptimal choice phenomenon. Rats value information, but only when it is useful.

Keywords: suboptimal choice, information, optimality, optimal foraging, rats

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Talk 4:

Suboptimal choice as information-tracking behaviour

Patrick Anselme

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Organisms typically prefer a cue that predicts food with certainty (100% chance) over a cue that predicts the same food with uncertainty (50% chance), suggesting that they attempt to maximize reward rate per unit time. Another interpretation might be that they choose certainty because the cue in that option is consistent in predicting food, independently of the food amounts to be received. Indeed, using a suboptimal choice (SOC) paradigm, organisms often prefer an option associated with a lower total amount and a lower probability of food than provided in the alternative option. Of course, pigeons and starlings, among others species, might "misbehave" in the SOC task because they were not shaped by evolution to respond to this unnatural design. However, the eventuality that these excellent information seekers miss the most profitable option seems unlikely. I suggest that, in the SOC task, like in other tasks in which some information can be obtained, organisms primarily track the cues that consistently predict food (and perhaps also no food) delivery to the detriment of profitability. In this perspective, their behavior does not appear suboptimal; it relates to information seeking rather than reward seeking. Reward uncertainty generates insecurity, and the optimal way of reducing it in nature is to learn the (correlational) structure of events in the local environment. Consistency tracking is a prerequisite for learning the structure of events, and should therefore favor better decisions and benefit survival in the long run. The adaptive value of consistency tracking may explain why organisms are willing to pay a cost for noninstrumental information (irrelevant to future actions) and for counterfactual information (missed alternative). It could also explain why, in Pavlovian autoshaping, partial reinforcement overstimulates responding to a reward-predictive cue compared to continuous reinforcement: effort and perseverance is effective in resolving uncertainty in a natural setting, even in the absence of direct payoff. Overall, it is argued that reward uncertainty has multiple behavioral effects that promote exploratory behavior in the environment, and consistency tracking revealed by the SOC task might be one of those effects.

Keywords: suboptimality; reward maximization; reward uncertainty; exploratory behavior

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Symposium 2: Stimulus control of instrumental performance

Thursday 21st - 10:00 to 11:15

Topic: We will present a series of talks that describe how environmental stimuli control instrumental performance – whether through Pavlovian processes, discrimination learning or the conditioning of stimulus-response habits – in both humans and rodents.

Chair: Dr. Felisa González, Universidad de Granada

Talk 1:

Incentive salience and human action control and selection: Individual differences

Felisa González¹, Irene Hinojosa-Aguayo¹ and Geoffrey Hall²

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There is an ongoing debate about whether outcome-specific Pavlovian to instrumental transfer (PIT) is an instance of a rather automatic (devaluation/extinction-insensitive) learning, or shares processes more akin to propositional goal-directed (devaluation/extinction-sensitive) ones. In the present talk, we review research conducted in our laboratory suggesting that both patterns, sensitive and insensitive, may be found in human participants depending on individual differences in some forms of impulsiveness. Participants with high scores in impulsivity traits, unlike those with a low one, seem to show poorer or lacking effects of a) outcome devaluation on a simple instrumental task; b) devaluation of PIT; or c) extinction of Pavlovian cues on PIT. We will also consider evidence using another incentive salience measure related to attentional sign-tracking: reward-related attentional capture task. The results suggest that, under some conditions, os-PIT may be based on flexible representations that allow updating of the value of the outcome, as well as the strength of the S-O contingency, but that this might be modulated by individual differences related to emotion regulation and the propensity to show enhanced incentive salience to reward-related cues.

Keywords: extinction, incentive salience, individual differences, outcome devaluation, PIT

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Talk 2:

The effect of conditioned inhibition on the specific Pavlovianinstrumental transfer effect: Some human data

Charlotte Bonardi and Daniel Alarcón

University of Nottingham

Pavlovian-instrumental transfer describes the process whereby Pavlovian cues can invigorate instrumental responding. This invigoration can be specific - when a CS predicting a specific outcome selectively elevates instrumental responding to obtain that same outcome – or general, when the CS elevates responding for any outcome of the same motivational value. These two mechanisms appear to be behaviourally and neurally distinct. Specific PIT is highly implicated as underlying acquisition and maintenance of addictive behaviours – and reducing PIT produced by environmental cues which predict addictive substances is of obvious therapeutic value. One strategy is to remove those cues completely - such as the current UK ban on displaying cigarettes in larger shops. But this is not always possible, and so alternative methods of reducing the effect of Pavlovian signals are important. One possibility is to generate a conditioned inhibitor - a stimulus that signals the omission of an outcome. Conditioned inhibitors can counteract the effects of predictors for the outcome whose omission they signalled. But there is debate on the extent to which such inhibitors act specifically on signals for that same outcome, or also on predictors for related outcomes. Moreover, this debate extends to inhibitors' effects on Pavlovian cues supporting specific PIT. This is especially pertinent for therapies trying to reduce specific PIT, where the aim is to generate an inhibitor that acts specifically on cues predicting the addictive substance. We will discuss some data from human participants that may throw light on these issues.

Keywords: Pavlovian-Instrumental transfer, addiction, conditioned inhibition

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Talk 3:

The degraded contingency paradigm as a tool to examine habitual operant responses in humans

David Luque, Joaquín Morís, Pedro L. Cobos, Sara Molinero, María J. Quintero, y Francisco J. López

Universidad de Málaga

Reward-learning theory considers habits as stimulus—response associations formed through extended reward training. Accordingly, animal research using outcome devaluation paradigms has shown that actions that are initially goal-directed can become habitual after operant overtraining. However, a similar demonstration has proved extremely difficult in human research, which poses a serious problem for translational models of behavior. In this study we try to show evidence for habitual operant responses using a different experimental tool, the degraded contingency paradigm. This strategy has been previously used to study habitual behaviour when comparing performance between OCD patients and healthy controls. However, it is the first time that this strategy is used to examine habitual behaviour after overtraining. The theoretical implications of the results are discussed and, more generally, further ways to examine habitual behaviour are examined.

Keywords: contingency degradation, goal-directed actions, habits, overtraining, reinforcement learning

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Talk 4:

The role of incidental Pavlovian cues in instrumental performance

Bernard Balleine and Thomas Burton

UNSW Sydney

When training instrumental actions, it is impossible to avoid incidentally establishing Pavlovian predictors. For example, when training a rat to press a freely available lever for food reward, stimuli, such as the sight of the lever or the experimental context, often predict the food as closely as the lever press action itself. Given that Pavlovian stimuli have been consistently demonstrated to modify instrumental performance, it is likely that instrumental performance not only reflects the contribution of instrumental conditioning processes but also the influence of these incidental Pavlovian cues. A number of generalisations regarding the nature of instrumental conditioning, including the influence of a range of response elimination procedures such as contingency degradation, extinction, reversal learning and so on, assume that Pavlovian predictors play a negligible role in these effects. Here I will describe a series of experiments that counter this assumption. Using a procedure that aims to nullify the influence of Pavlovian cues, I will also demonstrate that a range of previous findings and conclusions in the instrumental conditioning literature are open to dispute, suggesting our understanding of the fundamental nature of instrumental conditioning may be in need of revision.

Keywords: Instrumental conditioning; Pavlovian conditioning; Pavlovian-instrumental transfer; bidirectional control; outcome devaluation

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Symposium 3: Invertebrate Learning: Cognition and Consiousness

Friday 22^{nd} – 10:00 to 11:15

Topic: Experimental research on pyschological processes in invertebrates

Chair: Dr. Ignacio Loy, Universidad de Oviedo

Special Talk:

Invertebrate Learning: Cognition and Consiousness

Ignacio Loy

Universidad de Oviedo

After the Darwinian revolution, concepts such as intelligence, culture, purposefulness, intentional behaviour, thinking, or language had to abandon the exclusive domain of the human being. Firstly, these concepts were applied to other species of vertebrate animals such as primates, cetaceans, dogs and birds and now they were observed in invertebrates showing a variety of phenomena involving simple forms of tool use, attention, social learning of non-natural foraging routines, emotional states, face recognition, quantitative competence, learning by observation and metacognition. Therefore, it is possible to claim that cognitive processes are necessary to describe the behavioural skills of some invertebrates. On the other hand, the experimental development of associative learning has generated a variety and complexity of phenomena whose explanation requires the invocation of specific cognitive processes such as contextual specificity of memory, attentional control or working memory. The experimental demonstration in invertebrate species (planaria, tenebrio, earthworm, land snail) of avoidance learning and its extinction, the contextual specificity of habituation or the processes of intentional rehearsal of working memory, opens the possibility of experimentally investigating the origins and development of cognition, which it could be consider equivalent to the study of the origin of consciousness. The Symposium aims to share recent experimental research and conceptual explorations of cognition in invertebrates, stimulating debate on the relevance and implications of this topic.

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Context specificity and working memory in terrestrial snails

Judit Muñiz-Moreno and Ignacio Loy

Universidad de Oviedo

Recently, the interest in context specificity of associative learning in invertebrates has increased, showing several phenomena such as context specificity of latent inhibition (LI), spontaneous recovery, reinstatement, or renewal. In this talk we provide two experimental strategies to study cognition in invertebrates based respectively on renewal effect and trace conditioning in terrestrial snails. To study the magnitude of renewal effect snails experienced an odorous conditioned stimulus (CS) paired with food (conditioning), followed by the exposition to the CS without any consequence (extinction). Then, they were exposed to the CS alone in a different context from the extinction one (renewal test), so ABA group received the renewal test in context A, AAB group in context B and ABC group in context C. Subjects from AAA or control group received all the experimental phases in the same context. The results showed the recovery of the conditioned response (CR) for each renewal group, but there were not significant differences in the magnitude of the renewal effect among the three paradigms. On the other hand to study memory rehearsal in snails the usual simultaneous paradigm in tentacle lowering procedure was compare to delay and trace conditions. The implications of these findings for the new field of comparative cognition in invertebrates are discussed.

Key words: context specificity, cognition, memory, invertebrates, delay and trace conditioning

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Habituation of the abdominal contraction response in the mealworm pupae (Tenebrio molitor): Contextual dependency and the impact of sex

Rodolfo Bernal-Gamboa¹, Jesús García Salazar¹ and A. Matías Gámez²

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The decrement of responding produced by a repeated stimulation can be defined as habituation. We explored in the present study whether the habituation of abdominal contractions in the pupa of *Tenebrio molitor* is sensitive to contextual changes. Additionally, we examined whether the sex of the pupae has any impact. Both experiments consisted of two phases. During Phase 1, all groups were exposed to a continuous stimulus light in Context A. At the beginning of this phase, pupae showed a high number of abdominal contractions, however, during the last minute of Phase 1, the number of abdominal contractions were lower. In the next phase, the pupae were divided in different groups to test for response recovery. Half of the pupae received the Phase 2 in the original Context A, while for the other half this phase was conducted in Context B. Our results indicated an increase in the abdominal contractions only when subjects were exposed to the light stimulus in Context B (Experiment 1). Furthermore, we found that such increment in the responding was similar in both males and females' pupae (Experiment 2). Methodological and theoretical issues of our findings are discussed.

Keywords: Context, Habituation, Insects, Sex, Tenebrio molitor

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Conditioned Place Avoidance Acquisition and Extinction in the planaria Schmidtea mediterranea

Gonzalo P. Urcelay¹, Liam Jordan³, José A. Alcalá² and Jose Prados³

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The objective of this study was to model the development of avoidance learning and its extinction in planarians (Schmidtea mediterranea). Based on previous experiments showing conditioned place preference, we adapted the procedure to investigate conditioned place avoidance (CPA), using shock as an unconditioned stimulus (US). In Experiment 1, we assessed the unconditioned properties of different shock intensities by measuring post shock suppression. In two subsequent experiments we investigated CPA using different designs, surfaces as conditioned stimuli (CSs; rough, smooth, and silicone), and different US intensities (5 vs 10 V). In all experiments, we observed the successful development of CPA. In addition, we observed that CPA was stronger with higher shock intensities, and that the rough surface is best at entering into an association with the shock. Finally, we also observed extinction of CPA. Overall, these experiments reveal that CPA can be observed in flatworms and validate the planaria as a model for the study of aversively motivated learning in invertebrates.

Keywords: avoidance learning, planarians, conditioned place preference, aversively motivated learning

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The role of the context in invertebrate learning

Concepción Paredes Olay

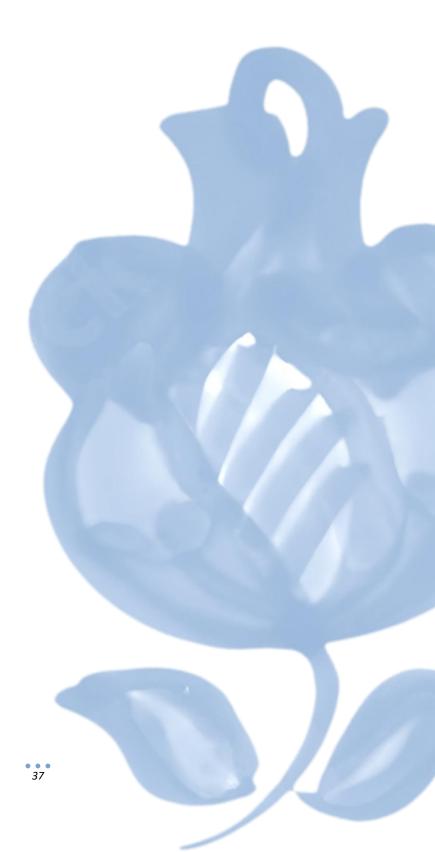
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Research in animal learning has shown that contextual specificity is relevant in some learning phenomena such as habituation, appetitive associative learning, extinction, latent inhibition, renewal, etc. In fact, the role of the context in learning and memory has been widely analysed in associative learning using, above all, rats and pigeons as experimental subjects. These studies focus on two main (though not mutually exclusive and, probably, not the only ones) functions of context: it can either act as a cue (i.e., similar to a conditioned stimulus) or as a memory modulator (that is, as an occasion setter). However, recent studies has revealed that contextual specificity is also present in invertebrate species, and that the way it works is not exactly parallel to that shown in "higher" species. In this talk, I intend to present a general review of the contextual effects observed in distant phylogenetically species and try to get some overall conclusions. Does the context act as a cue, as a memory modulator, or does it comprise a condition for learning?

Keywords: context, contextual specificity, invertebrates, learning

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ORAL COMMUNICATIONS



Oral Communication: Session 1

Wednesday 20th - 15:15 to 16:45

OC-1:

AAB Renewal Appears Regardless of Context-Outcome Associations or Differential Experience of Interference in a VR Spatial Learning Task

Jesús Moreno, José E. Callejas-Aguilera, J. Roberto Jiménez-Pérez, Juan M. Jurado and **Juan M. Rosas**

Universidad de Jaén

Two experiments were conducted with the goal of testing the mechanisms involved in AAB renewal when using a highly immersive virtual reality spatial learning task that resembles in humans the conditions of a Morris water-maze used in rodents. Participants played the role of archeologists searching for a hidden treasure within a circular arena that may be placed in different environmental contexts. The hidden treasure was placed in the quadrant close to beacons 1 and 2 during the acquisition phase, and then in the opposite quadrant during the interference phase. Acquisition and interference took place in context A, and the test was conducted in contexts A and B. The difference between Experiments 1 and 2 was the experience that participants had during acquisition and interference phases in context B (control condition). In Experiment 1, the treasure was hidden in the quadrant placed to the right of beacons 3 and 4, with no changes between phases, with the goal of testing whether participants behavior was regulated by the context, without taking in account the specific identity of the cues. In Experiment 2 participants also received an interference experience with beacons 3 and 4 in context B. AAB renewal was found regardless of the experience received in context B, suggesting that, in this task, participants' behavior depends of processing both, cues and contexts, rather than establishing general rules to solve the task.

Keywords: Spatial Learning, Renewal, Virtual Reality, Human

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OC-2:

Renewal from extinction learning in an insect

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 ⁴ Hokkaido University

Elucidation of basic computational rules underlying Pavlovian conditioning is an important subject. In Pavlovian conditioning, animals associate neutral stimulus (conditioned stimulus: CS) with biologically relevant stimulus (unconditioned stimulus: US). Extinction of Pavlovian conditioning is a basic form of inhibitory learning, where the repeated presentation of the CS results in a decrease of the conditioned response. Extinction has received increased interest for its similarities with exposure therapy, and especially for its relationship to a most important practical problem: the recovery of the response to the CS when the CS is tested outside of the extinction context (i.e., renewal). In insects, to our knowledge, renewal has not been reported. Here we tested extinction and its renewal in an insect. Animals received olfactory appetitive conditioning and repeated presentation of odour CS in a black / white surrounding context. They showed a significantly decreased response to the CS when they were tested in the same context where extinction had occurred. However, when the context was changed, at extinction training or retrieval test, the CR was recovered. In addition, we found some new conditions which induce renewal-like recovery of the CR. Our results suggest that renewal is a common form of learning among taxa and point out the possible practical problem of exposure therapy.

Keywords: learning, memory, extinction, renewal, cricket

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OC-3:

Applying linear mixed models to analyze renewal in choice behavior

Livia Sánchez-Carrasco, Tania Chávez and Salvador Zamora

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Four experiments with rats assessed the effect of the acquisition's reinforcement rate on the renewal effect in a choice procedure. All experiments used a reinforcement schedule that distributed reinforcements probabilistically between two response levers. During the acquisition phase, the percentage of reinforcers delivered by each lever differed between groups. One of the responses was extinguished in the extinction phase, and the other was reinforced under a VI 240 s schedule. Afterward, subjects were exposed to acquisition and extinction contexts in the test sessions while extinction conditions were maintained. The experiments showed higher renewal with higher acquisition reinforcement rates. However, this effect diminished when the reinforcement rate decreased during the last sessions of the acquisition phase. We used linear mixed models to analyze data, and findings are discussed under the most recent relapse theories.

Keywords: linear models, extinction, renewal, choice behavior, reinforcement rate

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OC-4:

Reinstatement as a change in arousal

James Byron Nelson and Maria del Carmen Sanjuan

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Bouton (1993) suggests that reinstatement results from context conditioning occurring during the unsignaled US presentation, effectively making the context different from extinction at test. If that account holds, then reinstatement should be produced even if the reinstating outcome is different from that used in conditioning, and extinction of a context that had been conditioned should also, paradoxically, produce reinstatement. Three online experiments were conducted using a video-game method (Nelson, Navarro, &Sanjuan, 2014) that allows the use of multiple outcomes to test the effects of context conditioning and extinction on reinstatement. Context conditioning with an outcome different from that used in conditioning did produce reinstatement, but extinction of a conditioned context produced weak and inconsistent evidence of reinstatement. Experiment three showed that when arousal produced by the expectation of an unsignalled outcome is held more constant, reinstatement is reduced. Overall the results suggest that reinstatement may be the result of arousal produced by changes in the testing context.

Keywords: Reinstatement, Renewal, Context, Extinction, Humans

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OC-5:

Extinction of a previous acquired response in goal and sign trackers rats

Nora Calle-Villa, Antonio Pérez-Colorado, Manuel Potavella and Juan Carlos López

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Brain maturation allows responses to be modulated based on environmental changes. At the end of adolescence, the prefrontal cortex reaches a stable state of maturity, facilitating executive functions. The inhibition response is one of the most important responses included within these cognitive processes. Thus, we used a stop signal in the sign tracker (ST) and goal tracker (GT) animals. In this procedure, the animals carry out a response in order to get the reinforcement and, in a second phase, unexpectedly, a stop sign appears indicating that they must stop it). This task measured the ability to stop or cancel an already started response to obtain a reward. The results showed a different behavior according to the state of maturation and sex. The adolescent group showed reduced inhibition compared to the adult groups. In addition, the adult group showed gender differences; that is, male GT rats showed reduced inhibition relative to the performance of female GT. Although both groups decreased responses throughout the trials, the ST group required more trials to fail to respond on the stop trials, which was used as an index of response inhibition. These data indicate that prefrontal cortex could be involved differently in response control under autoshaping procedure, supporting the idea that ST animals may show prefrontal imbalances.

Keywords: medial prefrontal cortex, autoshaping, sign tracker, goal tracker

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Funding: This research was funded by AgenciaEstatal de Investigación (AEI) of Spain (grant no.: PID2019-110739GB-I00/AEI/10.13039/ 501100011033

Oral Communication: Session 2

Wednesday 20th - 17:00 to 18:30

OC-6:

Effects of habituation to different light intensities on the head retraction response in earthworm

M. del Mar Carpio-Cruz, Lucía García-Torres, Sara Pérez-Vílchez, David Reyes-Jiménez, Sergio Iglesias-Parro, M. José F. Abad and Concepción Paredes-Olay

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The aim of these experiments was to evaluate the effect of habituation to different light intensities on the head retraction response in two different earthworm species (Lumbricusterrestris and Dendrobaenaveneta; Experiments 1 and 2, respectively). In each experiment, the retraction response of the experimental subjects to different light intensities (700, 2100 and 6300 lux) presented pseudo-randomly, before and after habituation to the two extreme intensities (group 700 and group 6300 lux) was evaluated. The results were conclusive. Habituation was faster in the lower intensity group, group 700, than in the higher intensity group, group 6300. However, in the post-habituation phase, the 6300 group showed reduced responses to all stimulus intensities compared to the 700 group. This supports the idea that, stimulus intensity does indeed influence habituation. Specifically, it suggests that habituation to less intense stimuli occurs more rapidly than habituation to more intense stimuli, but its effect is less long-lasting than when subjects habituate to stimuli of higher intensity. They also confirmed differences in the reactivity to light between the two different earthworm species.

Keywords: habituation, stimulus intensity, invertebrates, learning

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OC-7:

Individual differences in habituation: comparing instruments to predict individuals' readiness to habituate

Paula Nogueiras, Unai Liberal and Gabriel Rodríguez

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Individual differences in the ease of habituation to situations and/or stimuli are not yet fully understood. In this study we relate participants' performance in two habituation tasks to their responses on various scales and cognitive tasks. We found the well-known inverse relationship between anxiety (state and trait) and habituation. But, in addition, we found that two new scales that we designed explicitly to measure neophobia and the degree of ease of habituation to novel situations more accurately predicted the degree of habituation of the participants in our experiments. In addition to discussing the practical advantages of these new scales, the findings of the study are discussed in relation to habituation theories.

Keywords: habituation, individual differences, neophobia; anxiety

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OC-8:

Rapid alternating exposure to similar butterflies enhances later recognition but hinders learning new events about them

Jesús Sánchez, Ana González and Isabel de Brugada

University of Granada

In humans, rapid exposure to similar visual stimuli has been shown to enhance discrimination when presented in alternating fashion compared to block presentation or no preexposure at all. This perceptual learning effect has been attributed to the unitization or better representation of the distinctive features of the stimuli. Alternating exposure habituates the common elements always present while increasing the processing of unique ones, thus improving discrimination. However, while alternating exposure enhances the representation of unique elements of similar stimuli, it also increases latent inhibition, which hinders its association with new events. In our first experiment, we presented human subjects to a game involving the rapid image of very similar fictitious animals, namely pandas and butterflies. Half of them were presented in an intermixed manner, while the other half were presented in blocks. Subsequently, all animals, along with distractor animals of the same species, were presented in a recognition test, and participants were asked to identify the previously exposed ones. Our findings indicate that animals presented in an intermixed manner were recognized more accurately, as evidenced by a higher number of correct responses, compared to those presented in blocks. In the second experiment, we reintroduced participants to butterflies during the preexposure phase, employing both intermixed and blocked presentation formats. This was followed immediately by a conditioning phase, where an egg accompanied one butterfly from each pair, including a new pair that had not been preexposed. Participants were required to learn which butterflies were female and photograph them as quickly as possible, following the egg. Surprisingly, we observed that participants photographed the blocked preexposed butterflies the fastest, while the intermixed preexposed butterflies were photographed the slowest. However, in the final test, where participants were asked to identify the butterflies that were followed by the egg, no significant difference was found between groups. In conclusion, our experiments demonstrate that rapid alternating exposure to similar butterflies enhances their later recognition, consistent with previous research, but this comes at the cost of hindering learning with new events.

Keywords: Perceptual Learning, Intermixed/Blocked Effect, Visual Stimuli, Latent Inhibition, Recognition

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OC-9:

Investigating the Inhibitory Properties of a Latent Inhibitor with the Protection from Extinction Paradigm

Unai Liberal, Paula Nogueiras and Gabriel Rodríguez

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The Hall-Rodriguez theory of latent inhibition suggests that, under specific circumstances, a stimulus given non reinforced exposure can develop an overall inhibitory strength, for instance, when a stimulus (A) is repeatedly presented alongside various new stimuli (An1, An2, An3...). The model assumes that A possesses an initial excitatory value that allows it to activate the expectation that some other event will happen. By repeatedly presenting stimulus A without any consequences, this expectation would be extinguished. But, critically, the presence of the novel stimuli would ensure (because increases the strength of the expectancy that something will occur) that A's acquisition of inhibitory strength during that extinction would exceed its initial excitatory value, thus reaching a net inhibitory value. After testing this prediction in the retardation and summation procedures, and also using a superconditioning design, we now present new experiments with rats in which we exploit the phenomenon of protection from extinction. If the target stimulus A acquires active inhibitory properties, it should attenuate the rate of extinction of another excitatory CS (X) when both are presented in compound during extinction trials (i.e., X+ and then AX-).

Keywords: Latent inhibition, Inhibitory learning, rats

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OC-10:

To learn or to defend, that is the question

Gabriel Rodríguez

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The perception of novelty when interacting with stimuli generates two opposing tendencies that compete for behavioral expression: an exploratory component driven by curiosity about the unknown event and its possible consequences, and a defensive component driven by fear of its possible negative character. Non-reinforced pre-exposure to stimuli allows organisms to acquire information that modifies these components and their balance, generating behavioral changes that are often interpreted as habituation and sensitization of different types of concurrent responses. A theoretical model capable of integrating and explaining the mechanisms responsible for this complex information processing and related behavioral phenomena is discussed.

Keywords: habituation, sensitization, curiosity, neophobia, defensive responses

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Oral Communication: Session 3

Thursday 21st - 9:00 to 10:00

OC-11:

Unveiling the Power of Drug-Induced Classical Conditioning

Luis Gonzalo De la Casa¹, Lucía Cárcel¹, María de los Ángeles Cintado¹, Daniel Santos-Carrasco¹ and Gabriel Gonzalez²

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Both the analysis of previous literature and the experimental data obtained in our laboratory reveal the complexity that characterizes the establishment of associations between a neutral stimulus and the effects of different drugs. In this work, we review the effects of conditioning using haloperidol, morphine, and valproic acid (dopaminergic antagonist, opioid agonist, and GABA agonist, respectively) as unconditioned stimuli. The results indicate that, in some cases, the conditioned response reproduces the effects of the drug, while other times it is opposite to the unconditioned response that the drug produces. After describing some of our experimental results, we analyze their possible implications from a behavioral and psychophysiological perspective, to conclude by reviewing the relationship that classical conditioning may have with the placebo effect.

Keywords: Associative learning; Drugs; Placebo; Neuroscience

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OC-12:

Testing the anxiolityc effect of Valproic Acid on fear conditioning, context-induced neophobia, and responses in elevated plus maze

María Ángeles Cintado¹, Gabriel González ², Daniel Santos-Carrasco¹ and Luis Gonzalo de la Casa¹

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Valproic acid is an anticonvulsant that has been reported as potential anxiolytic drug acting though an increase of GABAergic activity. We conducted two experiments to compare the potential anxiolytic effects of Valproic Acid on fear conditioning, food consumption presented in a novel context, and anxiety manifested in an elevated plus maze. The results showed a reduction in fear conditioning in a drug-free extinction trial when valproic acid was administered 20 minutes before conditioning. Similarly, those animals treated with valproic showed a shorter latency to initiate food intake in a novel context as compared to saline-treated animals. The results were less consistent in the elevated plus maze test, since it only appeared a significant increase of entries into the closed arm for the valproic-treated animals as compared to the saline group. These results, that only partially confirmed our hypotheses, should be complemented with additional experiments exploring the effects of different drug's dose and delays between drug administration and testing.

Keywords: Valproic acid, fear conditioning, neophobia, elevated plus maze

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OC-13:

Effects of chronic methylphenidate consumption on a sustained attention task and its consequences impairing neuronal network using an animal model of impulsivity

Antonio Pérez-Colorado, Reyes Martínez, Fátima Montiel, Luis Miguel Traverso and Estrella Díaz

Animal Behaviour & Neuroscience Lab, Departamento de Psicología Experimental, Universidad de Sevilla

Methylphenidate (MPD) is a psychostimulant that increases dopamine in several areas of the brain. Although it is the most widely used drug for the treatment of attention deficit disorders, its long-term effects on executive functions have rarely been investigated. Recent studies have associated adolescence with brain regions maturation involved in the control of motivation, emotion, and cognition. Specifically, it has been proposed that the development of the prefrontal cortex (PFC) during adolescence underlies the maturation of cognitive functions and the regulation of affective response. Here, we investigated whether the performance of adult rats in a sustained attention task was affected by chronic methylphenidate treatment (21 days) during their pre-adolescence. The effect of chronic consumption of methylphenidate during adolescence on the maturational process of the prefrontal cortex in an animal model of impulsivity was also analyzed. Rats were phenotyped using an autoshaping procedure prior to pharmacological treatment and prior to behavioral tests. MPD was administered at low (2mg/kg) and high (5mg/kg) doses at week 6 (a period temporarily equivalent to human pre-adolescence), and training in operant conditioning boxes at week 14 when the animals are considered adults. Both female and male Wistar rats were used. The task requires our animals to respond to a visual stimulus (light) by pressing a lever ('hit') and hitting the opposite lever when the stimulus was not available ('correct rejection'). Once the subjects reached >75% correct hits and CR criteria, light exposure time was reduced to 500ms, 100ms, and 25ms. After behavioral experiments, we quantified parvalbumin immunoreactive neurons in the PFC in order to analyze whether the chronic MFD administration affected its maturation. We evaluated the expression of parvalbumin-positive cells across prelimbic and infralimbic levels in the prefrontal cortex (PFC). Our results showed that pharmacological treatment affected animals differently depending on phenotype (goal-tracker vs sign tracker).

Keywords: Sustained Attention, Dopamine, Impulsivity, Methylphenidate, Parvalbumin

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OC-14:

Cognitive effects of chronic methylphenidate administration in adolescent rats

Reyes Martínez, Antonio Pérez-Colorado, Adela Batanero-Geraldo, Esperanza Quintero and Estrella Díaz Argandoña

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The purpose of the present study was to investigate the effect of chronic consumption of methylphenidate (the main treatment for hyperactivity disorders) during adolescence on the maturational process of the prefrontal cortex in an animal model of hyperactivity.

Adolescent rats (35d) received methylphenidate treatment for 20 days and were behaviorally evaluated during adulthood (98d). Rats were phenotyped using an autoshaping procedure post pharmacological treatment and prior to behavioral testing. Animals were classifying into three groups: sign trackers, goal trackers and intermediates. Two attentional tests were performed to analyse stimulus filtering and working memory. A Prepulse Inhibition (PPI) test was used to analyse sensory-gating processes of the animals. PPI consisting of the inhibition of the startle reflex that occurs when a prepulse (a weak auditory stimulus) precedes the onset of the pulse (a stronger startle stimulus). After the acclimatization period (5min) the test began with five initial startle stimuli (120 dB) followed by four different trial types presented in a pseudo-random order: Pulse startle trials (120 dB), prepulse only trials (75, 85 or 90 dB), prepulse-pulse trial and no stimulus trials.

To measure working memory we used a delayed-matching-to-place (DMP) Water maze task with three phases. In the first phase, rats received 4 trials per day. The platform is hidden in a novel location on trial 1 of each day and then remains in this place for trials 2–4, on which rats can use rapidly-encoded place memory to reach the escape platform efficiently. In the delay phase, the interval between the first and the second trials was 30 min and in the test phase, the preference zone was measured. Our results showed that methylphenidate differentially affected both tasks depending on the phenotype and sex of the animals. This research underlines the importance of individual variations in the consequences of pharmacological intervention, especially during the adolescent stage, when the brain is still in the process of development.

Keywords: *methylphenidate*, *hyperactivity*, *cognitive correlates*

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Funding: This research was supported by PID2019-110739GB-I00 (Ministerio de Ciencia, Innovación y Universidades, FEDER, UE)

Oral Communication: Session 4

Thursday 21st - 15:00 to 16:15

OC-15:

A systematic review of occasional reinforced extinction as a method for relapse prevention

María J. Quintero^{1,2}, Francisco J. López ^{1,2}, Miguel A. Vadillo³ and Joaquín Morís ^{1,2}

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Introduction

Fear extinction is more vulnerable than the original fear memory, as relapse phenomena have systematically shown in the literature with different species and procedures. One strategy potentially useful to mitigate relapse is the occasional reinforced extinction (ORE) treatment. In contrast to a standard procedure, this strategy consists of the inclusion of a gradual and sparse number of CS-US pairings within the extinction treatment.

Method

Here, we provide a comprehensive review of the available literature on ORE. We conducted the search using three databases (Web of Science, Scopus, and PsycInfo) in July 2022, with an additional citation search. We collected data on different variables of interest, like the relapse phenomena being studied, the outcome measures, or the specific effects obtained.

Results

A total of 350 studies were identified from the main database search, including 16 in the review. Seventeen additional studies from the citation search were also included. The final sample of 33 reports consisted of 15 empirical and 18 theoretical articles. The observed methodological variability makes it difficult to draw a robust conclusion of the effectiveness of ORE to reduce different forms of relapse as the strategy has not consistently proved a general advantage over standard extinction.

Conclusion

The current evidence assessing the effectiveness of ORE does not appear to be consistent, although there are plenty theoretical studies recommending and discussing the potential effectiveness of such technique. Moreover, the lack of clear laboratory evidence seriously call into question how general the potential benefits of its use in clinical settings would be.

Keywords: conditioning, extinction, relapse, occasional reinforced extinction

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OC-16:

An effective procedure for the induction of physiological and psychological acute stress in human participants

Daniel Santos-Carrasco ¹, María de los Ángeles Cintado ¹, Gabriel González ² and Luis Gonzalo De la Casa ¹

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Despite the existence of multiple validated stress induction protocols in non-human animals, the evidence for humans is more limited. In the present study, the Maastricht Acute Stress Test (MAST) protocol was adapted and validated for the induction of acute stress in human participants. The procedure consists of combined psychological stress trials, with a difficult and uncontrollable arithmetic task, and physiological stress trials, involving the introduction of the hand into ice water (4-6°C). We present the results of the procedure's application to a sample of 36 participants (26 women and 10 men) who were randomly assigned to the Stress Group or a Control Group, in which a non-stressful task of similar characteristics to the MAST was used. The participants in the Control Group had a similar age (M=26.72, SD=5.54) to those in the Stress Group (M=25.22, SD=4.02). Psychological (STAI-S and PANAS) and physiological measures (diastolic and systolic blood pressure and heart rate) were collected before and after the application of the MAST. The results showed significant changes in both psychological (higher subjective anxiety-state and negative affect for experimental group in post-induction) and physiological measures (higher diastolic and systolic blood pressure for experimental group in post-induction), with the exception of heart rate, indicative of effectivity of the protocol to produce stress in the experimental group as compared to the control. These results confirm the suitability of the MAST procedure for inducing stress in experiments with human participants, and its validation for the Spanish population.

Keywords: Acute stress; Affect; Anxiety; Blood Pressure

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Cognitive inflexibility in patients with chronic fronto-striatal stroke

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Stroke is the second main cause of cognitive impairment and the third leading cause of death and disability worldwide. A dysexecutive functioning in frontal stroke patients is often associated with stroke cognitive impairments. However, cognitive affections in stroke literature are still limited in comparison to motor impairments. Therefore, the present study shows a neurobehavioural evaluation of functional connectivity and executive functioning in frontostriatal patients, specifically in cognitive flexibility and inhibition, which are key dimensions for daily life functioning. We counted with n=32 patients who had suffered from fronto-striatal stroke in chronic phase, from the Universitary Hospital Torrecárdenas (Almería, Spain) and n= 22 healthy controls. We measured cognitive flexibility and motor inhibition, with the probabilistic reversal learning task (PRLT) and the stop-signal task (SST) respectively. We also registered the functional connectivity in resting-state (rs-FC) with the Functional Near-Infrared Spectroscopy (fNIRS) (16x16) between left and right orbitofrontal, dorsolateral, and parietal posterior cortex. We found that frontostriatal stroke patients performed significantly worse in cognitive flexibility than the control group. Specifically, we also found differences in the win-stay variable. No differences were found in the SST. The stroke group also showed lower rsFC between lOFC-lpPC and lOFC-rpPC. Hence, there are difficulties in cognitive flexibility in frontostriatal stroke patients that need to be considered in future evaluations and interventions. In order to ensure a more accurate and focused treatment on the needs of these patients, further research is needed to investigate cognitive alterations in individuals affected by fronto-striatal stroke.

Keywords: Frontostriatal stroke, executive functions, cognitive flexibility, motor inhibition, functional connectivity

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Funding: The present study is part of the R&D and Innovation project PID2019-108423RB-I00, funded by the Spanish Ministry of Science and Innovation "ProyectosI+D+i: Generación de Conocimiento" and R&D and Innovation project P20_00308, funded by Junta de Andalucía "ProyectosI+D+i: Retos de la Sociedad Andaluza".

OC-18:

Inhibitory control in Giraffes

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Introduction

The ability to inhibit impulsive behaviour, or to show behavioural flexibility, provides crucial fitness benefits for survival. Inhibition has been studied in many animal species (including primates, dogs, chickens and rats), but we barely know anything about ungulates on this ability. In this study, we therefore investigated inhibitory control in giraffes (Giraffa camelopardalis) using three tasks: the A-not-B task, a Delay of Gratification task, and a Cylinder task. In these three tasks, giraffes should inhibit a prepotent response or postpone a reward to increase their food intake.

Methods

In the A-not-B task giraffes learned that one of three cups contained the reward for two trials, whereas in the test trial the position of the reward changed to the opposite cup. In the Delay of Gratification task, giraffes could get two pieces of reward immediately or wait an increasing amount of time for six pieces of reward. In the Cylinder task, giraffes were presented with a transparent cylinder with a reward inside and had to inhibit the prepotent response of trying to directly reach for food, by instead taking a detour through a lateral hole to get the reward.

Results

Across tasks, giraffes were successful at inhibition prepotent behaviour and maximize food intake, often showing a performance comparable to primate species. Giraffes also showed important inter-individual and inter-task variation in their performance, suggesting that these tasks might require slightly different forms of inhibition in this species.

Discussion

Giraffes showed good inhibitory skills when compared with other animal species in similar tasks, including dogs and primates. These results keep in line with previous research showing that ungulates might have better cognitive abilities than previously thought.

Keywords: Inhibition, behavioural flexibility, self-control, A-not-B

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Oral Communication: Session 5

Thursday 21st - 16:15 to 17:30

OC-19:

Differential effect of extinction of different response alternatives as a function of their location in the inter-reinforcement interval

Fernando Molines and Ricardo Pellon

UNED

The present study assessed the effects of selectively extinguishing responses that occur at different moments of the inter-reinforcement interval in other responses of the sequence; under the premise that Baum (2012) and Killeen and Pellón (2013) theories make different predictions, with the molar induction theory claiming just increases in the other response alternatives due to a relaxation of competition and the competitive traces theory specifying different effects (increases or decreases) depending on where the extinguished response fits within the interreinforcement interval in relation to the other response being tested. Rats (n=23) were exposed to a fixed time 30 s food delivery schedule for 30 sessions with water available; during the first 15 seconds of each trial, a light was present above the water sprout, signaling the availability of water contingent on a lick. In the last 15 seconds of each trial, a light was present above the feeder and water was unavailable. Afterwards, subjects were exposed to three "extinction" sessions with no food delivered, in which they could either drink or enter the magazine but not both, with each respective signal present. Lastly, the effects of the previous procedure in the other response alternative were tested and compared with a group that did not receive extinction. No differences in the rate of drinking were observed after magazine entries were extinguished, although differences in the drinking pattern across the session were evident. Differences were found in the rate of magazine entries between groups that received and did not receive extinction of drinking, the extinction group having higher rate of magazine entries. The later results were consistent with both theories, the former was not.

Keywords: Schedule-induced behavior, fixed time food schedule, extinction, rats

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OC-20:

Sex and age differences in mice models of effort-based decisionmaking: studies of dopamine depletion and the CDNF

Paula Matas-Navarro¹, Carla Carratalá-Ros¹, Régulo Olivares-García¹, Andrea Martínez-Verdú¹, John Salamone² and Mercè Correa¹

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Mesolimbic dopamine (DA) regulates vigor in motivated behavior. These results have been obtained mainly in male rodents. Thus, we compared CD1 male and female mice in effort-based decision-making tests of motivation. These tests offer choices between several reinforcers that require different levels of effort (PROG/choice task and 3-choice-T-maze task). Sweet reinforcers were used in both tasks. In the operant tasks, females worked harder as the task required more effort to access a 10% sucrose solution. Although males and females do not differ in preference for 10% vs 3% solutions under free concurrent presentation, females consume more 10% solutions. The operant task requires a long period of training and changes in the DA system due to age can be mediating this progression in effort. Thus, age and sex factors were evaluated in the T-maze; a short-training requiring task. Both sexes and ages were equally active when habituated to the RW, but females consumed more sweet pellets than males, especially at an older age. Both sexes had a strong preference for the RW compared to more sedentary reinforcers in the 3choice-T-maze test, but older animals spent less time running and ate more than the young ones showing an anergic pattern. DA depletion reduced time running in older mice but not in adolescents. The cerebral-dopamine-neurotrophic-factor (CDNF) was reduced in older mice of both sexes compared to adolescent mice. These results remark the importance of taking into account differences in sex and age when evaluating willingness to exert effort for specific reinforcers.

Keywords: sex age, effort, vigor, dopamine, neurotrophic factors, operant, running wheel, mice

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OC-21:

Dopamine markers and behavioral correlates of individual differences in effort-based decision making in rats

Andrea Martínez-Verdú ¹; Régulo Olivares-García ¹; Paula Matas-Navarro ¹; Carla Carratalá-Ros ¹, Noemí SanMiguel², John D. Salamone³ and Mercè Correa ¹

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Nucleus Accumbens (NAcb) dopamine (DA), plays an important role in effort-related decisionmaking processes and behavioral activation. Previous results have shown that individual differences in selection of high effort activities for food are related to DA activity markers in NAcb, such as phosphorylation of pDARPP32-Thr34. In this study we assessed in Sprague Dawley male rats what are the behavioral correlates of individual differences in effort-based decision-making evaluated in operant boxes, where the non-water deprived animals can work on a progressive ratio task (PROG) to achieve a high concentration of sucrose (5%) or approach and consume a less preferred (0.3%) solution that is freely accessible at the same time. Prior and post to the operant task, the animals were evaluated on a voluntary activity wheel (RW), their spontaneous preference (without effort) for sucrose (0.3% vs 5%) and novel exploration of an Open Field (OF). We also assessed individual differences in markers of DA activity in the NAcb such as the Cerebral Dopamine Neurotrophic Factor (CDNF) and its relation to effort expenditure. Using the two extreme quartiles in PROG performance, animals were divided into three groups of responders: high-responders (HR), intermediate (IR) and low-responders (LR). Lever pressing was significantly different for these three groups, and their performance in the PROG/choice task was correlated with responses in the PROG under no free choice conditions. Thus, low performers are also low when there was no free option. Although the three groups were not different in the amount of free 0.3% sucrose consumed, there was a significant negative correlation between lever pressing in the choice condition and free sucrose consumed. In addition, preference for the highest concentration of sucrose under free conditions or vigorously running was not correlated with number of lever presses before and after operant evaluation. However, rearing in the OF evaluated before the operant task showed a significant positive correlation with lever pressing. CDNF immunoreactivity in NAcb seemed to be related to these individual differences, with number of positive cells higher in HR. Identifying behavioral and neural correlates of individual differences in effort-based decision making can help to understand the underlying factors of vulnerability for symptoms such as anergia, which are important in some psychological and neurological pathologies.

Keywords: Dopamine, Nucleus Accumbens, individual differences, CDNF

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OC-22:

Differences in cerebral dopamine neurotrophic factor (CDNF) in nucleus accumbens of male and female rodents after dopamine depletion

Carla Carratalá-Ros¹, Paula Matas-Navarro¹, Andrea Martínez-Verdú¹, Régulo Olivares-García¹, Edgar Arias-Sandoval¹, John D. Salamone² and Mercè Correa¹,²

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Nucleus Accumbens (Nacb) dopamine (DA) regulates behavioral activation and effort-related decision-making in motivated behavior, and DA depletion has been shown to induce anergia and fatigue in effort-based decision tasks in humans and animals. The Cerebral Dopamine Neurotrophic Factor (CDNF) supports the survival and function of dopaminergic terminals, and it is used to restore midbrain dopaminergic neurons in animal models of Parkinson's disease. However, little is known about the role of CDNF in Nacb and if this neurotrophic factor can be affected by drugs that modulates DA transmission. In the present work we characterized the neuroanatomic distribution of CDNF in Nacb under baseline conditions. In addition, we studied changes in the immunoreactivity of CDNF due to the administration of the DA depleting agent Tetrabenazine (TBZ; 0, 8 or 10 mg/kg) in mice and rats of both sexes. CDNF immunoreactivity has been observed in the postsynaptic but not in the presynaptic neurons of the Nacb. Baseline CDNF immunoreactivity does not differ between sexes in both types of rodents. CDNF immunoreactivity in male rodents changes after TBZ administration, but female rodents seem less affected by these doses of TBZ. Further research is needed but these preliminary results indicate that CDNF could be involved in the function of postsynaptic Nacb neurons, and could be implicated in the regulation of vigorous and sustained behavioral activation.

Keywords: Dopamine, Nucleus Accumbens, CDNF, rodent, sex

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Oral Communication: Session 6

Friday 22nd - 9:00 to 10:00

OC-23:

Time-based behavioral interventions at early ages to reduce impulsive choice

Gloria Ochoa-Zendejas¹, Cristiano Valerio dos Santos² and Jonathan Buriticá¹

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Impulsivity is a multidimensional and complex construct involved in many disorders and maladaptive behaviors. There is evidence to suggest that the inability to delay gratification, possibly due to temporal processing deficiencies, plays an important role in impulsivity. Impulsive choice behavior has been defined as choosing a smaller reward available sooner rather than a larger reward available later when the larger reward is objectively more optimal in terms of reward-earning potential. The purpose of this study was to evaluate the effects of two timebased behavioral interventions in rats at early ages, while testing for impulsive choice as adults. 24 male and 24 female Wistar rats were divided into four groups. In early ages, the rats had free access to food, but were water-deprived for 14 h a day. Twelve conditioning chambers were used. Half of the subjects (n=24) were exposed to a DRL10s schedule and the rest to a VI-10s schedule in early ages (25-40 PND) with formula milk as reinforcement. During adulthood (90-PND) the rats were exposed to a delay discounting task where they were food deprived and maintained at 85% of their weight ad libitum. 45 mg pellets were given as reinforcement. In general, both groups showed a reduction in impulsive choices that is consistent with other studies. In addition, differences were found between sexes and interventions. Preliminary results indicate that early interventions in time-based behavioral interventions may have an effect on impulsive choice as adults.

Keywords: Impulsive choice, Timing, Delay discounting, Early ages, Rats

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OC-24:

Dimensional analysis of cognitive flexibility in impulsive-compulsive disorders

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The prevalence of mental health disorders is on the rise, in contrast to the low response to treatment and poor quality of life of patients. This is due to the limitations of categorical systems: arbitrary cut-off points, clinical heterogeneity, or comorbidity. Obsessive-Compulsive Disorder (OCD) and Attention-Deficit/Hyperactivity Disorder (ADHD) are two mental health disorders that have in common a deficit in executive functions, whose neuroanatomical basis is the prefrontal cortex. Theses populations are characterised by use of rigid strategies, perseveration errors and non-adaptive responses. Thus, this study aimed to identify dimensional profiles of cognitive flexibility in adults aged 18 to 55 years and to explore the role of frontoparietal cortex resting-state functional connectivity (rsFC) as a possible biomarker of different cognitive flexibility patterns. One hundred and forty-nine adults (43 OCD, 53 ADHD and 53 healthy controls) participated in this study. We use the neurobehavioural task Probabilistic Reversal Learning (PRLT) to measure cognitive flexibility and Functional Near-Infrared Spectroscopy (fNIRS) (16x16) to record rsFC of the orbitofrontal, dorsolateral and posterior parietal cortex. We adopted a dimensional approach by performing cluster analyses to identify behavioural profiles based on the performance on the PRLT. Results suggest different profiles around the selected variables: cumulative feedback rate, win-stay, lose-shift, learning rate and hit percentage estimated by Bayesian generalized logistic model. This study might help to understand how these variables contribute to the clinical features of these disorders.

Keywords: impulsive-compulsive disorders, neuropsychological assessment

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Funding: The present study is part of the R&D and Innovation project PID2019-108423RB-I00, funded by the Spanish Ministry of Science and Innovation "ProyectosI+D+i: Generación de Conocimiento" and R&D and Innovation project P20_00308, funded by Junta de Andalucía "ProyectosI+D+i: Retos de la Sociedad Andaluza".

OC-25:

Testing the Negative Conditioned Magazine Approach paradigm as an animal impulsivity procedure

Luis E. Gómez Sancho and Gonzalo de la Casa Rivas

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In the Conditioned Magazine Approach (CMA) paradigm, rats acquire an association between a conditioned stimulus (CS) and food delivery (US). As a result of this association, they frequently make anticipatory magazine entries (CR). Generally, this CR is acquired even when it is negatively punished (CMA- procedure) (Harris et al., 2013). However, significant individual differences are observed in CMA- regarding the subjects' ability to inhibit the final link of the CR, which affects their acquisition of more or fewer reinforcers. These differences may be indicative of varying levels of impulsivity among the subjects. In a two-phase experiment with rats (N=36), we explored within-subject covariations using different measures of impulsivity. In phase 1, all subjects were trained using a CMA- procedure. In phase 2, subjects were trained using two standard animal impulsivity procedures: half with a Differential Reinforcement of Low rate schedule (DRL) and half with a delayed reinforcement choice schedule. Following the strategy of Tomie et al. (1998) the animals were "phenotyped" based on their responses in the two reinforcement schedules at the end of phase 2: high-rate subjects versus low-rate subjects in the DRL program, and subjects more sensitive versus less sensitive to the delay in the choice program. Differences in choice, but not in the DRL, partially predict sensitivity to the omission contingency in CMA-. The results are discussed in relation to conceptualizations of impulsivity as the manifestation of a unitary congenital trait versus impulsivity as the result of diverse traits.

Keywords: Conditioned Magazine Approach, Omission Contingency, DRL Schedule, Delayed Reinforcement Schedule, Impulsivity

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OC-26:

Exploring the implication of vulnerability to compulsive alcohol drinking in the development of pathological gambling and social dominance

Manuela Olmedo-Córdoba, Ángeles Prados-Pardo, Elena Martín-González and Margarita Moreno-Montoya

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Compulsivity refers to the inability to cease an ongoing behavior that has become unsuitable for the given circumstances. Clinical research indicates that obsessive-compulsive symptomatology is related to alcohol consumption leading to a pattern of compulsive alcohol drinking. Thus, compulsivity may be a vulnerability factor contributing to loss of control and alcohol abuse. The aim of the current study was to delineate the susceptibility of compulsive alcohol drinking as a determinant for the development of pathological gambling and social violence. To accomplish this, male Wistar rats were selected as high (HD), or low (LD) drinkers based on rate of drinking behavior on Schedule-Induced Polydipsia (SIP). Subsequently, the rats were exposed to SIP with alcohol, and diverse groups were formed based on their levels of water and alcohol intake during SIP. Blood samples were collected during the last day of SIP-alcohol to analyze alcohol concentration using the Analox AM1. Following group formation, a series of behavioral tasks were conducted, including the probabilistic spatial reversal learning task (evaluating cognitive flexibility), the rodent gambling task (assessing decision-making), the dominance tube test (measuring social dominance), and Crawley's sociability test (examining social interaction). The outcomes will be discussed in terms of identifying behavioral characteristics such as cognitive inflexibility, risky decision-making, and social dominance and interaction within a susceptible vulnerable population to alcohol drinking. In conclusion, the assessment of this factor underscores compulsivity as a transdiagnostic attribute that is present in the vulnerability to the development of alcohol use disorder.

Keywords: Compulsivity; Schedule-Induced Polydipsia; Alcohol drinking; Decision-making; Social dominance

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Funding: This research was funded by Gobierno de España MCIN/ AEI /10.13039/501100011033/ grantnumber PGC2018- 099117-B-C21, UAL2020-CTSD2068 with FEDER I+D+i funds "Una manera de hacer Europa", and PND-20221024 Plan Nacional sobre Drogas, Ministerio de Sanidad, Gobierno de España

Oral Communication: Session 7

Friday $22^{nd} - 15:00$ to 16:30

OC-27:

Starlings in the midsession reversal task: A test of the timing hypothesis

Armando Machado and Marco Vasconcelos

University of Aveiro

In the Mid-Session Reversal task (MSR), an animal chooses repeatedly between two options, S1 and S2 (e.g., a red key and a green key). Choices of S1 are rewarded from trials 1 to 40, and choices of S2 are rewarded from trials 41 to 80; a fixed-duration Inter Trial Interval (ITI) separates consecutive trials. With pigeons, the psychometric function relating S1 choice proportion to trial number starts close to 1 and ends close to 0, with indifference (Point of Subjective Equality) around trial 40. Pigeons make anticipatory errors, choosing S2 before trial 41, and perseverative errors, choosing S1 after trial 40. These errors suggest that they use time-into-the-session as the cue to reverse their preference from S1 to S2. The errors express the uncertainty in timeestimation. We tested the timing hypothesis with 10 Spotless starlings. After learning the MSR task with a either a 5-s or a 10-s ITI, the starlings were exposed to ITIs twice as long or twice as short (i.e., 10-s or 5-s) during testing. If the starlings were timing the reversal moment, then doubling the ITI should shift their psychometric function to the left and halve its PSE, whereas halving the ITI should shift their function to the right and double its PSE. When the starlings received one pellet per reward, the ITI manipulation was effective: The psychometric functions shifted in the direction and by the amount predicted by the timing hypothesis. However, nontemporal cues also influenced choice. We compare these results with the results obtained with other animal species.

Keywords: MidSession Reversal task, Timing, Serial Learning, Starlings

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OC-28:

Giving Time a Chance in the MidSession Reversal Task

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The MidSession Reversal Task involves a simultaneous discrimination between stimuli S1 and S2. Choice of S1 but not S2 is reinforced during the first 40 trials, and choice of S2 but not S1 is reinforced during the last 40 trials. Trials are separated by a constant inter-trial interval (ITI). Pigeons learn the task seemingly by timing the moment of the reversal trial. Hence, most of their errors occur around trial 40 (S2 choices before trial 41 and S1 choices after trial 40). It has been found that when the ITI is doubled on a test session, the reversal trial is halved, a result consistent with timing. However, inconsistent with timing, halving the ITI on a test session did not double the reversal trial. The asymmetry of ITI effects could be due to the intrusion of novel cues during testing, cues that preempt the timing cue. To test this hypothesis, we ran two types of tests after the regular training in the MidSession Reversal Task, one with S1 and S2 choices always reinforced, and another with S1 always reinforced but S2 reinforced only after 20 trials when the ITI doubled or 40 trials when the ITI halved. For most pigeons, performance was consistent with timing both when the ITI doubled and when it was halved.

Keywords: timing, reinforcement contingencies, midsession reversal task, pigeon

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OC-29:

Discrimination Reversal on a Delay Discounting Task

Carlos F. Aparicio, Juliana Johnston and Jake Hebert

Salem State University

Delay discounting is the process by which the value (efficacy) of the reinforcer decreases with the increasing delay to obtain it. It develops when organisms choose between a smaller-sooner reinforcer (SSR) and a larger-later reinforcer (LLR), choosing the SSR more often than the LLR indicates impulsive choice and choosing the LLR over the SSR suggests self-controlled choice. The hyperbolic-decay model fits delay discounting data well estimating the discounting rate (k) and sensitivity to the magnitude of the LLR (A), both increasing with the organism's experience on the impulsive task suggesting a gradual discrimination between two options, one associated with the SSR and the other with the LLR. If these contingencies change such that after training the LLR now is associated with the opposite alternative, then the organism will need to re-learn the discrimination between alternatives. I analyzed this possibility with Lewis rats responding to concurrent-chains procedures. Rats pressed the left lever to get the SSR and the right lever to get the LLR and the right lever to get the SSR. Estimates of K and A indicated that rats needed ninety sessions to re-learn the discrimination between two response alternatives associated to the SSR and LLR.

Keywords: *Delay discounting, choice, discrimination, Lewis, rats*

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OC-30:

Subjective relief and the avoidance of aversive stimuli: a Bayesian approach using Reinforcement learning

Antonio González-Rodríguez¹ and Bram Vervliet²

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Introduction:

Prediction errors have been proposed to be closely related with learning. However, literature exploring this issue apart from purely theoretical perspectives is scarce. Omissions of aversive events have been shown to trigger a feeling of relief that scales with surprise. In the present research we explore whether subjective reports of relief and aversiveness may be related to the prediction error defined by Rescorla-Wagner learning model. Besides, we test the effect that these subjective reports, the parameters estimated in the learning model, personality variables, and Skin Conductance Respones (SCRs) may exert over the performance of our participants.

Methods:

83 participants completed a probabilistic reversal learning task. In each trial, they had to press the left or the right arrow of their keyboard. Their goal was to avoid an electric shock delivered to the wrist, which was uncomfortable, but not painful. Depending on the outcome received, participants rated shock unpleasantness or relief pleasantness. Across blocks, the probabilities associated to each choice for delivering an electric shock were modified. During all the task, SCRs were also registered. Participants also completed a set of personality questionnaires, concretely the State-Trait Anxiety Inventory, the Intolerance of Uncertainty Scale, the Distress Tolerance Scale, and the Schizotypal Personality Questionnaire. A Reinforcement Learning model was performed in order to compute the trial-by-trial prediction errors of our participants and Bayesian General and Generalized Linear Models were carried out to statistically test our hypotheses.

Results:

Prediction errors were a credible predictor for the subjectively reported relief after the shock was avoided. Performance was negatively predicted by the learning rate for punishments and positively predicted by the learning rate for rewards. Finally, reported aversiveness and SCRs when omissions occurred after picking the disadvantageous choice showed a positive relationship with performance.

Conclusions:

Results suggest that subjective relief ratings may be used as a proxy to prediction error processing in the context of threat omissions. Future researches may study whether this subjective index may predict overall learning in different contexts, such as exposure therapy. Expectancy updating and emotional responses towards disadvantageous choices seem to be at the basis for optimal performance in avoidance learning.

Keywords: learning, avoidance, reversal learning, reinforcement learning, Bayesian analyses

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OC-31:

Trial order in human learning – evidence for a primacy effect

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Cardiff University

Associative learning models reflect statistical relationships between experienced events. Moreover, at least once learning has reached asymptote, they typically make predictions that are insensitive to trial order and/or frequency. This neglects the fact that the frequency with which events occur does influence behaviour over and above the probability of reward (e.g., Estes, 1976). A recent investigation of such frequency effects exposed human participants to multiple cues, one (A) reinforced 65% of the time and another (C) 75% of the time, but the cue with lower reward probability was presented twice as frequently during training. When offered a choice between these cues participants predominantly chose the cue that had been presented more frequently in training, despite its lower reward probability (Don et al., 2019). In addition, traditional "delta-rule" learning models were unable to account for this result, while a "decayrule" model could. The success of the decay model in fitting the effects of manipulating trial frequency implies that the effects of trial frequency should be largely determined by trials experienced at the end of training (i.e., a recency effect). We tested this prediction by exposing human participants to multiple cues, some (A/E) reinforced 65% of the time and others (C/G) 75% of the time. In addition, cues A and G were presented twice as often in the first half of training than cues C and E; with the reverse true of the second half of training. If recent trials primarily determine responding, then participants would be expected to choseC over A (C being experienced more frequently at the end of training than A), but E over G (E being experienced more frequently at the end of training than G). The opposite result was observed, participants chose A over C more than E over G – that is, a primacy effect was observed not a recency effect. This result reinforces the often-neglected idea that trial order and/or frequency have important influences on learning beyond those of reward probability, but it challenges recent modelling perspectives that predict that trial order and frequency effects should be largely based on recency.

Keywords: Primacy and recency effects, Error-correction, Human learning

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Oral Communication: Session 8

Friday 22nd - 16:30 to 18:00

OC-32:

Uncertainty increases generalization of human predictive learning

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In this study, we wanted to assess generalization gradients as a function of outcome probability in human predictive learning. Participants (N=180) were recruited through Prolific and experienced differential conditioning of two Gabor patches (90° and 0°, counterbalanced) with a fictitious outcome (i.e., shock). The 3 groups differed during training in terms of the probability that the CS+ was followed by the outcome (100%, 50%, 25% of CS+ trials). Following 12 training trials with each CS (3 blocks), all participants were tested with the trained stimuli (90° and 0°) and generalization stimuli (GS) at intermediate values (15°, 30°, 45°, 60°, 75°, 105°, 120°, 135°, 150°, 165°). During training, participants in Group 100% learned the discrimination between CS+ and CS- better than Group 50%, which in turn learned it better than Group 25%. The results during training thus scale with the different probabilities that were scheduled for each group. During test, shock expectancy judgements for GS 75° and 105° (close to the CS+) also scaled with training probabilities, in that Group 100% expected the outcome more than Group 50%, and the latter expected it more than Group 25%. However, shock expectancy for GS close to the CS- (GS 15° and 165°) revealed more responding in Group 25% than in Group 100%. In other words, generalization increased with lower probabilities of reinforcement, a finding that challenges standard associative theories of learning. Further analyses revealed that the unsigned prediction error during the last block (3) of training correlated with generalization at test. In order to investigate this further, in Experiment 2 three groups were used (N=170). During training, two groups received 4 blocks with consistent 100% or 25% probability of reinforcement, whereas a third group received 3 blocks with 100% and a 4th block with 25% reinforcement. The Groups that received consistent reinforcement (100% and 25%) replicated Experiment 1. At issue was whether one block with 25% reinforcement (in Group 100%-25%) was enough to broaden generalization, a finding that was confirmed. Overall, these results suggest that the amount of unsigned error experienced during training determines generalization at test.

Keywords: uncertainty, generalization, prediction error, predictive learning

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OC-33:

The role of prediction in social categorization

José A. Alcalá¹, Nadia Loulidi¹, Rocio Calviño¹, Tamara Giménez-Fernández², Miguel A. Vadillo² and José A. Hinojosa¹

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In social interactions, individuals often categorize others as belonging to their own social group or as members of an outgroup. The Other Race Categorization Advantage (ORCA) refers to the phenomenon in which faces from other races (outgroup) are categorized faster than faces from the same race (ingroup). We explored the effect of social categorization by manipulating the predictability of the category of a face. In two experiments, we asked participants to categorize racial ingroup and outgroup faces. In the first experiment (n = 70), a predictive cue indicated the subsequent group membership. Three predictive cues were employed: unpredictable (ingroup and outgroup faces appeared with equal likelihood), ingroup predictive (ingroup faces were more likely), and outgroup predictive (outgroup faces were more likely). In the second experiment (n = 70), participants were required to explicitly predict group membership before the face appeared. Results from both experiments revealed faster reaction times for categorizing outgroup faces in the unpredictable condition, replicating the ORCA effect. Moreover, when the outgroup was predictive, reaction times for categorizing the outgroup were reduced, enhancing the ORCA effect. Critically, in the case of ingroup predictability, the first experiment did not observe differences between ingroup and outgroup faces. However, in the second experiment, there was an advantage in categorizing the ingroup compared to the outgroup, reversing the ORCA effect. These findings suggest that explicit predictions modified the categorical processing of ingroup faces. The results are discussed in terms of the interaction between prediction, perceptual processes, and social categorization.

Keywords: Social Categorization, prediction

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Prediction error produced by extinction attenuates overshadowing: An eye-tracking study

Roberto Jiménez, Alejandra Vázquez and Javier Vila

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A prediction error occurs when a discrepancy exists between an expected and actual outcome (Torrents-Rodas, 2020). Experiencing extinction produces context dependency and attenuation of overshadowing, which suggest that prediction error is related to attention redistribution. Behavioral measures of attention, such as responses to specific elements of a compound stimulus (Reynolds, 1961), have been previously proposed. However, eye tracking can add another measure of the effect of extinction on attention and insight into how attention changes when extinction occurs. The present experiment aimed to study the effects of prediction error produced by extinction on overshadowing while recording responses and gaze behavior. Thirty-two participants were randomly assigned to two groups and trained to respond to a Sample Stimulus (SS): Y in a matching-to-sample task during the first phase. In the second phase, one group experienced the extinction of SS: Y, while the other group did not. Both groups were trained to respond to compound SS: AX during this phase. The test phase presented elements A and X separated. Results showed overshadowing when the extinction of SS: Y was not experienced, where element X received fewer responses, dwell time, and eye fixations than element A. However, when the extinction of SS: Y was experienced, both elements received similar responses, dwell time, and eye fixations showing an overshadowing attenuation. These results suggest that extinction produces an attentional change to X. This effect appears to be related to a rise in prediction error during extinction that produces a change in the distribution of attentional resources to SS: AX.

Keywords: prediction error, overshadowing, extinction, attention, eye-tracking

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Satiety modulates attentional capture of food images but not food brand logos

Irene Ruiz, Ana González and Isabel de Brugada

University of Granada

In our environment we are exposed to cues such as images and smells that remind us of the great availability of highly caloric and palatable foods. These cues, through associative learning, can predict the presence of food as a rewarding stimulus and motivate eating behavior, leading to excessive food consumption even in a satiety state. Several studies have investigated how food has a great capacity for capture attention and how this effect can be transfer to arbitrary stimuli that had been artificially paired with food in the laboratory. The present research had two objectives: examine whether this attentional capture is also present in food cues that are naturally present in our environment, such as logos and food brands (Experiment 1) and investigate if this attentional effect to food logos is independent of the satiety state (Experiment 2). To test our hypothesis, in both experiments we used an odd-one-out task to measure attentional bias with pictures of food and neutral objects (task 1) and pictures of food-related logos and neutral logos (task 2) as distractor stimuli. A satiety devaluation procedure consisting of ad libitum food intake was conducted before the attentional task in Experiment 2. As we expected, in Experiment 1, we replicated the effect of attentional capture to food images and observed the same attentional effect to food logos. In Experiment 2, attentional capture to food images disappeared after the satiation procedure whereas attentional capture to food logos was not modulated. This study will allow us to better understand how environmental stimuli influence our attention and food consumption.

Keywords: Attentional capture, associative learning, Pavlovian conditioning, food cues, environmental cues

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OC-36:

Episodic or episodic-like? Why we should care about the definition of episodic memory

Christopher R. Madan

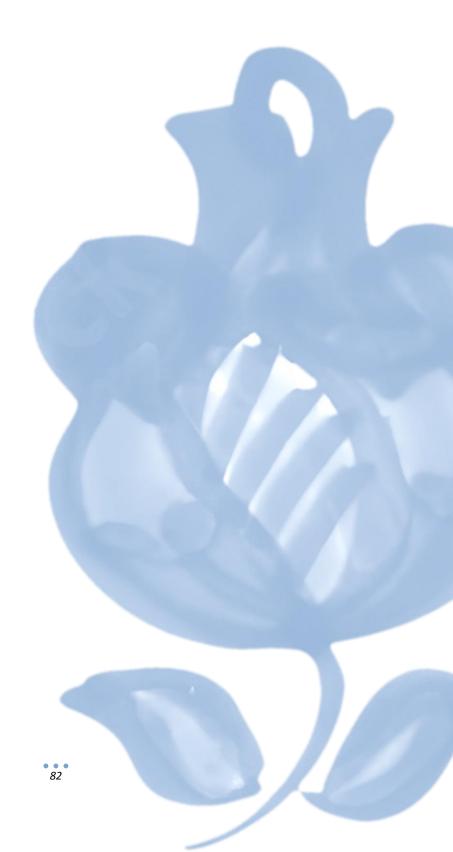
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Episodic memory used to be defined as memory for a specific episodic experience—what, where, and when. Then the definition changed, and it further required conscious recollection and became "probably unique to humans" (Tulving, 2002). Here I propose that we move back towards objective criteria for assessing episodic memory and re-think what it means to have the ability to form episodic memories and why rigorous definitions matter. These views are informed by studies and theoretical perspectives across cognitive psychology, comparative psychology, cognitive neuroscience, and neuropsychology—all subfields that actively study episodic memory but vary in their research methods and goals. The effectiveness and appropriateness of such a narrow definition in capturing the essence of episodic memory is increasingly being questioned.

Keywords: episodic memory, animal learning, animal cognition

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POSTERS



Poster: Session 1

Wednesday 20th - 11:30 to 12:30

P-1:

Inconsistent pre-exposure to the sweet-calorie relationship alters conditioned satiety

Ana González and Isabel de Brugada

University of Granada

In the context of the obesity pandemic, the effect of non-nutritive sweeteners has been studied as a possible way to counteract widespread exposure to high-caloric foods. However, it has been claimed that non-caloric sweetener's effect may be more detrimental than positive. It has been suggested that exposure to these sweeteners may initiate a process of extinction of the sweetcalorie link, leading to alterations in learned responses of intake regulation: e.g. conditioned satiety. To address this question, we pre-exposed three groups of rats to sweet taste but manipulated the consistency of the sweet-calorie relationship and then measured the degree of conditioned satiety tothis taste. One group of rats was massively exposed to sucrose (consistent group), another group to saccharin and a third group to either saccharin (extinction group) or sucrose (inconsistent group). After this pre-exposure phase, all rats received a one-hour sweet versus water preference test. Finally, all groups received a conditioned satiety test, receiving a sweet and energetic pre-meal, and the amount of chow they ingested was measured over the following two hours. The results showed that all rats consumed similar amounts of sucrose in the preference test. However, in the conditioned satiety test, the rats that received inconsistent preexposure showed a lack of calorie compensation, whereas in the other groups a compensatory response was observed.

Keywords: Saccharin, conditioned satiety, extinction, intake regulation

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Nutritional labels and intake regulation an assessment from a food attentional bias approach

Fernando Ojedo¹², Ana González¹, Irene Ruiz¹, Marta Gil³, Pedro Macizo¹ and Isabel de Brugada¹

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Current societies are featured by a constant exposure to foods that have very similar sensory characteristics but differ in their nutritional values (e.g. sugar or sugar-free beverages). It has been suggested that this inconsistency between sensory cues and nutritional content leads to an impairment of eating regulatory mechanisms like flavour-nutrient learning and conditioned satiety. The aim of this research is to study the role of the nutritional labels as a tool that could counteract the presumed impairment of these eating regulatory mechanisms. To this end, we focused on whether the previously observed effect of attentional bias towards foods could be modulated by nutritional labels. In the present research we proposed through three different experiments to explore whether this effect depends on the nutritional value of the food used (Experiment 1), whether this effect can be altered by the motivational state of participants (Experiment 2), and if it can be modulated through a prior learning phase where participants were exposed to to these nutritional values (Experiment 3). Our results replicate that attentional biases towards foods are modulated by their nutritional value and the motivational state of participants during the task but the effect of nutrition labels is inconclusive. Future research should investigate whether using this methodology with other types of nutritional label formats would be more effective.

Keywords: Nutritional labels, eating behavior, attentional bias

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P-3:

Effects of nutrition labels on attentional bias to food pictures

Adrián Castro, Irene Ruiz, Ana González, Fernando Ojedo and Isabel de Brugada

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In the context of the obesity pandemic, it has been suggested that some basic mechanisms of intake regulation may be altered. A characteristic of today's societies is the great variability of food products that are similar to each other but have different nutritional properties (e.g., sugary versus diet soft drinks). Given this flavor-nutrient inconsistency, it has been suggested that one altered mechanism may be that of conditioned satiety, which helps to predict the nutritional content of the foods and thus, compensate for caloric intake. In fact, in humans, this basic learning process appears to be impaired in comparison to rodents. Our aim is to investigate whether nutrition labels can serve as external cues (as opposed to food sensory cues) for predicting the nutritional consequences of foods and thus to mimic conditioned satiety. To this end, two experiments were conducted in which the nutritional content of a particular food was manipulated through the nutritional labels (NutriScore). Attentional bias to food images was used as an index for calorie learning, predicting a greater bias towards food images with higher nutritional content on the label. Our results replicate the attentional bias towards food, but the effect of nutrition labels is inconclusive.

Keywords: Food cues, nutrition labels, motivational state, taste-nutrient learning

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Exploratory Factor Analysis of the Diener SWLS scale for children and adolescents in the Mexican population

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The satisfaction with life scale (SWLS) created by Diener, Emmons, Larsen and Griffin (1985) is one of the most widely used instruments for research in the field of basic, positive and clinical psychology. In 2015 Padrós-Blázquez, Gutiérrez-Hernández and Medina-Calvillo (2015) adapted it to the adult Mexican population and it showed excellent psychometric properties. Currently, there is no psychometric study on the adaptation of the SWLS in children and adolescents in Mexico. For this reason, this research proposes to study the psychometric properties of the SWLS scale in the Michoacan population. A sample of 300 high school students (M=14.09; DE=2.29; 55.2% female) was used. SWLS was administered. In the Exploratory Factorial Analysis, a unifactorial internal structure was observed that explains 56.50 of the variance, the five items showed to be adequate. The internal consistency of the scale also turned out to be adequate (α = .800). However, it is necessary to carry out a Confirmatory Factor Analysis with a new sample capture and show evidence of validity in subsequent investigations. Up to now it seems that the SWLS is an adequate instrument to assess satisfaction with life in the child and adolescent population of Michoacán (Mexico).

Keywords: Psychological well-being, Affect, Psychometric, Reliability and Validity

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Factors fostering resilience and post-traumatic growth during the Covid-19 pandemic: A systematic review

Tasleem Sayed and Hannes Malan

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Based on research, negative psychological outcomes such as anxiety, uncertainty, and fear of the unknown make people more vulnerable during a pandemic. Thus, to prevent a rise in mental health issues and improve psychological functioning, it is essential to foster individuals' resilience. Despite the detrimental impact of the Coronavirus (Covid-19) pandemic, resilience and post-traumatic growth (PTG) have the potential to promote positive functioning and reduce the negative effects of stress. This study aimed to investigate and uncover elements linked to predicting or encouraging people's resilience and PTG during the Covid-19 pandemic. This systematic review (SR) was guided by the Cochrane Collaboration and followed a 10-step process. A total of four databases were searched with no limiters. Through database and reference list searches, 310 suitable studies were identified, of which 52 were included in the final analysis. Several themes were found, namely social support, emotional support, mindfulness, personal strengths, positive thinking, spiritual growth and meaning; these themes emerged as the strongest predictors of resilience and PTG.

Keywords: resilience, post-traumatic growth, strengths, covid-10

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Effects of the incentive salience of stimuli on conditioned inhibition in the suboptimal choice procedure in pigeons

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Pigeons prefer an alternative associated with stimuli that reliably signal reinforcement and absence of reinforcement, but with a low probability of reinforcement, over an alternative associated with a higher probability of reinforcement with stimuli that do not reliably signal reinforcement. This suboptimal choice has not been successfully replicated with rats. It has been argued that pigeons are less sensitive to the stimulus that signals absence of reinforcement, a presumed conditioned inhibitor, than rats. Alternatively, it has been suggested that the differences may be due to the incentive salience of the stimuli employed: illuminated keys may have more incentive salience for pigeons than tones and lights for rats. Mixed results have been found in studies that used insertion of retractable levers as stimuli with rats. In contrast, it has been found that using tones or ambient lights reduces suboptimal choice in pigeons. Although both hypotheses have been treated separately, it is possible that the incentive salience of stimuli modulates conditioned inhibition. The purpose of the study was to evaluate the effects of the incentive salience of stimuli on conditioned inhibition and on preference in the suboptimal choice procedure. Six pigeons were exposed to a choice between an alternative with a probability of reinforcement of 0.2 and an alternative with a probability of reinforcement of 0.5. The stimuli that followed choice responses were illuminated keys in Condition A and tones in Condition B. Summation tests, in which both the stimulus that signaled food and the stimulus that signaled absence of food were presented simultaneously, were conducted once the subjects achieved a discrimination criterion and once the preference was stable. Preliminary results show a higher suboptimal choice and faster discrimination in Condition A than in Condition B. Mixed results are being found on summation tests. The results are discussed in terms of the enhanced conditioned reinforcement, rather than conditioned inhibition, by incentive salience of stimuli.

Keywords: suboptimal choice, conditioned inhibition, incentive salience, pigeons, tones

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There is still hope: higher relative frequency does not lead to preference for ineffective compared to effective treatments

Marta N. Torres¹, Fernando Blanco², Manuela Moreno-Fernández², Javier Rodríguez-Ferreiro¹ and Itxaso Barberia¹

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Causal illusion has been proposed as a cognitive mechanism that influences the development of pseudoscientific beliefs and may lead to the subsequent use of pseudo-therapies. Previous research suggested that the prevalence of popular treatments may make them seem particularly effective, regardless of their actual effectiveness (i.e., that the frequency of use facilitates causal illusions). However, these previous results are insufficient to explain why some people prefer pseudoscientific treatments even when effective alternatives exist. In order to generate a laboratory situation that more appropriately reflects this circumstance, the present study aims to investigate whether this relative frequency effect persists when the less frequent remedy is, in fact, effective. We presented the participants with a contingency learning task that involved two fictitious remedies against headaches, one of which was more frequently used than the other. Volunteers also received information on some patients who took no treatment. The frequent pseudoremedy was not effective, as the recovery rate did not vary from the control condition in which no treatment was taken (0.6). However, the less frequent remedy was effective, increasing the recovery rate from 0.6 to 0.9. After observing all trials, volunteers were presented with an effectiveness question about both remedies, and an action question, where they had to indicate which action they would take in the event of a headache: take the frequent (but ineffective) pseudo-remedy, take the infrequent (but effective) remedy, or take nothing. Contrary to the relative frequency effect, participants correctly perceived the infrequent remedy as more effective and chose it more often than the more frequent one or taking no treatment at all. A second experiment used the same procedure, only reducing the remission rate for the infrequent remedy to 0.8, and found similar results. Taken together, the two experiments suggest that, although people are generally subject to cognitive biases such as the frequency effect, they are still able to discriminate between null and positive contingencies.

Keywords: causal illusion, contingency learning, pseudo-remedy, causal judgement, action question

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Saline is neither aversive nor rewarding for planarians (Girardia Dorotocephala) in a conditioned place preparation; however, it seems to interfere with the normal process of habituation to environmental stimuli

Toru Tazumi¹, Gonzalo P. Urcelay² and José Prados³

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Planarians show reduced reproduction, abnormal regeneration, decreased feeding behavior and locomotor activity when exposed to a salty solution. Jordan et al. (2023) reported that planarians acquire a conditioned place avoidance (CPA) using a shock-unconditioned stimulus (US). Based on these findings, we predicted that planarians would avoid stimuli signaling a salty solution. The purpose of Study 1 was to investigate whether planarians acquire CPA using tactile stimuli and different concentrations of saltwater as the US. In a pre-training test, planarians were exposed to two-sided dishes with two surfaces: glass and sand; the time that planarians spent in the smoothglass and rough-sand areas was measured to determine their preference. Over the next eight days, 7 groups of animals were exposed to the preferred area with 0%, 0.05%, 0.1%, 0.2%, 0.4%. 0.6% and 0.8% saltwater, and the non-preferred area with water (for 4 days). Twenty fours hs later, a post-training—identical to the pre-training—test was performed. In the test, the 0% group increased the time spent in the initially non-preferred area—an instance of habituation. The experimental groups, exposed to salt in the preferred area, did not change their preference for the non-preferred area. In fact, some concentrations (0.05% and 0.2%) prevented the change in the preference, suggesting that exposure to a salty solution interfered with habituation. In Study 2, we examined whether exposure to salty solutions could impair habituation to light. We used petri dishes with a half dark and the other half brightly illuminated. A 10-min pre-training test showed that the animals preferred the dark side (i.e., photophobia). Planarians were then divided in three groups and exposed for 30 minutes to water (0%) or a saline solution (0.2% or 0.6%) either in the Dark (Replica 1) or in the Light (Replica 2). Immediately afterwards, we measured the time spent in each area as in the pre-training preference test. In both replicas, the 0% group increased the time spent in the light area, indicating habituation. However, planarians exposed to a salty solution did not increase the time spent in the light area, with the animals exposed to 0.6% salty solution staying in the dark area at the same rate as on the pre-training test, suggesting impaired habituation. These results suggest that salty solution is neither aversive nor rewarding, but interferes with habituation.

Keywords: planarians, salty solution, habituation, conditioned place aversion

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Spontaneous recovery in Primary School children

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It is widely accepted that an instrumental response that has been successfully extinguished might reappear in some cases, such as spontaneous recovery, reinstatement and renewal effects. These effects have been proposed as laboratory models for studying relapse of unwanted voluntary behaviors (e.g., Bouton et al., 2012). Some strategies have shown be useful to reduce that relapse (e.g., Gámez & Bernal-Gamboa, 2019). With the aim to apply this knowledge to the educative context, we designed a task for exploring the acquisition and the extinction of instrumental responses in Primary School children. In the experiment we present, children had to learn how to deactivate a dragon and a wizard pressing a key on a computer keyboard. In extinction phase the participant's response had no consequences. Then, to evaluate the spontaneous recovery of instrumental responses, the participants were tested 24 hours later. The results show the spontaneous recovery of the instrumental responses that was previously extinguished. These findings suggest this task could be useful in the study of some relapse effects related to children instrumental behavior.

Keywords: Operant behavior, Extinction, Relapse, Spontaneous recovery, Primary School

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P-10:

Characterization of green spaces for the study of ADHD symptom decrease in adolescents in urban and rural contexts: Theoretical and experimental approach

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The study of green spaces is a field within psychology and social sciences that is gaining importance regarding well-being. The European population lives in urban environments, making nature an essential element for their well-being. Pollution and barriers to accessing natural spaces in urban contexts can impact the level of psychological well-being experienced by individuals. Some hypotheses point to a relationship between humans and nature, such as the hypothesis of biophilia. Regarding the benefits of exposure to green spaces, the attention restoration theory accounts for cognitive aspects related to the improvement of psychological functions in individuals with mental and neurodevelopmental disorders. This work is part of a systematic review of the markers that green spaces can generate on psychological well-being. To achieve this, the PRISMA 2020 guidelines were followed as a method for the systematic review of the literature in health sciences. The results focus on three avenues of study and empirical support: the improvement of symptoms in diseases with attentional problems in children/adolescents and neurodegenerative diseases, the recurrence and severity of symptoms in mental disorders in urban contexts, and finally, green spaces as restorers and promoters of health. To this end, different spaces where psychological well-being can be studied are proposed.

Keywords: ADHD, Intervention, green spaces, psychological well-being

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P-11:

Metatiming Assesment based on Performance

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Temporal Error Monitoring (TEM) has been described as an individual's ability to monitor their own timing accuracy, particularly in situations where feedback is lacking. Several methods have been proposed to measure TEM in humans, most of which rely on surveys, in particular 2 forced choice tasks and/or Likert scales. Conversely, the assessment of metacognition in animals cannot be achieved using these tasks. Experiments with animals must rely on analysing their performance with the option to redo their choices or to observe whether they retract their decisions. Therefore, the main aim of this research is to measure the TEM of human participants based on their performance. The method used involved analysing the performance of 60 participants in a reproduction task with simultaneous stimuli. Each participant had to attend to one to three intervals and reproduce one of them. After each trial, the participants judged whether their reproduction was incorrect. If they thought it was, they had the option of repeating it to minimise errors and increase their reward. The results of the task itself were in line with expectations, as performance worsened with increased attentional load (i.e. a greater number of simultaneous stimuli), regardless of the task manipulation. Regarding TEM, participants detected and corrected errors only when they were extreme, displaying limited sensitivity to detecting errors in their reproductions.

Keywords: Error monitoring, reproduction timing, metacognition, temporal reproduction, signal detection theory

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P-12:

Consummatory successive negative contrast effect: differences between male and female rats in absolute vs. relative reward processing

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The main aim of the present study was to analyze the influence of sex on the consummatory successive negative contrast (cSNC) effect. This frustration-related effect consists of a transient reduction in the consummatory response (fluid intake) that appears after receiving low levels of reward in animals that have previously been exposed to higher reward values, compared to the consummatory response showed by controls exposed to the same (low) level of reward. Ninety 3 months-old Wistar rats (48 males, 48 females) were food-deprived and exposed during 10 daily 5-minutes sessions to a 32% sucrose solution (preshift phase), which was reduced to 2% during sessions 11 to 14 (postshift phase; group 32-2). Control groups received a constant sucrose concentration throughout the training (2% -group 2-2- or 32% -group 32-32). Sex differences were found with respect to the processing of the absolute value of the reward, as female rats exposed to 32% sucrose (group 32-2 in preshift phase and group 32-32 in both preshift and postshift phases) exhibited significant higher sucrose consumption compared with male rats. Reward devaluation (32% to 2% sucrose) similarly decreased fluid intake in male and female rats, thus both sexes showing similar cSNC effects. The results are compared with previous studies, and discussed in relation with the importance of incorporating the variable sex in studies with non-human animals for a better understanding of absolute and relative reward-related effects.

Keywords: Frustration, cSNC, devaluation, sex, consummatory

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P-13:

A systematic review on sex differences in prepulse inhibition of startle response

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Prepulse inhibition occurs when the startle response to strong stimulus (called Pulse) is reduced by prior presentation of a weaker stimulus (called Prepulse). Several studies have pointed to sexual dimorphism of this sensorimotor measure in both human and non-human participants. In this work we have conducted a systematic review of the experimental literature to analyze potential sex differences in prepulse inhibition of startle in both humans and non-human animals. More specifically, we conducted a search in three databases (Web of Science, PubMed, and PsycInfo) which resulted in a final selection of 53 studies. Among the 27 human studies reviewed, the sample mean was 171.41 participants (SD = 226.96), with a similar distribution of men and women (50.7%, and 49.3%, respectively). The 26 animal studies reviewed had a sample mean of 102.96 subjects (SD = 71.46), with a distribution of 51.3% males and 48.8% females. The results revealed that, in most of the studies with human participants (77.78%), it was registered a greater prepulse inhibition effect for men than for women. A similar result appeared in 69.23% of the studies with non-human animals, with males exhibiting higher percentages of prepulse inhibition than females. The results confirmed a sexual dimorphism of prepulse inhibition, underlining the importance of considering sex as an independent variable in future research.

Keywords: Sexual Dimorphism, Sensorimotor Gating, Comparative Psychology, Review

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P-14:

The anxiolityc effect of Valproate Acid reduces fear-potentiated startle

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Fear-potentiated startle occurs when the startle response to a high-intensity stimulus (e.g. an auditory tone) is enhanced by simultaneously presenting the stimulus along with an aversive stimulus (e.g. a light previously associated with an electric shock). In an experiment with rats, we analyzed the effect of a drug that appears to have anxiolytic properties (valproic acid) to reduce the Fear-potentiated startle effect. To this end, a light was associated 10 times with an electric shock. The next day, and 20 minutes before registering the startle response in presence of a light + tone compound, half of the animals received an i.p. injection of valproic acid (300 mg/Kg), while the other half received an equivalent amount of saline solution. The results showed an attenuation of fear-potentiated startle for the animals in the Group that received the drug, giving thus support to the potential anxiolytic properties of Valproic Acid that would be mediated by the facilitation of GABAergic inhibitory action.

Keywords: valproic acid, fear-potentiated startle, anxiety

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Exploring neuroplasticity changes in a compulsive phenotype selected by Schedule-Induced Polydipsia: insights from Diffusion MRI

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Introduction: Compulsive behavior is a prominent indicator of impaired inhibitory control and a fundamental characteristic observed in various neuropsychopathological conditions like obsessive-compulsive disorder, schizophrenia, addiction, and attention-deficit hyperactivity disorder. It has been consistently linked to different alterations within the cortico-striatalthalamic-cortical loop. Recent advancements in diffusion Magnetic Resonance Imaging (d-MRI) techniques have enabled the detection of microstructural changes, making it a reliable tool in preclinical imaging. Methods: In this study, we examined the brain microstructural alterations using a preclinical model of compulsivity called Schedule-Induced Polydipsia (SIP). We conducted d-MRI analysis to measure key parameters such as Fractional Anisotropy (FA), Mean Diffusivity (MD), Radial Diffusivity (RD), and Axial Diffusivity (AD) in rats exhibiting high or low levels of compulsive drinking (HD and LD groups) on SIP. Results: Our findings revealed SIP-induced microstructural changes in the brains of both LD and HD animals. HD rats exhibited lower MD in the cerebellum, lower AD in the midbrain and corpus callosum, and lower RD in the cerebellum compared to LD rats. Conclusions: These results suggest neuroplasticity alterations associated with axonal and myelin integrity in HD compulsive rats, which could potentially underlie the behavioral deficits observed in this compulsive phenotype. Finally, these neuroplastic alterations may prove valuable in the prevention, diagnosis, and treatment of compulsive spectrum disorders.

Keywords: Inhibitory control deficit; Compulsive behavior; Schedule-Induced Polydipsia; Diffusion MRI; Neuroplasticity

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Funding: Funded by Gobierno de España MCIN/ AEI /10.13039/501100011033/ (PGC2018-099117-B-C21), UAL-FEDER (UAL2020-CTSD2068), and Plan Nacional sobre Drogas, Ministerio de Sanidad, Gobierno de España (PND-20221024).

P-16:

Preliminary studies on the effects of context familiarity on light habituation learning in earthworms (Dendrobaenaveneta)

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In recent years, there has been a growing interest in studying the role of context in learning in invertebrates. Some experimental data suggest that context familiarity is an important factor in the role it plays in learning. Previous experiments conducted in our laboratory showed that preexposure to contexts (i.e., familiarity) leads to a general decrease in the response level of the experimental subjects. In this experimental series, we aim to explore the effect of context familiarity on the habituation of the head retraction response to light in earthworms (Dendrobaenaveneta). To achieve this, we test different ways of manipulating context. As familiar contextual cues, we used water from the home flowerpot (Experiment 1) and the smell of the food provided to the worms (Experiment 2). Once the most suitable context was identified, we conducted an experiment to evaluate the role of context change on re-habituation after light habituation in a familiar context versus a new context (Exp. 3). It was hypothesized that the habituated response during training would reemerge in a different context during testing and that the effect would be stronger in the transition from the familiar context to the new one. The findings from this study will enhance our understanding of the mechanisms underlying habituation and shed light on the role of context in this process. Additionally, this research contributes to the knowledge of habituation phenomena in less-explored invertebrate species, such as earthworms.

Keywords: context familiarity, habituation, earthworms

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Behavioural profiles of temporal discounting in Attention-Deficit Hyperactivity Disorder

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Attention-Deficit Hyperactivity Disorder (ADHD) is the most prevalent childhood-onset disorder worldwide. Individuals with this condition typically exhibit weak inhibitory control and deficits in reward-related mechanisms, leading to a low tolerance for delays and a preference for immediate gratification. To assess impulsive decision-making, Delay Discounting Tasks (DDTs) that involve selecting between a small-sooner reward and a larger but delayed one are widely used. Neuroimaging studies suggest that proper top-down neural regulation of reward valuation systems is essential for maintaining consistent hyperbolic discounting. In individuals with ADHD, there is typically a more rapid temporal discounting rate than in healthy controls, corresponding to abnormal activity of the frontostriatal pathway. However, previous studies have reported conflicting results. This study aimed to characterize impulsive choice in children and teenagers (6 to 16 years old) with (n=41) and without (n=41) a diagnosis of ADHD through an experiential DDT. Cluster analysis was performed on the subjective value of the delayed reinforcer at each task delay to identify profiles of children with different patterns of temporal discounting. The study found that there are no discernible distinctions between children diagnosed with ADHD and the control group according to DSM-5 criteria. Cluster analyses identified four cluster profiles with equal distribution of children with and without ADHD: two groups (n=53) demonstrating hyperbolic behaviour, as expected, and two atypical groups. One group (n=21) exhibited heightened discounting (impulsive cluster), while the other (n=7) showed no discounting at all (high self-control cluster). The findings suggest that delay aversion is not a distinct trait limited to individuals with ADHD; rather, it is a characteristic equally distributed in ADHD and the general population.

Keywords: Impulsive choice, Delay Discounting, ADHD, cluster analyses

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P-18:

Ambiguity processing in young adult Decision Making

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Ellsberg (1961) showed that decision makers have a non-neutral attitude toward ambiguity: their choices reveal preferences for risk (known probabilities) or uncertainty (unknown probabilities). The aim of the present research was to evaluate choices and attention to the components of a Decision Making under Risk (DBR), Ambiguity (DBA), and with that of a Decision Support Tool (DST) task. The experimental Ellsberg task in computerized version was used. Fifty undergraduate students from different higher education schools in Mexico City participated. . Participants were asked to bet on the ball's color pick probability drawn from different containers. Inside each container were 36 balls, colored red, green and blue. Three experimental phases were used: DBR (they knew the number of balls of each color and the choice was reinforced to the most probable one), DBA (they knew the number of red balls and the set of blue and green balls, no reinforcement was presented) and HSD (they knew the probability of each ball color, no reinforcement was presented). The results show that the percentage of correct responses and the latency of the DBR and HSD phases are similar to each other. The DBA phase presents longer latencies and lower response percentages than those observed in the other phases. In addition, eye fixations in each phase show that the information attended to differs in each phase. The subjects' choices and eye fixations allow us to differentiate between subjects who process ambiguity as a probabilistic/numerical situation, or under subjective assumptions.

Keywords: Risk, Ambiguity, uncertainty, Decision Support Tool, Attention

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P-19:

Effect of methylphenidate on sustained attention in male and female rats

Adela Batanero-Geraldo, Fátima Montiel-Herrera, Reyes Martínez, Nora Calle-Villa and Juan Pedro Vargas

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An operant task was designed to measure sustained attention in rats. Training was carried out in operant conditioning boxes with 24 adult Wistar rats (12 females and 12 males). The task consisted of 120 trial sessions with a time limit of 80 minutes. During the procedure, two levers (right and left) and three lights (right light, center light, and left light) were displayed. The center light was switched on as an indicator of the start of a new trial, and then one of the side lights (light stimulus) was switched on. The subject had to respond by pressing the lever corresponding to the lit side light to obtain a reinforcer (pellet). In case of error, no pellet was administered. The training consisted of four phases; subjects were required to provide 65% correct responses for 3 consecutive days to meet the criterion and proceed to the phase change. The first phase was a pre-training and habituation phase in which the light stimuli were presented together with the levers. The second and third phases were successive approximation to phase 4, in which the appearance of the levers at the end of the trial was delayed. In phase 4, a variable ITI was added before the appearance of the light stimulus (right/left light), always with the central light on, and when this was turned off, the levers appeared. After three consecutive days of reaching the criterion in this phase, the training was continued by administering a dose of methylphenidate (MPH) 30 minutes before the sessions to observe the effects on performance throughout the session. All animals consumed 4% saccharin water during even- sessions and a dose of MPH (0.5 mg/kg, 2 mg/kg, 5 mg/kg or 10 mg/kg) during odd sessions. The results suggest a possible sexdependent effect of MPH on animal performance.

Keywords: Attention, dopamine, methylphenidate, rat, sustained attention

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P-20:

Effects of MPH Consumption on Extinction Conditioned Response in Wistar Rats

Fátima Montiel-Herrera, Adela Batanero-Geraldo, Nora Calle-Villa and Estrella Díaz Argandoña

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Methylphenidate is a stimulant drug that is commonly used to treat attention deficit hyperactivity disorder (ADHD) in both children and adults. So far, studies on the effects of methylphenidate use in adults are scarce and the results are controversial. Studies in animal models can provide us with more specific information about the physiological and behavioural effects of MPH. To this end, we analysed the effects of MPH administration on fear extinction in a population of 48 adult Wistar rats. The subjects were divided into 4 groups: (1) MPH -treated female group, (2) saccharin-treated female control group, (3) MPH -treated male group, and (4) saccharin-treated male control group. All subjects were exposed to a conditioning session (tone + shock), 7 days of extinction during treatment administration, and finally a test session performed 48 h after drug withdrawal. MPH was administered orally by pipette at a dose of 5 mg/kg dissolved in a saccharin solution. Half of the animals received MPH 30 min before the beginning of the extinction sessions and the rest received a saccharin solution. The conditioning and extinction sessions were carried out in different contexts to avoid a possible generalization of fear to the context. The aim of this experiment was to analyse the effects produced by MPH on the extinction of the conditioned response and, to determine whether this effect is modulated by sex.

Keywords: Fear conditioning, Metylphenidate, Extinction, Contextual cues

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Poster: Session 2

Thursday 21st - 11:15 to 12:15

P-21:

The role of self-esteem, self-concept, academic performance and frustration intolerance on the impact of reward devaluation in humans

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The successive negative contrast (SNC) effect is a frustration-dependent phenomenon induced by the sudden devaluation of an expected reward. In the present study, a cognitive task was used to induce frustration in humans, analyzing whether the impact of reward devaluation was modulated by participants' self-esteem, self-concept, academic performance and frustration intolerance. Fifty-nine students (51 women, 9 men) performed the Raven's Progressive Matrices test and received -manipulated- positive (correct) or negative (incorrect) feedback after each trial. Training consisted of two phases for the SNC group: preshift (high probability of receiving post-trial positive feedback) and postshift (low probability of receiving post-trial positive feedback); control group always received low probability of positive feedback. Reward expectancy was based on giving students information about their expected performance based on their age and academic level (high for SNC, low for control). Accuracy, reaction time, and preand post-task subjective measurements of positive and negative affect (Scale for Mood Assessment) were used as dependent variables. The Rosenberg Scale, Five-Factor Self-Concept Questionnaire AF5, Frustrative Non-Reward Scale (FNR), Investigative Scale of Tolerance to Frustration (ISTF), and Frustration Discomfort Scale (FDS) were used as assessment instruments for self-esteem, self-concept, and frustration intolerance, respectively. The results showed significant lower reaction time in the SNC group compared with the control group in the preshift phase, and higher reaction time and sadness scores in the SNC group when postshift phase was compared with the preshift phase. Correlational analyses conducted with the results obtained in the SNC group showed significant negative correlations between post-task sadness scores and academic and physical self-concept, and significant positive correlations between post-task joy and social and emotional self-concept. As seen in previous studies, there was an impact of reward devaluation on behavioral (reaction time) and affective (sadness) measures of frustration, the impact of these manipulation being related with self-concept. The theoretical and methodological implications of present results for human research on frustrative non-reward are discussed.

Keywords: Frustration, Self-esteem, Self-concept, Successive Negative Contrast, Negative Affect

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P-22:

A new virtual reality task for studying response recovery-fromextinction effects in human instrumental learning: Spontaneous recovery

A. Matías Gámez¹, Jesús Moreno², Juan M. Rosas² and José E. Callejas-Aguilera²

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There is grounded evidence about response recovery-from-extinction effects in human beings (i.e., spontaneous recovery, renewal or reinstatement) both in classical and in operant conditioning, maybe because of its clinical implications (e.g., Bouton, 2014). Understanding the mechanisms underlying these phenomena could play an important role in the development of behavioral techniques with long-term effectiveness for preventing the relapse of problem behavior (e.g., Wathen & Podlesnik, 2018). With that end, we use to employ a videogame task in which participants had to fire against enemies such as planes or tanks to defend Andalusia. In this experiment, we present a new virtual reality task in which participants had to dig to discover treasures and obtain some coins in a more realistic scenario. In extinction phase participant's response had no consequences. To evaluate the spontaneous recovery of instrumental responses, participants were tested 48 hours later. The results show the spontaneous recovery of the instrumental responses that were previously extinguished. This task allows us to design more versatile and ecological experiments, which is why it could be much more useful for the study of some relapse effects related to human instrumental behaviors.

Keywords: *Instrumental learning, relapse, humans, virtual reality*

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P-23:

The Influence of Affective Dimensions on Generalization Gradients

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The ability to respond to novel stimuli based on past experiences is influenced by the physical resemblance to the original Conditioned Stimulus (CS+), as reflected in generalization gradients. Notably, recent research has revealed that cognitive or conceptual dimensions also contribute to the shape of these gradients. However, the impact of affective dimensions, specifically emotional valence (i.e., hedonic experience), on generalization gradients remains unexplored. Valence is usually represented trough a functional continuum that ranges from unpleasant or negative to pleasant or positive. In a predictive learning experiment with 135 participants, we manipulated emotional valence conveyed by words as an affective dimension and line orientation as a physical dimension. In the first phase, we conducted a differential discrimination training within each dimension. One stimulus at the extreme of the dimension was paired with the outcome (a fictitious shock; CS+), while another stimulus at the other extreme was not (CS-). For instance, in the case of words, we used a word with a valence of 2 (negative valence) as CS+ and a word with a valence of 8 (positive valence) as CS- (counterbalanced). In the case of line orientations, we used 0º and 90º. In a subsequent expectancy test, we measured and compared generalization gradients between the two dimensions by presenting the trained stimuli and five novel stimuli (in between the extremes) for each dimension. The results revealed that the observed gradient followed a linear tendency: variations in valence resulted in a progressively reduced outcome expectancy corresponding to the proximity in valence between the novel stimuli and the CS+. Critically, this decrease in the valence dimension closely resembled the one observed in the physical dimension, suggesting that valence and line orientation resulted in similar generalization gradients. Our results showed that the affective properties of language can influence generalization gradients, highlighting the importance of considering affective representations for a better understanding of stimulus generalization.

Keywords: generalization gradients, emotion, predictive learning

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P-24:

In vivo microdialisys technique to register dopamine concentration in the striatum

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Repeated administration of the dopaminergic agonist haloperidol in presence of a novel context results in an association between the effect of the drug and the context which, depending on the type of test and the timing of the response recording, leads to a conditioned response that either reproduces the drug effect (catalepsy), or is opposite to it (hyperlocomotion). One possible psychophysiological interpretation of these apparently contradictory results depends on temporal changes in dopamine concentration elicited by the conditioned stimulus associated with the drug effect. To evaluate this possibility, we propose the use of in vivo microdialisys technique to register extracellular dopamine concentration at different time points in the presence of the CS. Specifically, we suggest an within-subject design in which two samples of cerebral fluid will be collected from the striatum (at 15 and 30 minutes) in the presence of the context in a first baseline session without drug and in a drug-free test session conducted after conditioning. In this work, we present all the experimental and technical details necessary to implement the microdialysis technique in Wistar rats.

Keywords: Microdialysis, Dopamine, Haloperidol, Classical Conditioning

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P-25:

Patients under treatments with delayed effectiveness are more vulnerable to pseudomedicine

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Beliefs of effectiveness are one of the factors that drive patients' decisions about their treatments (quitting a treatment, looking for alternative treatments, etc.). I propose that these beliefs form from the experience of a contingency between the treatment and the symptom remissions. In this context, Delayed Effectiveness Treatments (DETs) are interesting because they imply a change in the contingency: initially, the treatment is not followed by symptom remission (i.e., null contingency), but later it shows a positive contingency. Here, I study the formation of effectiveness beliefs of a DET through computer-based contingency learning tasks. Experiment 1 shows that people using a DET are particularly vulnerable to pseudomedicine, especially in the first stages of the treatment. A potential solution is explored in Experiment 2: by strategically introducing and removing a harmless placebo drug, participants improve their beliefs of effectiveness about a DET. The principles underlying these experiments are well-known in the contingency learning literature, but are not typically applied to understanding how beliefs of treatment effectiveness form.

Keywords: Contingency learning, Causal learning, Cognitive biases

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P-26:

Modulation of the US-Preexposure effect by food deprivation with a flavor preference conditioning procedure

Luis Miguel Traverso, Juan Carlos López, Luis Gonzalo de la Casa, Estrella Díaz and Juan Pedro Vargas

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In this work, we analyzed the US-preexposure effect with a flavor preference procedure to replicate the phenomenon (Gil, Symonds, Hall & de Brugada, 2011) and to investigate whether food deprivation can modulate the acquisition and expression of learning (Gil, de Brugada & Hall, 2021). In previous experiments, we failed to reproduce the effect using sucrose as the unconditioned stimulus (López, Traverso, De la Casa, Díaz & Vargas, 2022). At a procedural level, the absence of the expected reduction in conditioning due to previous experience with sucrose could be related to the use of two odors throughout the procedure. It is possible that conditioning an excitatory stimulus (odor A+) and an inhibitory stimulus (odor B-) could facilitate preferences resistant to preexposure since both stimuli could function as predictive cues. To simplify the procedure and reduce the role of inhibitory conditioning, we conducted a first experiment with two groups: during preexposure, half of the animals had access to two bottles with sucrose (3.5%), while the other half had water in each bottle. During acquisition, both bottles contained sucrose + lemon (0.2%). During testing, the animals had access to two bottles, one containing water and the other containing the flavored solution. The US-preexposure effect emerged, with a significant reduction in conditioning for the group that was preexposed to sucrose. In the second experiment, we evaluated whether food restriction during preexposure could potentiate the US preexposure effect by increasing the relevance of nutritional reinforcement. The results are discussed in terms of changes in attention to the reinforcer as a function of food deprivation condition.

Keywords: Conditioned Preferences, US-Preexposure, Flavors, Nutritional Deprivation

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P-27:

Preferences conditioned to orthonasal odors and CS-preexposure effects with satiated rats and caloric and non-caloric reinforcement

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The acquisition of preferences conditioned to odorous extracts can be obtained by combining aromas and tastes to form compounds (flavors), which are then processed retronasally. Alternatively, the scent can be positioned a few centimetres away from the animal's olfactory system, allowing perception through the orthonasal pathway while the fluid solution is consumed orally. It has been suggested that in the retronasal procedure, the acquisition of preferences through delayed nutritional impact occurs via predictive learning, whereas the hedonic experience associated with the simultaneous presentation of odors and tastes without caloric consequences may only involve evaluative conditioning (De Houwer, Thomas & Baeyens, 2001). Conversely, in the orthonasal procedure, the temporal arrangement of odors and their presentation should facilitate predictive learning (e.g., Gómez-Sancho, Traverso & De la Casa, 2019), regardless of the characteristics of the substances used as reinforcers. In our first experiment, half of the animals were preexposed to two alternating odors (mint and almond), while the other half received odorless water (PE and NPE groups, respectively). Subsequently, all animals were able to consume a 3.5% sucrose solution while simultaneously sniffing one of the two pre-exposed odors. The test phase was conducted intermixing trials, such that after every two conditioning trials, the animals underwent a test trial with the conditioned scent (A+) versus the unconditioned scent (B). We also carried out a similar experiment using saccharin (0.35%) as US. Subjects in the caloric groups consumed more from the bottle with odor A+ than from the bottle with odor B, from the second test trial, while preferences were only expressed on the first day in the non-caloric groups. On the other hand, CS-preexposure did not affect conditioning, regardless of the reinforcer used. The results are discussed in relation to the motivational state of the subjects, since the absence of food deprivation could have been a key factor in our study.

Keywords: Conditioned Preferences, Odors, Sucrose-Saccharin, CS-Preexposure

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P-28:

The green halo effect: The role of eco-friendly labelling on environmental impact estimations

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Recent research has described how cognitive biases contribute to human inaction on climate change. In the current study, we focus on biases that are induced by eco-friendly labelling of products, and specifically on how this labelling affects environmental impact perceptions. We developed a new computerized footprint illusion task based on the standard contingency learning task in which participants were presented with monthly records of a community household carbon footprint. Consistent with the "green halo effect", participants tended to judge the carbon footprint of eco-labeled houses as weaker than those who were not informed about the environmental certification of the houses, even though both groups of participants were exposed to identical information that could be used to make accurate and unbiased judgements. Implications for the design of strategies aimed at promoting better understanding of the environmental impact of human choices and at minimizing environmental harm are discussed.

Keywords: Green halo effect, Eco-friendly label, Causal learning, Causal illusion

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Adolescent alcohol exposure induces microRNA-182 overexpression and increases amygdala activity in adult rats

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Alcohol consumption during adolescence has a significant impact on epigenetic mechanisms mediated by microRNAs (miRNAs), small non-coding RNAs that play important roles in gene expression regulation. The effects of alcohol on miRNAs during this crucial stage of brain development are of particular concern. One of the most vulnerable areas in this period is the amygdala which is associated with increased risk-taking behavior, impaired decision-making, and addiction susceptibility. Therefore, the aim of this study was to explore if repeated alcohol exposure during adolescence could alter amygdala miRNA expression in the short and long term. Additionally, amygdala activity was evaluated by c-Fos immunohistochemistry. A total of 60 adolescent Wistar rats (30 males; 30 females) were exposed either to to intermittent injections of ethanol (2 g/kg, i.p.; AIE) or equivalent saline volume (AIS) on a 2-day on/off schedule. The animals were euthanized and their brains were immediately extracted at PND-41 (short-term group) or PND-98 (long-term group). A subset of rats belonging to the long-term AIS and AIE groups underwent an open-field test and an injection of ethanol (2 g/kg, i.p.) prior to euthanization. We found that adult rats that underwent the AIE procedure showed a greater number of c-Fos neurons in the basolateral amygdala in response to alcohol and increased anxiety. Moreover, miR-182 was overexpressed in the amygdala of adult female rats with AIE procedure but not in adult male rats or in or adolescents. These results suggest that repeated alcohol exposure during adolescence alters amygdala both miRNA expression and activity patterns, which could lead to long-term consequences on behavior and addiction susceptibility.

Keywords: Adolescence, alcohol, amygdala, c-Fos, epigenetics, microARN

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Funding: Funded by PID2020-114269GB-I00 (MICIU, Spain), BSEJ.514.UGR20 (FEDER, Junta de Andalucía, Spain) and FPU18/05012 (MIU, Spain).

P-30:

How individual differences influence attentional sign-tracking?

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Value-Modulated Attentional Capture (VMAC) is an attentional phenomenon by which a high reward predictive signal is more likely to capture attention than a low reward predictive signal. When an irrelevant feature (color) of a distractor in a visual search task is predictive of high reward, its presence in the visual search display results in a decrease in performance relative to a low-reward distractor (e.g. longer reaction times), even when attending to the high-reward distractor is counterproductive. The high-reward predictive signal acquires incentive salience and biases behavior due to the automatic attentional capture triggered. Thus, the VMAC effect has been proposed as an attentional analogous to sign-tracking in humans, in which there is a tendency to approach a Paylovian signal of reward rather than the location at which the reward will be delivered. Attentional sign-tracking in humans has been shown as a marker of the risk of addictive-related behaviors. Furthermore, studies on individual differences have revealed that the degree of attentional bias is related to emotional traits, specifically, impulsivity appears to correlate with it. Additionally, impulsivity (negative urgency) has been associated with difficulties in incidental emotional regulation. On the other hand, the tendency to experience craving may predispose individuals to attribute incentive salience to stimuli that predict the relief of the craving sensation, but also, sign-trackers might be more prone to focusing on rewardrelated cues and experiencing craving. In this face-to-face experiment, we assess self-reported emotional dysregulation traits, specifically impulsivity and craving for food (validated scales: UPPS-P and FCQ-T), in order to examine their relationship with the strength of the VMAC effect as well as its persistence (i.e., failure in updating the incentive value of the cue when introducing a reversal phase in the VMAC task). Besides, we will explore the relation between the VMAC effect as a measure of sign-tracking and the persistence in the reversal phase. We anticipate that people with high self-reported negative urgency and craving for food as a trait will show greater VMAC effect and its persistence after reverse reward-stimulus contingencies.

Keywords: craving, impulsivity, reversal, sign-tracking, VMAC

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Funding: Grant #PID2021-127985NB-I00 (MCIN-AEI-FEDER)

P-31:

ABC Renewal in a Virtual Reality Spatial Learning Task

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A single experiment was conducted with the goal of testing whether ABC renewal can be obtained in an Immersive virtual reality spatial learning task that is being developed in our laboratory as a tool for study learning phenomena in humans. The task was designed to resemble the conditions of spatial learning studies in rodents using the Morris water maze. Participants play the role of archeologists searching for a hidden treasure within a circular arena within different environments that play the role of contexts. The position of the hidden treasure is related to beacons that are presented within or in the limits of the arena. Dependent variables are the time spent in each quadrant of the arena, and the number of eye fixations, as an indirect measure of attention. Participants received training in which the treasure was hidden in the quadrant close to the beacons in context A. Interference was conducted in context B by hiding the treasure in the quadrant opposite to the beacons. The final test was conducted in contexts B and C without the treasure hidden. Responding with the context change (C) showed attenuation of interference performance, replicating ABC renewal, and validating further the use of a highly immersive virtual reality task as a tool for study learning, attention, and memory phenomena in humans.

Keywords: Spatial Learning, Renewal, Virtual Reality, Human

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P-32:

Differences in control in a Conditional Magazine Approach do not covary with differences in control in a Differential Reinforcement of Low rate schedule

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Impulsivity can be defined as a deficit in the ability to inhibit dominant responses, which leads to a loss of potential rewards. Conversely, control can be defined as the ability to inhibit dominant responses, which leads to achieving those rewards. In a Conditioned Magazine Approach (CMA) paradigm, a dominant response, such as anticipated entry into magazine, is induced by pairing a stimulus, for example, a tone (CS) with food delivery (US). In a two-phase exploratory experiment with rats (N = 30), one group of animals was trained (Phase 1) with a CMA procedure, while another group was trained with a CMA procedure to which an omission contingency was added (CMA-). As a result, subjects in the CMA- group acquired greater control over the dominant response than subjects in the CMA group. In the Phase 2, all animals were exposed to a Differential Reinforcement of Low rate schedule (DRL). DRL Schedules are tasks commonly used for the study of response inhibition in action impulsivity. In DRL, if animals learn to retain the dominant leverpress response they receive more reinforcement than if they don't. It was found that the control acquired during Phase 1 did not transfer to Phase 2. Subsequently, following the "backwards" strategy of Tomie, Aguado, Pohorecky, & Benjamin (1998), subjects were "phenotyped" according to their responses with DRL in phase 2: high-rate (impulsive) subjects vs. low-rate subjects (controlled). The results indicate that these differences did not covary with responses during the CMA- procedure. The results are discussed in relation to conceptualizations of impulsivity, understood as the manifestation of a unitary congenital trait (unitary approach), versus impulsivity understood as the result of diverse traits (fragmentary approach).

Keywords: Animal Paradigms of Impulsivity

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P-33:

Pavlovian-to-instrumental transfer: Individual differences in implicit emotional regulation

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Reward-related cues may acquire incentive salience, which refers to motivational properties that make them irresistible, acting as motivational magnets. Thus, reward-cues can bias action control and selection, promoting actions that may be counterproductive to our goals. It has been hypothesized that individuals exhibiting emotional dysregulation attribute greater incentive salience to cues, being more susceptible to develop addictive behaviours and other psychopathological symptoms. Individual differences have been observed regarding the degree of incentive salience that people attribute to cues, and several factors have been put forward to explain them. Specifically, here we focus on emotional dysregulation, which comprises: 1) selfreported affect-driven impulsivity, measured by the UPPS-P questionnaire, and 2) implicit emotional regulation failures, such as the inability to update reward-value (devaluation) and/or stimulus-reward contingency (extinction), measured using computerized behavioral tasks. In the present work, we use Pavlovian-to-Instrumental transfer (PIT), as a measure of incentive salience, and diverse measures of emotion dysregulation such as failures in US devaluation and Pavlovian extinction, and self-reported affective impulsivity. As in the relevant literature, we differentiate between specific and general PIT effects. Specific PIT occurs when the presentation of a reward-related cue increases the instrumental response associated with the same reward; meanwhile general PIT refers to an increase in overall responding across different behaviours associated with rewards sharing the motivational value. Taking into account all the above, the main objective of this work was to explore the relationship between implicit emotional regulation mechanisms using the PIT task (devaluation and extinction) and self-reported affect-driven impulsivity, expecting to find a negative relationship between them.

Keywords: devaluation, goal-directed behaviour, incentive salience, pavlovian extinction, pavlovian-to-instrumental transfer

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Funding: Grant #PID2021-127985NB-I00 (MCIN-AEI-FEDER).

Role of lobule VII cerebellar perineuronal nets on relapse of drug seeking

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Addictive behavior derives from aberrant activation of drug-induced plasticity and metaplasticity mechanisms that restrict subsequent synaptic modifications and stabilize drug-associated memory. Perineuronal nets (PNNs) are specializations of the extracellular matrix that enwraps the soma and proximal dendrites of some subsets of neurons. They have been related to synaptic stabilization and long-term memory. In the cerebellar cortex, the only neurons that express PNNs are Golgi interneurons and Lugaro cells. As inhibitory interneurons, the role of Golgi cells is to regulate the glutamatergic activity of granule cells and mossy fibers that excites the Purkinje cells, the sole output of the cerebellar cortex. In previous studies, we found that cocaine-induced conditioned preference increases neural activity in the posterior cerebellar vermis. In addition, we showed a dynamic regulation of PNN expression after protracted abstinence from extended cocaine self-administration. The aim of the current study was to investigate the effects of PNN removal in lobule VII of the cerebellar cortex during protracted abstinence on incubation of drug seeking and neuronal activity. The effect of PNN digestion using the bacterial enzyme Chondroitinase ABC (ChABC) was evaluated in rats allowed to self-administer intravenous cocaine during an extended (6h) or restricted (1h) access for 12 days. Rats were left undisturbed in their home cages for 24h or one month (28d). The results showed that extended access to cocaine self-administration increased the expression of Golgi-bearing PNNs and C-Fos activity in the granule cell layer of lobule VII after protracted abstinence. On the other hand, we found a faster decline in drug seeking after PNN digestion in lobule VII and a positive correlation between C-Fos and the number of active lever presses after protracted abstinence. Our findings involve lobule VII of the vermis in drug seeking and suggest that PNNs play a key role in the stabilization of neuroplasticity underlying the incubation of drug-seeking that occurs during abstinence.

Keywords: Addiction, Cerebellum, Perineuronal Nets, Chondroitinase, Drug-seeking

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Cerebellar correlates of female sensitivity to reward devaluation

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Sensitivity to reward devaluation is commonly used as a parameter to evaluate the degree of disengagement when the value attached to a rewarded outcome is reduced. Several studies that used devaluation procedures showed that goal-directed behavior predicts high devaluation sensitivity, but habit-based actions are associated with insensitivity to reward devaluation. Extended experience with drug use can lead to an imbalance between flexibility and repetition in behaviors that can become habit-bound, even in natural rewarded behaviors. Recently, our group has demonstrated that cocaine-induced incentive memory and extended access to cocaine selfadministration increased neural activity and the expression of specialized extracellular matrix structures that stabilize synapsis called perineuronal nets (PNNs) in the cerebellum. Nevertheless, the role of the cerebellum in this transition to habits is unknown, especially in females. Using a random ratio schedule, we explored cerebellar correlates of sensitivity to devaluation in naturally rewarded behaviors after a prolonged drug experience and its emotional and activity effects in female rats. Before an extended treatment with cocaine, rats were trained in operant boxes to consume two kinds of rewards (chocolate pellets or 10% liquid sucrose). Before and after cocaine treatment, the reward was devalued by satiety, and we assessed rat sensitivity to devaluation in an extinction test. Also, we evaluated spontaneous activity, exploration and anxiety using the Open Field Test (OFT), Dark & Light (D&L) and Elevated Plus Maze (EPM). All drug-treated and control female rats exhibited sensitivity to reward devaluation despite cocaine experience. However, cocaine increased rearing and sniffing behavior in the OFT, and also increased entries to and time spent in the lighted area and decreased latency to enter the compartment in the D&L, but no effect was observed in the EPM. Although cocaine produced a pharmacological effect based on the observed anxiety and locomotion tests, it was not able to promote the transition to habit, as the animals remained sensitive to devaluation and thus maintained goal-directed behavior. Cerebellar correlates are currently under evaluation.

Keywords: Addiction, Sensitivity to reward devaluation, Cerebellum, Drugs, Females

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How Goal-Landmark Distances Impact Overshadowing: a replication in humans of Goodyear & Kamil (2004)

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Spatial cognition has seen a debate between associative theories that predict competition between landmarks and geometry, and modular theories that anticipate absence of competition. Results from numerous labs have documented (or not) said competition, but little is known about the variables that determine whether competition is observed in the spatial domain. It has been suggested that spatial contiguity could be a determinant of competition between events. In these experiments, we aimed to replicate, in humans, findings by Goodyear & Kamil in birds (Clark's nutcrackers). Participants were recruited through Prolific. During training, they had to find a hidden goal using 4 landmarks arranged in the shape of a cross, in the presence of orientation cues. In Group Close, landmarks were placed at 10, 30, 50, and 70 virtual units (VUs) from the goal, whereas in Group Intermediate the distances were 30, 50, 70 and 90 VUs. Finally, in Group Distal landmarks were placed at 50, 70, 90 and 110 VUs. Following 16 training trials, all participants were tested individually with each of the 4 landmarks trained. Of interest was how well participants did when tested with landmarks 50 and 70, which were common across all 3 groups. Consistent with the results in birds, we observed better performance in Group Distal than in Group Close, suggesting that overshadowing was greater in Group Close and thus dependent on the spatial contiguity between landmarks and the goal. Landmarks near the goal overshadow landmarks far from the goal, but the opposite is not true. A second experiment, in which landmarks and orientation cues were misaligned in order to prevent the use of a straightforward solution to the task, showed similar results. The results are discussed in terms of a modification of Pearce's configural model.

Keywords: Spatial Cognition, Overshadowing, Competition, Contiguity, Distance

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P-37:

Effects of prediction error produced by partial and delayed reinforcement on overshadowing

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A prediction error occurs when a discrepancy exists between the expected and presented outcomes (Torrents-Rodas, 2020). The prediction error remains constant in a partial reinforcement arrangement, and the organism can't determine the relationship between the signal and the consequence (Holland, 2006). Delayed reinforcement manipulates when a reinforcer will be delivered (Crum et al., 1951). Thus, changing a reinforcer from immediate to delayed could also produce a rise in prediction error, as the reinforcer would not be delivered when it is expected. The effects of prediction error generated through extinction have been previously observed in overshadowing attenuation. The present experiments aimed to study whether prediction error produced by partial reinforcement and reinforcement delay also affect overshadowing. In Experiment 1, participants were randomly assigned to three groups. Using a matching-to-sample task, all participants learned to respond to a Sample Stimulus (SS): Y in a continuous reinforcement schedule during the first phase. During Phase 2, SS; Y received a 50% partial reinforcement schedule for one of the groups, while the other two remained in continuous reinforcement. In this phase, two groups were also trained to respond to compound stimulus AX; the other group was trained to respond to SS: X. The Test phase presented elements A and X separated. In Experiment 2, twenty participants were randomly assigned to three groups. All participants were trained to respond to SS; Y during Phase 1, using zero reinforcement delay. In Phase 2, SS; Y reinforcement was delayed by 8 s for one of the groups, while the reinforcement in the others was immediate. In this phase, two groups were also trained to respond to compound stimulus AX; the other group was trained to respond to SS: X. The test phase was equal to Experiment 1. Results for Experiments 1 and 2 showed that when reinforcement of SS: Y was continuous or immediate during the Test, element X received fewer responses than element A. However, responses to both elements were similar when partial or delayed reinforcement was presented. These results suggest that these reinforcement manipulations could increase prediction error and have a similar attentional and behavioral effect upon overshadowing as extinction.

Keywords: prediction error, overshadowing, partial reinforcement, reinforcement delay, attention

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Alcohol consumption in Lewis and Fischer male rats after reinforcer devaluation and the modulatory role of exercising

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Increased voluntary consumption of alcohol has been demonstrated in animals experiencing frustrative reward devaluation. The results have been interpreted in terms of emotional selfmedication (ESM). There is evidence that the ESM effect is modulated by genetic factors, as strains of rats more reactive to frustration (Roman Low-Avoidance rats) exhibit higher alcohol consumption after being exposed to reward devaluation compared to strains of rats less reactive to frustration (Roman High-Avoidance rats; Manzo et al., 2014). The present study investigated whether these strain differences extend to Lewis vs. Fischer 344 rats, two strains of rats that differ in behaviors reflecting emotional reactivity (Fischer 344 > Lewis) and vulnerability to abuse drugs (Lewis > Fischer 344). The modulatory role of voluntary wheel running on ESM induced by reward devaluation was also analyzed. Eighty male rats (40 Lewis, 40 Fischer 344) received 32% sucrose (4% in controls) during 10 57-min preshift sessions followed by 4% sucrose during 5 postshift sessions. Immediately after each consummatory session, animals were exposed to a 2-h, two-bottle preference test involving 32% alcohol vs. water. Half of the animals also had access to a running wheel during the preference test. Strain differences were found with respect to sucrose intake, alcohol consumption, and wheel turns. During the reward devaluation task (32%-to-4% sucrose), Lewis rats showed consummatory suppression after reward devaluation. This consummatory suppression was accompanied by increased alcohol consumption (g/kg) in Lewis animals without access to the running wheel, but this ESM effect was absent in Lewis animals with access to the running wheel. None of these effects were observed in Fischer 344 rats. These findings suggest that the protective effect of physical exercise on alcohol self-medication induced by reward devaluation depends on Lewis vs. Fischer 344 (genetic) differences modulating reactivity to frustrative nonreward, proneness to alcohol consumption, and disposition to engage in physical activity.

Keywords: Alcohol consumption, Emotional self-medication, Reinforcer devaluation, Physical activity, Lewis vs. Fischer rats

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Analyzing variance components in different procedures and reinforcement schedules in instrumental conditioning

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The interest in causes and consequences of between- and within-individual variation is growing in biology and clinical psychology. Associative learning procedures typically employ several manipulandum and outcomes, and occasionally have been reported that these procedures increase the variance of data. However, it is still unknown how different response-outcome combinations contribute to this variance. Mixed-effect models were used to compare the variance of two groups of rats trained under two reinforcement schedules (i.e., RR or RI). The first group learned, in a counterbalanced manner, lever pressing, and chain pulling as responses and received pellets and liquid sugar as outcomes. The second group was trained similarly, but two levers (i.e., left and right) were used as manipulandum, and two flavors of liquid sucrose (i.e., chocolate and cherry) were the outcomes. These models allow us to know how different schedules of reinforcement and types of response and consequence shape variance components and size effects.

Keywords: linear models, instrumental conditioning, identity of response and outcome, response rate

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Poster: Session 3

Friday 22nd - 11:15 to 12:15

Behavioral analysis of the drug "ephenidine" for the treatment of depression

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Currently, pharmacological treatments for depression have a very limited effectiveness due to their long latency in the onset of action. In this frame of time there is a risk of suicidal behavior; thus fast-acting antidepressants, such the Ketamine, have been registered to avoid thisproblem. Nevertheless, ketamine has the serious drawback that it also produces dissociative and hallucinogenic effects. In an attempt to find another fast-acting antidepressant drug devoid of these side effects, we tested the efficacy of the anestheticEphenidine. For this purpose, male Wistar rats were administered three different doses of Ephenidine (2.5mg/kg; 5mg/kg and 10mg/kg) and two control groups were administered either Ketamine (10mg/kg) or saline. Subsequently, 24 hours after the administration, the animals underwent an open field test to determine possible motor drug effects and 48 hours after the administration, they went through a forced swimming test to evaluate possible antidepressant effects. After analyzing the results, it was observed that Ephenidine did not produce an increase in motor activity, an effect reminiscent of psychotomimetic activity in humans. In addition, for the 5mg/kg and 10mg/kg doses, an improvement in depressive symptomatology was found compared to the controls that received saline. However, the complexity of operationalizing hallucinogenic patterns in rodents implies waiting for a possible clinical study in humans, in which its efficacy and possible dissociative effects will be determined.

Keywords: *Immobility, Ketamine, rats, fast-acting*

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P-41:

Ethanol as a context for habituation response in the earthworm (Dendrobaenaveneta)

Roberto Álvarez, Cristina Aragón, Jairo Parras and José Manuel Lerma-Cabrera

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The phenomenon of habituation is one of the simplest of processes, yet it involves a theoretical complexity that challenges traditional associative learning explanations and the study of cognition. In this paper we present a preliminary investigation of the role of context using alcohol in habituation. Although there is a large literature on habituation in general, this is not the case for research on invertebrate species. Using the earthworm (Dendrobaenaveneta) as subjects, we evaluated whether ethanol can serve as a differential context for habituation. Using two contexts, water-wet soil alone versus water-wet soil with 1/% ethanol, we habituated the retraction response to light. In an experimental design, two groups of worms were first habituated in different contexts and then habituated in the same or different contexts in a later phase. The results indicate a context specificity. Indicating that earthworms are sensitive to the change of context producing a recovery of the response. These results are interpreted in relation to the associative theories that assign a prominent role to the context.

Keywords: habituation, associative learning, context, earthworm, invertebrate learning

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P-42:

Please don't stop the music – the effect of changes in background music on the recovery of an extinguished response in human predictive learning

Sahar Aghajari, Harald Lachnit and Metin Uengoer

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In two human predictive learning experiments, we investigated whether background music can function as contexts in renewal procedures. In Experiment 1, we demonstrated the ABA renewal effect using two music tracks as Contexts A and B. In Phase 1, participants learned that a cue was followed by an outcome (Acquisition) while Music A was playing. During Phase 2, the cue was no longer followed by the outcome (extinction) in the presence of Music B. In phase 3, we observed a recovery of the initially acquired response towards the cue when participants were tested while Music A was playing (ABA renewal). In Experiment 2, acquisition, extinction, and testing were conducted in the presence of Music A, B, and C, respectively (ABC renewal). Data collection for this experiment is currently running, and we are looking forward to presenting the results of both experiments in the poster session at the conference.

Keywords: Extinction, Renewal, Auditory context, Human predictive learning

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P-43:

Ethanol-induced place conditioning in earthworms (Dendrobaenaveneta)

José Manuel Lerma-Cabrera, Jairo Parras, Cristina Aragón and Roberto Álvarez

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Place conditioning is a commonly used procedure to assess the motivational value of drugs in non-human animals. However, research in this area with invertebrates, such as earthworms, is limited. In this preliminary study, we present a detailed protocol for ethanol-induced place conditioning to assess contextual learning in earthworms. First, a preference/familiarization phase was conducted to determine the worms' initial preference between two contexts that differed in soil texture (smooth or rough). Next, in the conditioning phase, eight alternating trials were conducted. The worms were exposed to a moist, rough soil context containing 7% ethanol (v/v) for 10 minutes, followed by exposure to a moist, smooth soil without ethanol for another 10 minutes. Finally, in the test phase, the worms' preference for one of the two contexts was assessed. The number of worms in each context was recorded every two minutes for a total of 10 minutes. The results shown a significant preference for the context associated with ethanol indicating that earthworms displayed an associative learning response toward ethanol. This study represents one of the first investigations of place conditioning and ethanol preference in earthworms, providing valuable insights into the behavioral responses of invertebrates to drugrelated stimuli. Further research in this area could contribute to our understanding of the neural mechanisms underlying contextual learning in different animal species.

Keywords: contextual learning, ethanol, invertebrates, earthworm, place conditioning

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Funding: This work was supported by MCI grants PID2021-128650NA-I00 (Spain).

P-44:

Extinction of avoidance behaviour with and without response prevention

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The goal of this experiment was to assess, in a human instrumental (operant) avoidance task, the effect of response prevention during extinction. Previous research in human instrumental avoidance tasks have found recovery from extinction when the response was prevented during extinction but again available at test (Vervliet & Indekeu, 2015). The current experiment used a within subjects AAB renewal design. Participants had to avoid a loud noise by pressing the space bar. We trained two pairs of stimuli (fractals; CS1+ and CS2-; CS3+ and CS4-) in two different contexts (A and B; which were different background colours; all counterbalanced). In each context, one S (CS1+ and CS3+) was paired with the US (aversive sound), and the other S (CS2and CS4-) was not paired with the US (8 trials of each CS during acquisition). During extinction (24 trials), one S (CS1+) was extinguished whilst participants could avoid (CS1-RA) and the other S (CS3+) was similarly extinguished but participants were instructed not to respond (CS3-RP). During test, all stimuli were tested in both contexts, resulting in a within-subjects AAB renewal design. Avoidance responses were measured throughout the experiment, and expectancy ratings to all stimuli and context combinations were collected at the end. The results revealed that during acquisition, participants were able to distinguish between CS1+, CS3+ and CS2-, CS4- showing discriminated avoidance learning. During extinction, participants complied and did not respond to CS3-RP and CS4RP. They continued to respond to the other stimuli pair but responding decreased to CS1+ showing extinction learning (although not complete) by the end of extinction. The main results during the test phase revealed similar rates of responding to CS1+ and CS3+, with a tendency to respond less in the extinction context than in the alternative context. Responding to CS2- and CS4- was also similar, in both contexts. The expectancy results mirrored the avoidance behaviour, but this manipulation was more sensitive as it revealed higher ratings for CS1 and CS3 in the alternative context relative to the extinction context – indicative of AAB renewal. Overall, there was no evidence that response prevention facilitated extinction.

Keywords: Response Prevention, Avoidance, Extinction Anxiety

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P-45:

New procedures and operational registers for assessing learned behavioural changes in earthworms (Eisenia fetida)

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A series of experiments with earthworms (Eisenia fetida) as subjects is presented in which different learning phenomena such as habituation, classical conditioning and discrimination were evaluated. Different data collection systems were tested in the search for a more accurate observation of the usual responses of interest (retraction response and migration response in the earthen environment). In addition to these methodological and/or procedural contributions, several theoretical aspects of the results obtained and their implications for current debates on the concept of minimal cognition are discussed.

Keywords: earthworms, habituation, classical conditioning, discrimination

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P-46:

Noradrenergic stimulation facilitates Novel Object Recognition (NOR) in Swiss mice: sex-dependent differences in learning and memory processes

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The Novel Object Recognition (NOR) paradigm is a widely used task to assess declarative memory in rodents. This test is based on the innate preference for novelty and the ability to discriminate novel and familiar objects. Current evidence suggests sex differences in object recognition tasks. However, only few studies have included females, and in some cases, females have been ovariectomized, which reduces the interpretation about female behavior. The noradrenergic (NA) system has been demonstrated to play a critical role in the emotional arousal necessary for memory consolidation, including object recognition. For example, a post-training administration of the noradrenergic stimulant yohimbine, enhanced object location memory in male mice. Atomoxetine (ATO), a NA reuptake inhibitor, improved impaired NOR in a mouse model of hyperactivity disorder. However, these effects are poorly understood and studies evaluating the contribution of the NA system to NOR with females have not been done yet. Systemic ATO administration in mice increases NA levels in the medial prefrontal cortex 30-120 min after the injection, showing the peak at 120 min. Our aim is to explore the effects of ATO on NOR memory in male and female Swiss mice. ATO was administered 30 or 120 min before training (two identical objects were presented: AA). After training, a NOR test was carried out (familiar and novel object were presented: AB). ATO administered 30 min before training facilitated object recognition in females, but not in males. These data suggest sex-dependent differences in Noradrenergic modulation in object recognition memory and support previous literature demonstrating that males and females may differ in object recognition tasks. Taking in account sex-differences in the study of neural bases of learning and memory is relevant since males and females may differ in the way they interact and encode contextual information.

Keywords: Novel object recognition, Noradrenaline, Atomoxetine, Sex differences

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Reinstatement of extinguished cocaine-induced conditioned place preference and c-Fos expression depends on contextual cue configuration

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Drug addiction is a neuroplasticity disorder characterized by long-lasting changes in brain circuits responsible for learning and memory. Exposure to environmental stimuli associated with the drug triggers relapse after abstinence. An animal model widely used for evaluating the conditioned effects of addictive drugs is the Conditioned Place Preference (CPP). Two typical configurations used in preclinical studies are "One-compartment" (1C; animals have access to the whole CPP apparatus) and "Two-compartment" (2C; animals are confined to one side of the CPP apparatus). The aim of this study is to assess the neurobiological impact of exposure to different spatial configurations in the memories of acquisition, extinction and reinstatement of cocaineinduced CPP. Male C57BL/6 mice were trained following an unbiased design; paired, unpaired and saline groups with cocaine (20 mg/kg), using 1C or 2C configurations in the acquisition and extinction phases. Brains were collected 24h after the reinstatement test to study c-Fos expression. Different apparatus configurations (1C or 2C) induce similar levels of acquisition and extinction of cocaine-induced CPP on paired groups. However, only the paired group trained following 2C configuration reinstated CPP after receiving a lower dose of cocaine (10 mg/kg). Cocaine-primed reinstatement of CPP was associated to activation of the lobule VIII and IX of the cerebellum in both; 1C and 2C animals. However, only animals trained under a 2C configuration showed an activation of Prelimbic and Infralimbic cortex, CA1, Dentate Gyrus, Lateral Habenula and the Lateral Hypothalamus in response to cocaine reinstatement. Our data suggest that contextual information encoded during memory acquisition may determine the neural circuitry activated by cocaine-induced reinstatement of an extinguished CPP. Further studies are required to explore this phenomenon and to develop specific treatments based on stimuli configuration.

Keywords: Conditioned Place Preference, Cocaine, Memory, Reinstatement, c-Fos expression

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P-48:

Association Between Individual Differences in Extinction of Flavor Aversion and Anxiety Trait in Rats

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Several studies have documented individual differences in the extinction of conditioned fear in rats, but less is known about the existence of similar individual differences in flavor aversion learning preparations. In the present experiment, Sprague-Dawley rats of both sexes received two conditioning trials, in which consumption of a flavored solution was paired with a LiCl injection to induce taste aversion. The acquired taste aversion was subsequently extinguished, presenting the same solution but without any associated consequences. Following previous literature on fear conditioning, rats were categorized into two extreme groups: one consisting of subjects with faster extinction and another consisting of subjects with slower extinction. After a 23 day interval, a test of spontaneous recovery was conducted. Individual differences in the level of trait anxiety were assessed using the light/dark transition test and the elevated plus maze tests, both of which measure the tendency of a subject to avoid exploration of novel and potentially dangerous environments. Based on previous findings in fear conditioning studies, it was expected that rats with slower extinction rates would display reduced levels of exploration and higher levels of anxiety-like behavior in the conducted tests.

Keywords: extinction, flavor aversion, individual differences, anxiety

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P-49:

Exposure to beer prior to extinction reduces ABA and AAB renewal of beer seeking in rats

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In two experiments, rats were trained to rundown an alley for beer in Context A. Then, extinction was in effect in Context B for Experiment 1, whereas rats in Experiment 3, received extinction in Context A. Each extinction session was preceded by a brief exposure to the beer in half of the groups in each experiment. Finally, all the rats were tested in both the extinction context and in the renewal context to measure renewal. We found both ABA and AAB renewal of beer seeking. However, the renewal effect was thwarted in the groups for which beer was presented briefly before each extinction session. These results suggest that the renewal of alcohol-seeking can be prevented by using the retrieval-extinction paradigm.

Keywords: Beer, Context, Instrumental learning, Rats, Renewal

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P-50:

No sex differences in attenuation of neophobia despite differences in hedonic reactions to novel flavours

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Taste neophobia is the reluctance of an animal to consume novel flavours. It represents a survival mechanism to prevent overconsumption of potentially harmful substances. If consumption is not followed by negative consequences, the animal will increase intake on subsequent exposure, a phenomenon called attenuation of neophobia (AN). While the effect of AN in consummatory behaviour has been widely studied, there has been a notable lack of attention given to potential changes in the hedonic value of flavors. Furthermore, the potential impact of sex differences remains relatively unexplored, primarily due to a bias towards using male animals in experimental procedures. To address this research gap, examined the palatability of a novel flavor during the process of attenuating neophobia using two different methodologies. In the first experiment, male and female rats had free access for 15 minutes to a 3% cider vinegar solution for six days while the microstructure of licking behaviour was recorded. The second experiment involved a taste reactivity test where a solution was infused intraorally through a surgically implanted cannula over six days, and the orofacial reactions to the solution were recorded and categorized. A voluntary consumption test was performed at the end of the second experiment. Females displayed generally higher lick cluster sizes in females than males. However, during the taste reactivity test, females displayed higher aversive reactions and fewer appetitive reactions than males. Although the typical neophobia and AN effects were observed with consumption measures, AN did not produce any significant effect on either palatability measure (or either sex). These results highlight the importance of considering sex differences and the hedonic value of flavors during the process of attenuating neophobia. The findings contribute to our understanding of how sex influences flavor processing and call for further exploration in this field.

Keywords: *Flavor*, *neophobia*, *rat*, *sex*, *taste*

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Funding: Funded by PID2020-114269GB-I00 (MICIU, Spain), BSEJ.514.UGR20 (Junta de Andalucía, Spain), MR/RO11397/1 (Medical Research Council. UK) and FPU16/06017 (MECD, Spain).

P-51:

Sex Differences in the Expression of Taste Neophobia as a Function of the Deprivation State

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We conducted an experiment to evaluate possible sex differences in the expression of taste neophobia in rats. Previous investigations reported more neophobia in females, however, our results did not confirm that findings. After a period of baseline consumption of water, half of the subjects of each sex were exposed to saccharine and the other half to water. Although there was a significant effect of sex on the overall consumption, males drinking more than females, there were no apparent differences in the expression of neophobia. When comparing the groups exposed to water and to saccharin, female and male animals showed similar reductions in consumption of the novel taste. We also assessed the influence of deprivation by including additional groups of rats with the same preexposure conditions but without being subjected to a regimen of liquid deprivation. There were sex differences among non-deprived animals, with females, in this case, showing more overall consumption than males. Non-deprived rats drank substantially less than deprived ones, but, interestingly, they showed a different pattern of consumption, drinking more saccharine than water; the same reaction to novelty was observed in both sexes. We interpret these results as an interaction between two mechanisms that modulate the ingestion response. With a low need for nutrients, the achievable amount of intake will be below the threshold level of tolerable toxin, and thus neophobia will not be evident. However, with a high need for nutrients, the achievable amount of intake will be above the threshold level and neophobia will start to be evident.

Keywords: Neophobia; Deprivation; Palatability; Sex differences.

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P-52:

ABA renewal is reduced by a focused attention intervention

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In one experiment we investigated the effects of focused attention instructions on ABA renewal using a remote causal learning task with humans. During Phase 1, participants learned that a fictional medicine was associated with a side effect in Context A, then in Phase 2 they learned the medicine produced a different side effect in Context B. Subsequently, participants in the ABA_f group received focused attention instructions, while the ABA_u group was exposed to unfocused attention instructions. Participants in the rest of the groups did not receive any of those instructions. In the final phase, the response of the participants to the medicine was evaluated. We found that when participants were tested in Context B, they provided the most recently learned response, however, when tested in Context A, ABA renewal was reported. Nevertheless, the group that received the focused attention instructions showed lower levels of ABA renewal. The methodological and theoretical value of the present findings is discussed.

Keywords: Attention, Context, Humans, Predictive Learning, Renewal

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Effects of the NMDA Receptor Antagonist MK-801 on Social Deficits and Synaptic Plasticity

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Psychosis-related pathologies are characterised by a diminished desire for social contact, leading to significant impairment in psychosocial functioning. Social withdrawal typically emerges during the initial psychotic episode, worsens over time, and often persists throughout the course of the illness. The objective of this study was to investigate the impact of the first episode of psychosis on social behavior and synaptic plasticity using a rodent model of post-first episode psychosis. In order to simulate symptoms observed in humans after a psychosis episode, we administered MK801, a well-known N-methyl-D-aspartate receptor (NMDAR) antagonist to male Long Evan rats. MK801 is widely recognised for inducing neuronal changes associated with psychosis in rodents. During the experiment, animals injected with MK801 and controls were allowed to interact with either sibling or stranger animals placed inside a Plexiglas cage within an open field for 10 minutes. Additionally, one month after MK801 injection, animals underwent a second social interaction trial. Using immunohistochemistry techniques, we measured changes in the expression of oxytocin receptors (OxR) and examined neural activation through the c-Fos immediate early gene (IEG). Behavioral results indicated no significant differences in social interaction between the MK801 and control animals. However, regional brain differences within the limbic system were detected between the two groups, particularly in the central, medial, and basal amygdaloid nuclei. Furthermore, variations in oxytocin levels were detected between groups, suggesting potential alterations in social bonding mechanisms within the psychosis model. These findings emphasize the importance of investigating the neural mechanisms underlying social deficits in psychosis-related pathologies. Understanding these processes can provide valuable insights into the development of effective interventions for individuals affected by psychosis-related social impairments.

Keywords: psychosis, social withdrawal, synaptic plasticity, oxytocin, c-Fos, immunohistochemistry

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P-54:

Neophobia and pre-exposure effects in conditioned taste aversion with Hidango ewes

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Here we present an experiment aimed to test the effect of pre-exposure to two tree leaves in habituation of neophobia and latent inhibition with ewes. To do this, 16 ewes receives four presentations of two different tree leaves— orange, lemon, avocado, and pine, counterbalanced—in separate block of trials prior to receive two conditioning trials in a conditioned taste aversion preparation. We found a general effect of neophobia habituation irrespectively of the pre-exposed leaves. However, neophobia seemed to be stronger for the lemon and weaker for the pine than for the other leaves. Further, pre-exposure to the first leave seemed to reduce neophobia to the second leave. The present findings are discussed in terms of palatability, nutritional value and generalization of habituation, analysing the potential role of conditioned taste aversion in owes for the sustainable development of farming systems.

Keywords: Acquisition, Conditioned Taste Aversion, Habituation, Latent Inhibition, Neophobia

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P-55:

Singleton detection mode prevents habituation of the attentional capture by color singleton distractors

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The study by Tommaso and Turatto (2019) showed that experience alone does not cause habituation of attentional capture by distractor stimuli. When a singleton detection mode is adopted, habituation is prevented. The present study aims to replicate Tommaso and Turatto's experiments 2-4 and investigate whether attentional capture by low-salience distractors can also not be suppressed with training. Tommaso and Turatto's study only examined distractors of the same luminance, so it remains unclear if distractor salience plays a role in the habituation process. Objective: Our objective is to investigate the habituation of attentional capture caused by a bright yellow singleton distractor and a dim orange singleton distractor through multiple exposure trials. Method: Sixty-one students completed an additional-singleton paradigm. They responded to a shape-singleton target while a color distractor was presented. The effects of training and distractor stimuli on RTs have been analyzed via mixed-effects models. Results: The selected model accounted for 47% of the within-participant variability in RTs. Regarding the effect of the distractor, the difference in the observed RTs was statistically significant between the bright distractor and absence of distractor and between the bright and dim distractors, however there were no significant differences between the dim distractor and absence of distractor. Given that the interaction effect between the effects of distractor and training was not statistically significant, the differences among distractors were maintained throughout the training blocks (0-4), which suggests that habituation did not occur. Conclusion: Our findings showed that experience did not lead to habituation when attention was initially captured by a bright singleton distractor in a singleton paradigm. Additionally, our results showed a lack of initial attentional capture by the dim singleton distractor and no subsequent habituation. We discuss the benefits of using mixed-effects models to study attentional capture and we propose that singleton detection mode is shaped and reinforced by successfully finding the target over trials, preventing habituation regardless of distractor salience.

 $\textbf{Keywords}: habituation, attentional \ capture, singleton-detection \ mode, singleton \ distractor, \ mixed-effects \ models$

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P-56:

The Signal for Good News (SiGN) model of suboptimal choice

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As reported almost half a century ago pigeons, (Columba livia) sometimes choose options that provide less food over options that provide more food. Research has focused on the circumstances under which pigeons make these suboptimal choices and the mechanisms that drive this seemingly paradoxical behaviour. One early account of suboptimal choice (Dunn &Spetch, 1990) based on Fantino's delay-reduction theory assumed that signals for a reduction in delay to food reinforce choice. This model was later termed the signal for good news (SiGN) model. In a recent publication we mathematically formalized the SiGN model and showed that, without free parameters, the SiGN model provides an excellent fit to the data from a large set of conditions across studies from numerous researchers. Here we describe key features of this formalization and present predictions about the effects of parameters that characterize suboptimal choice. This approach may have general applicability to understanding how rewards and signals for reward combine to reinforce behaviour. To test the model, we compiled a large data set which is publicly available on the Open Science Framework at https://osf.io/39qtj. We encourage other researchers to use these data as a resource to test existing models or develop new approaches.

Keywords: conditioned reinforcement, suboptimal choice, paradoxical, delay reduction, SiGN model

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P-57:

Initial-link Schedule Affects Suboptimal Choice

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Research has demonstrated that the pigeons and other animals will sometimes choose suboptimally, that is, prefer an alternative that leads to less food over one that leads to more food. This phenomenon depends on the presence of informative stimuli following choice of the leaner alternative and the absence of informative stimuli on the richer alternative. The present study assessed the effect of increasing the duration of the initial-link (choice) schedule on suboptimal choice. Pigeons chose between a suboptimal alternative that led to signaled food 20% of the time and an optimal alternative that led to unsignaled food 50% of the time. In one experiment, the choice schedule was either a fixed-ratio (FR) 1 or variable interval (VI) 30 s. In a second experiment, choice schedule was either a VI 1.7 s, VI 4.75 s, or VI 35 s. In both experiments, the VI schedules were programmed on one common timer. The birds showed extreme preference for the suboptimal alternative when the choice schedule was an FR 1 or a VI 1.7 s. When the choice schedule was a VI 30-s or 35-s schedule, pigeons behaved optimally, showing strong preference for the optimal alternative. Thus, the present results confirm that suboptimal choice is affected by the initial-link schedule, which has important implications for models of choice.

Keywords: suboptimal choice, conditioned reinforcement, temporal variables, preference

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P-58:

Therapy focused on the reduction of threat perception (TFRTP) to reduce pathological worry

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Worry is a complex process of great adaptive utility for the human being, which is possible due to the capacity for anticipation and language. According to the PAMTA model (Perception of future threat, Activation, Motivation, Thought and Action), it reduces the probability that we are affected by different threats or mitigate their effects if they occur. However, dysfunctions are frequently observed in the worry process that is associated with different disorders, such as; social anxiety, depression, and especially generalized anxiety disorder. In the present work, the Therapy focused on the reduction of threat perception (TFRTP) is described as an intervention proposal for pathological worry based on the PAMTA model, which sequentially describes different steps to carry out the worry process in an adaptive way and points out different aspects that can make it dysfunctional. Likewise, different proposed acceptance and commitment therapy (ACT) strategies are used. The most novel aspects of the proposed treatment are: 1) It provides a guide to worry adaptively, 2) it places particular emphasis on reducing the perception of threat, in which strategies such as cognitive implosion and radiating circumference are used, and 3) The use of ACT to cope with cognitive fusion and promote psychological flexibility. Finally, some aspects of the intervention are discussed, and the need for further studies to study the efficacy of TFRTP is pointed out.

Keywords: Anxiety, Stress, Worry, Treatment

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Ability Of Musical Stimuli In The Generation Or Modification Of Emotional States: A Systematic Review

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Music has a profound relationship with human emotions. However, the characteristics and correlates of this relationship have not yet been determined. The aim of this review is to describe the results of the research on the capacity of music in the generation and modification of the emotional state in the listener, the respective methodological designs and the evaluation tests used. Methods: A systematic review of articles written between 2009 and 2021 was carried out. The criteria for inclusion, exclusion, analysis, and data recording are based on the structure proposed in the Preferred Items of Reports for Systematic and Meta-analyses Reviews (PRISMA). Results: The results show that music can generate and modify changes in the emotional state of listeners, in addition to modifying cognitive performance in recognition tasks and executive performance. However, the neuropsychological foundations and characteristics that would determine these modifications are diverse and inconclusive. Conclusions: It is necessary to carry out studies that, through a rigorous methodology, allow to establish consistent conclusions on the human characteristics that sustain the capacity of music in the generation or modification of the emotional state.

Keywords: Music, Emotion, Cognition, Brain

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P-60:

How does having experienced anxiogenic situations affect alcohol consumption? A pilot study in rats

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Alcohol consumption has been observed to produce sedative and anxiolytic effects if taken in high quantities. Some authors hypothesize that drinking alcohol can be a way to self-medicate when experiencing negative emotions, such as anxiety, as a way of dealing with them. Thus, having experienced anxiogenic situations may lead to a higher alcohol intake. In order to expand the knowledge regarding this relationship, it was first induced anxiety through Open Field and Light-Darkness tests. Then, a self-administered alcohol procedure was implemented: rats were presented with the choice of drinking water or alcohol (20%) ad libitum during a few hours for three consecutive days. Primarily, It was expected to observe water vs alcohol choice, and their consumption over time. Secondly, the next objective was to explore whether rats experiencing anxiogenic situations showed higher alcohol intake compared to the control group.; and whether rats that experienced higher anxiety also showed higher alcohol consumption. Furthermore, sexual differences were also of interest; we expected that females would drink less alcohol than males. With respect to the hypotheses, it was observed that the control group consumed more alcohol than the experimental group over the days, so that the anxiety generated increases neophobia, preventing them from consuming alcohol in the experimental group. Also, the control group consumed more alcohol than the experimental, because in safe contexts without anxiety, neophobia decreases and consumption increases. Likewise, there were no differences in consumption by sex despite the different metabolism and weight, which could be studied in the future, and because there are different consumption trends, an analysis of consumption over time should be made. Dimorphic differences on anxiety and neophobic behaviors are also discussed.

Keywords: Alcohol, Anxiety, Open Field test, Light/Dark test, Dysmorphic Differences

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