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XXXIV International Conference of the Spanish Society for Comparative Psychology

September 25th, 26th and 27th

Baeza, Spain

ABSTRACT BOOK

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DIPUTACIÓN DE JAÉN

PROGRAM

Wednesday (25 sept)		Thursday (26 sept)		Friday (27 sept)	
9:00-9:30	Registration	9:00-10:00	Contents and development of learning	9:00-10:00	Discrimination and generalization
9:30-10:00	Opening				
10:00- 11:30	**Understanding contextual control through renewal**	10:00-11:30	**Psychology as the biopsychist views it (with no thanks to John B Watson)** *(Videoconference)*	10:00-11:30	**Markers and theoretical commitments in the study of animal consciousness**
11:30-12:30	Poster 1 - Coffee (UNIA Garden)	11:30-12:30	Poster 2 - Coffee (UNIA Garden)	11:30-12:30	Poster 3 - Coffee (UNIA Garden)
12:30-14:00	Extinction and information retrieval	12:30-13:45	Sexual differences	12:30-14:00	**Neuroscience and Behavior**
14:00 - 15:30	Lunch (TRH Hotel)	14:00 - 15:30	Lunch (TRH hotel)	14:00 - 15:30	Lunch (TRH hotel)
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16:00-17:30	**SOP and Recognition Memory**	16:00-17:30	**Anthrozoology: Benefits of human-animal interaction**	16:00-17:00	Choice and Learning flexibility
17:30 - 18:30	Attentional processes	17:30 - 18:30	Time and number processing	17:00-18:30	**Winner doesn't always take all: synergistic and competitive outcomes in associative learning**
20:00	Welcome reception (UNIA Garden)	19:30	Guided tour (Plaza de Santamaría)	18:30-19:30	SEPC Annual Meeting
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Understanding contextual control through renewal
James Byron Nelson
University of the Basque Country, Spain

Thursday 26th – 10:00 to 11:30

SEPC Keynote
Psychology as the biopsychist views it
Pamela Lyon (1) and Ken Cheng (2)
(1) School of Humanities, University of Adelaide, Adelaide
(2) School of Natural Sciences, Macquarie University, Sydney

Friday 27th – 10:00 to 11:30

SEPEX Keynote
Markers and theoretical commitments in the study of animal consciousness
Eva Jablonka
Tel Aviv University

Friday 27th – 17:00 to 18:30

Closing Keynote
Winner doesn't always take all: synergistic and competitive outcomes in associative learning
Gonzalo Urcelay
University of Nottingham

Symposia

Wednesday 25th – 16:00 to 17:30

Symposium 1: SOP and Recognition Memory

Chair: Dr. Charlotte Bonardi

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Charlotte Bonardi and Jasper Robinson
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Aleksander W. Nitka, Charlotte Bonardi and Jasper Robinson
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Sergio N. Galarce, Edgar H. Vogel, Charlotte Bonardi, Jasper Robinson and Benjamin Keep
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Friday 27th – 12:30 to 14:00

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Marta Miquel
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Milagros Gallo, Alejandro N. Expósito, Beatriz Gómez-Chacón, Alejandro B. Grau-Perales and Fernando Gámiz
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Wednesday 25th

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Rocio C. Fernandez, Martin M. Puddington, Mauricio R. Papini, and Ruben N. Muzio
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María J. Quintero, Joaquín Morís, Francisco J. López and Bram Vervliet
OC - 3. Extinction of an instrumental response produces an extinction burst and changes in attention
Roberto Jiménez-Castillo, Alberto Monroy-Olvera and Javier Vila
OC - 4. Can pavlovian extinction be enhanced by compound presentation with novel stimuli?
Paula Nogueiras, Gabriel Rodríguez, Fernando Rodríguez-San Juan and Unai Liberal
OC - 5. Human AAB, ABC, and ABA renewal from extinction in a fully immersive virtual reality ecological task
A. Matías Gámez, Rodolfo Bernal-Gamboa, José E. Callejas-Aguilera, Jesús Moreno-Arjonilla and Juan M. Rosas

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Clara Muniz-Diez, Mark Haselgrove, Sandra Lagator and Tom Beesley.
OC - 7. Novelty may endow a context with excitatory properties
Unai Liberal, Paula Nogueiras and Gabriel Rodríguez
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OC - 11. Saline blocks the expression of conditioned place preference using light and dark cues in planarians (Dugesia japonica).
Toru Tazumi, José Prados and Gonzalo P. Urcelay
OC - 12. Overtraining and sensitivity to devaluation in flavor preference learning
Ana González, Jesus Sánchez Plaza and Isabel de Brugada
OC - 13. Devaluation of the US in the snail Cornu aspersum
Judit Muñiz-Moreno, Félix Acebes and Ignacio Loy

12:30 - 14:00 Sexual differences
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OC - 15. Frustrative nonreward in male and female Wistar rats: No evidence of sexual dimorphism in behavior.
Marta Valero, Antonio David Rodríguez Agüera and Carmen Torres.
OC - 16. Sex differences in conditioned inhibition with a conditioned taste aversion preparation in rats.
Javiera Osses, Lucía Cárcel, Camila Pérez, Anais Moraga and Rocio Angulo
OC - 17. Methylphenidate's impact on extinction learning in Wistar rats: A sex-based analysis
Fátima Montiel Herrera, Adela Batanero Geraldo, Reyes Martínez Marín and Estrella Díaz Argandoña
OC - 18. Prenatal conditioning and social learning affect the aversion of male and female lambs to pine leaves.
Rocio Angulo, Jaime Figueroa, Marcelo Quezada and Laura Quezada.

17:30 - 18:30 Time and number processing
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Alejandra Salinas, Armando Machado and Marco Vasconcelos
OC - 20. Optimizing learning through pretesting: The role of timing
Yeray Mera, Nataliya Dianova and Eugenia Marin-Garcia
OC - 21. Verbal causal information affects time estimation
Carmelo Pérez Cubillas and Helena Matute
OC - 22. Do zebras go for more? Quantity discrimination in common zebras (Equus quagga)
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María del Carmen Sanjuan and James Byron Nelson
OC - 24. Compound-stimulus salience test of the unique elements in an acoustic discrimination task with human participants
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OC - 25. Beyond conditioning: The impact of affective congruency and contingency on generalization gradients
José A. Alcalá, Celia Martínez-Tomas, Gonzalo P. Urcelay and José A. Hinojosa
OC - 26. Inductive learning benefits from spacing and interleaving in recognition and categorization tests
Marina Espinosa Mayoral, Víctor Trillo Rodríguez and Joaquín Morís Fernández

16:00 - 17:00 Choice and Learning flexibility
Chair: Pilar Flores

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Guilherme Hoffmann, Marco Vasconcelos and Armando Machado

OC - 28. Is all information worth It? The observing response in the suboptimal choice task
Susana Maria Carlos Vieira, Armando Domingos Batista Machado and Marco Alexandre Barbosa de Vasconcelos
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Paula Nogueiras, Gabriel Rodríguez and Unai Liberal
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P - 4. Parallelisms between latent inhibition and extinction: The role of the prediction error generated by novel stimuli
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P - 5. Retrieval practice: Effect stability and anxiety
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P - 8. Cognitive benefits of nature on Stroop performance
Javier Gonzalez-Espinar, Alba Gómez Ruiz, Isabel Carmona Lorente, Aitor Calvente García and Juan José Ortells Rodríguez,
P - 9. Spacing and interleaving effects improve long-term inductive learning
Víctor Trillo Rodríguez, Marina Espinosa Mayoral and Joaquin Morís Fernandez
P - 10. Exploring the mechanisms underlying reward and punishment driven learning in a modified probabilistic reversal learning task: A pilot study
José Juan León, Pablo Rueda-Rosas, Rocío Rodríguez-Herrera, Pilar Fernández-Martín, Ana Sánchez-Kuhn and Pilar Flores
P - 11. Safety signals reinforce instrumental avoidance in humans
Courteney Fisher and Gonzalo Urcelay
P - 12. Unconditioned and conditioned effects of naloxone on fear conditioning
Mª Ángeles Cintado, Daniel Santos-Carrasco and Luis Gonzalo de la Casa
P - 13. An evaluation of resurgence in dogs
Rodolfo Bernal-Gamboa, Azul C. Meléndez Candela and José E. Callejas-Aguilera

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P - 14. The effect of context familiarity on habituation of the retraction response in earthworms
José L. Hidalgo-Baños, Elena Vílchez-Moreno, Alejandro Ramírez-Gómez, Sergio Iglesias-Parro and Concepción Paredes-Olay

P - 15. Effects of contextual surface change on habituation of the retraction response in earthworms (Dendrobaena veneta)
Elena Vílchez-Moreno, José L. Hidalgo-Baños, Alejandro Ramírez-Gómez, Sergio Iglesias-Parro and Concepción Paredes-Olay
P - 16. Habituation is context-specific in invertebrates: New data on the earthworm (Dendrobaena veneta)
Roberto Álvarez, Andrés C. Muñoz, José Antonio Sánchez-Pomares and José Manuel Lerma-Cabrera
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Irene Ruiz, Ana González and Isabel del Brugada
P - 18. An initial observational study for an intervention program to reduce stereotypic behaviors in giraffes at the Madrid Zoo
Gema Paula Méndez, Ana María de Paz Regidor, Pedro Vidal García and Ricardo Pellón Suárez de Puga.
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P - 20. Exposure to docosahexaenoic acid (DHA) attenuates the ethanol-induced place preference in earthworm (Dendrobaena veneta)
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P - 25. Going nuts! The impact of acute stress induction on cognitive function
Daniel Santos-Carrasco and Luis Gonzalo de la Casa
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Adela Batanero Geraldo, Antonio Pérez Colorado, Manuel Portavella García and Juan Pedro Vargas Romero
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Giselle Kamenetzky, María Celeste Ifran, Andrea Suárez and Mery Hernández Escalona
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Ana Sánchez-Kuhn, José Juan León-Domene, Pilar Fernández-Martín, Rocío Rodríguez-Herrera, Fernando Sánchez-Santed, Margarita Moreno, Marta Miquel and Pilar Flores
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Elena Martín-González, Manuela Olmedo-Córdoba, Ángeles Prados-Pardo, Santiago Mora, Patricia Ibáñez-Marín, Aitor Sanchez-Hernandez, Margarita Moreno and Marta Miquel

P - 33. DHA reduces binge-like ethanol drinking in adolescent mice without influencing anxiety levels
Ainhoa Sánchez-Gil, Diana Cardona, Francisca Carvajal, Sergio Contreras and José Manuel Lerma-Cabrera
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P - 35. Exploring peak-shift as a function of valence dimension
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P - 36. Behavioral flexibility in mice: Effect of fixed or variable change and continuous or variable reinforcement
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P - 37. The impact of docosahexaenoic acid (DHA) on binge-like consumption of caloric and non-caloric palatable substances in C57BL/6J mice
Francisca Carvajal, Ainhoa Sánchez-Gil, Sergio Contreras, Diana Cardona and José Manuel Lerma Cabrera
P - 38. ABA and ABC renewal procedures in instrumental learning in children
Rosalia Baiamonte and A. Matías Gámez
P - 39. Attenuation of Overshadowing Depends on Increased Prediction Error: A Study of Order Effects
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Plenary Lectures

OPENING KEYNOTE

Understanding Contextual Control through Renewal

James Byron Nelson

University of the Basque Country (UPV/EHU)

Contextual control is often conceived as a hierarchical-type mechanism whereby the meaning of stimuli is retrieved, or otherwise enabled, by the presence of a specific background context. Contextual control is often described as an “occasion setting” mechanism where it sets the occasion for particular associations to be in effect. The present paper uses the “renewal effect” where the current meaning of an extinguished CS appears to be controlled by the context, as an example of contextual control to describe its importance and assess mechanisms by which it can occur. The talk demonstrates the prevalence and generality of the contextual control in associative learning and shows that 1: Contextual control favors second learning when new learning about stimuli occurs after previously having learned the relationship between stimuli and outcomes. 2: Contextual control does not depend on the nature of associations being excitatory or inhibitory. 3: Contextual control does not depend on the context itself signaling a particular outcome. 4 Contextual control does not reflect the known properties of occasion setting. Research is presented showing that contextual control does depend on new and old learning conflicting. Evidence for mechanisms related to contextually controlled representational changes in stimuli is presented as a contributing factor. Research showing the role of individual differences in mechanism is presented and ways to investigate those differences, as a way forward in understanding the phenomenon, are proposed.

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SEPC KEYNOTE

Psychology as the biopsychist views it

Pamela Lyon (1) and Ken Cheng (2)

(1) School of Humanities, University of Adelaide, Adelaide
(2) School of Natural Sciences, Macquarie University, Sydney

In 1913 John B. Watson wrote a lacerating critique of the consciousness-focused psychology of his day that was also a manifesto for a new research program based on the study and modification of animal behavior. The title of the article was "Psychology as the behaviorist views it." Behaviorism brought to psychology a set of investigative tools and principles relating to conditioning that still have utility. Its two main ideological conceits, however, failed utterly. An animal's responses to an experimental setup cannot be understood without reference to physiology, just as natural behavior cannot be understood divorced from ecological context. Mentalistic terminology, including consciousness, cannot be banished from psychology without significant cost to explanation and understanding. Yet important parts of Watson's general critique remain valid. Psychology's potential as a natural science remains unrealized. We believe a radical comparative psychology—the study of behavior grounded in biological process, ecological reality, and evolution across widely divergent phyla—has the power to provide psychology with the empirical and theoretical mooring needed. Inspired by Darwin, this effort had been underway for decades, in behavioral studies of microscopic organisms and other non-traditional models, when behaviorism took hold. Obstacles both methodological and philosophical stopped it. Today, comparative psychology has astonishing tools, e.g., microfluidics, sophisticated tracking techniques, statistical programs for analyzing data, comparative genomics, plus the ability to propagate a staggering variety of organisms, a growing body of literature upon which to build, and unrivalled means of communication within and across specialties. It is now possible to understand behavioral and mechanistic commonalities—and differences—between organisms of widely differing complexity in the instantiation of cognition, affect, and motivation. The paper will present several examples to illustrate what such a comparative psychology could look like.

Keywords: Psychology, behaviorism, cognition, evolution, biogenic approach, navigation, oscillation, random-rate processes

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SEPEX KEYNOTE

Markers and theoretical commitments in the study of animal consciousness

Eva Jablonka

Tel Aviv University

The study of animal consciousness is becoming a respectable domain of study, which has acknowledged implications for neuroscience, evolutionary biology and ethics. In this lecture I discuss the theoretical commitments of naturalistic approaches to animal consciousness and point to potential markers of consciousness and ways of testing them. For example, designing contrastive learning experiments based on experiments in reporting humans that uncovered conscious versus unconscious processing, may reveal analogous or homologous behavioral and neural markers of consciousness in other animals. However, the choice of contrastive experiments that are deemed relevant is theory dependent. The next step is therefore to show how consciousness may be derived from the connections among the processes underlying the relevant cognitive capacities. I present an evolutionary approach suggesting that consciousness is the outcome of the evolution of a complex form of associative learning (unlimited associative learning, UAL), and that the cognitive architecture that evolved to enable this kind of learning is the architecture of minimal consciousness. This theory provides a framework for observational and experimental studies in animals and has many testable predictions. For example, it suggests that one of the effects of UAL was the evolution of intricate perceptual, emotional, and motor signaling patterns that could not have existed before it had evolved, and that are therefore indicative of minimal consciousness in the selecting signal receiver. The implications of such studies for consciousness research and for evolutionary biology are then discussed.

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CLOSING KEYNOTE

Winner doesn't always take all: synergistic and competitive outcomes in associative learning

Gonzalo P. Urcelay

School of Psychology, University of Nottingham, UK.

The observation that events compete during learning (a.k.a. cue competition phenomena) has been widely documented in different species, and these phenomena have become a gold standard that theories of learning need to account for. However, in some domains (i.e., flavour aversion, spatial cognition) these effects have not been reliably observed, and recent discrepancies in the literature suggest that the observation of competition may occur under a restricted set of parameters. In this talk, I will present recent work from our laboratory in which we investigated the role of temporal and spatial distance (i.e.., contiguity) in predictive, action-outcome and spatial learning domains. In all these domains, we reliably observed competition when events were close in space and time, but no competition (and sometimes the opposite, that is facilitation) when events were discontiguous. Overall, these results suggest that contiguity is necessary for competition between events, and hence that we need to better account for contiguity effects in associative learning models.

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Symposia

Symposia

Wednesday 25th – 16:00 to 17:30

Symposium 1: SOP and Recognition Memory

Chair: Dr. Charlotte Bonardi

Recognition memory is a fundamental component of human cognition, and is impaired in old age and dementia – making recognition research increasingly important. If we are to understand the neural basis of recognition in man, and test new drug treatments, some of this research must take place in animals. But most studies of recognition memory in animals are based on theories developed in humans. We have proposed an alternative approach, explaining recognition in terms of Wagner's (1981) SOP model of associative learning. This symposium comprises four talks looking at this issue. The first talk (Bonardi) will outline the SOP account of recognition memory, explore the similarities and differences it has with human accounts of recognition, and its potential as a translational account of recognition memory. Robinson will describe the data from a series of experiments conducting parallels of rodent recognition tasks in a human eyetracking task. Galarce will describe implementing a simulation of SOP in Python, and explore the extent to which it can explain the human eyetracking data presented by Robinson. Finally, Keep will present data from some experiments performed in mice, which evaluate predictions this SOP account makes about the effect of distractor stimuli.

Charlotte.Bonardi@nottingham.ac.uk

Talk 1:

A translational approach to recognition memory.

Charlotte Bonardi and Jasper Robinson

University of Nottingham

Recognition memory is a fundamental component of human cognition, and is widely studied in both animals and man. Yet theories of recognition are typically based on human work, and recognition is often defined phenomenologically, and measured using subjective verbal judgements. This makes it theoretically and empirically challenging to study recognition in animals, and is therefore a challenge for translational work. But behaviourally it is clear that animals can recognise, and as the same principles of associative learning apply across all vertebrates and invertebrates, regardless of brain physiology, it seems possible that the same might be true of recognition. One approach is to adopt a theoretical account of recognition phrased in terms of Wagner's (1981) SOP model (Robinson & Bonardi, 2015). This account will be outlined, and the extent to which it might relate to the human conception of recognition memory will be explored.

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Talk 2:

An associative analysis of recognition memory: Relative recency effects in an eye-tracking paradigm

Aleksander W. Nitka (1), Charlotte Bonardi (2) and Jasper Robinson (2)

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I will present experiments from a paper whose results have been simulated and will be presented in this symposium by Sergio Galarce. People participated in two eye-tracking experiments, designed to establish human variants of two rodent recognition memory tasks, relative recency and object-in-place. In Experiment 1 participants were sequentially exposed to two images, A then B, presented on a computer display. When subsequently tested with both images, participants biased looking toward the first-presented image A: the relative recency effect. When a contextual stimulus x and y respectively accompanied A and B in the exposure phase (xA, yB), the recency effect was greater when y was present, than when x was present at test. In Experiment 2 participants viewed two identical presentations of a four-image array, ABCD, followed by a test with the same array, but in which one of the pairs of stimuli exchanged position (BACD or ABDC). Participants looked preferentially at the displaced stimulus pair: the object-in-place effect. Three further conditions replicated Experiment 1's findings: two pairs of images were presented one after the other (AB followed by CD); on a test with AB and CD, relative recency was again evident as preferential looking at AB. Moreover, this effect was greater when the positions of the first-presented A and B was exchanged between exposure and test (BACD), compared to when the positions of second-presented C and D were exchanged (ABDC). The results were interpreted within the theoretical framework of the Sometime Opponent Process model of associative learning (Wagner, 1981).

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Talk 3:

Simulating object recognition with the SOP model

Sergio N. Galarce (1), Edgar H. Vogel (1), Charlotte Bonardi (2), Jasper Robinson (2) and Benjamin Keep (3)

(1) University of Talca, University of Talca
(2) University of Nottingham
(3) Queen Mary University of London

Robinson & Bonardi (2015) proposed that Allan Wagner's SOP (Wagner, 1981) model of Pavlovian conditioning is a helpful framework to explain various empirical regularities of recognition memory, particularly those observed in object recognition. Nitka et al. (2020) conducted two experiments involving humans that appear to support this conjecture. To examine the quantitative fit of SOP to Nitka et al.'s data, we performed a series of computer simulations. Using Python, we programmed a specific stimulus presentation schedule for each experiment. As a first step, we utilized the parameters most frequently recommended by Wagner and his colleagues instead of conducting any parameter fitting or optimization. Our results showed that the simplest version of the SOP model is sufficient to describe Nitka et al.'s data well. However, a more elaborate version of the theory, which includes specific response functions and distractor effects, might be necessary to account for a broader corpus of research in this area. We outline some ideas for future theoretical work and empirical research to build upon these findings.

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Talk 4:

Associative analysis of distractor effects in recognition memory

Benjamin Keep (1), Jasper Robinson (2) and Charlotte Bonardi (2)

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Recognition memory is a fundamental cognitive process which is often impaired in dementia. In rodents, it is often studied using spontaneous object recognition tasks (SOR) where objects that differ in novelty, recency, or prior location, are explored by animals. The theoretical basis and explanations of performance during these tasks remain controversial, often based on theories of familiarity and recollection. Sometimes opponent process (SOP) offers an alternative explanation and proposes that two priming processes underlie recognition memory. Self-generated priming occurs when a current stimulus has been recently experienced, and retrieval-generated priming arises when an object is predicted by another stimulus through prior association. Relative recency (RR) SOR tasks map onto self-generated priming and consist of two objects sequentially presented over two sample phases, followed by a test with both objects. Rodents generally explore the less recent object more during test. SOP postulates that a distractor stimulus experienced during the sample-sample interval would enhance the RR effect. Thus, we used a RR task with the inclusion of a third distractor object, placed either in the sample-sample interval or prior to the first sampled object, to explore this prediction and will interpret the results in terms of Wagner's associative model of memory (SOP).

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Thursday 26th – 16:00 to 17:30

Symposium 2: Anthrozoology: Benefits of human-animal interaction

Chair: Dr: Rafael Martos-Montes

Despite the impact that animals have on human life, the field of psychology has barely addressed the topic of human-animal relationships as an important area of human activity. It is evident that human-animal interaction (HAI) or anthrozoology constitutes an interdisciplinary field of great relevance in the scientific landscape of many disciplines. The analysis of how people relate to other animal species and the mutual benefits of this relationship in family, educational, therapeutic, social, and recreational contexts is gaining increasing importance and attention from the scientific community. Not surprisingly, the American Psychological Association dedicates Section 13 of Division 17 to professional, academic, and scientific activities related to the study of HAI and its relationship to psychology: The role of human-animal bonding in the development of empathy, the ability to form and express attachments, the reaction to pain and loss, the challenges of aging, animal-assisted intervention (AAI) in various educational, therapeutic, and social contexts, etc. The objective of this symposium is to address the research developed from the Master's program in Animal-Assisted Intervention (Universities of Jaén and International of Andalusia) in relation to the benefits of the human-animal relationship. First, we will discuss the role that animals play in our homes, taking into account their status, well-being, and attachment that triggers in multi-species families. Subsequently, we will address the role of dogs (the main companion animal) in the physiological reactivity of people and anxiety levels in response to social stress situations. Along the same line, we will discuss the role of dogs in modulating emotional reactivity and feelings of security in threatening scenarios. An area where the benefits of HAI are also evident is AAI, which is why we will address its current surge and development, especially in the field of autism spectrum disorders (ASD). Finally, we will analyze the mechanisms responsible for the effectiveness of AAI in ASD, taking into account the more efficient processing of social stimuli, such as dog faces, compared to the processing of human faces. Such research represents an advance in the study of HAI.

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Talk 1:

The link between humans and other animals: We need to discuss our relationship

Javier López-Cepero, Alicia Español-Nogueiro and Ángel Rodríguez-Banda

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The presence of non-human animals in Spanish homes has registered a sustained increase over the past few decades, and their status within families has risen to the point where they are considered full-fledged members. However, these social transformations have given rise to debates about the limits of interspecies relationships. These debates are reproduced at different levels of analysis. From a social and cultural perspective, the literature shows inconsistencies between the status and guarantees granted to various animal species, which do not appear to correlate with their cognitive and emotional abilities. In terms of the home, research finds numerous examples of difficulties in integrating companion animals into family dynamics, including the choice of terms, limits of reciprocity, and respect for the ethology of dogs, cats, and other animals. Finally, events such as death are receiving increasing attention, framed within the field of comparative thanatology. This presentation reviews the current state of these debates, presenting information extracted from various studies conducted on the Spanish population over the past few years. The presentation will highlight especially those aspects in which comparative psychology plays a relevant role in the development of multi-species families.

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Talk 2:

The role of animals in the physiological reactivity of humans

Rafael Martos-Montes (1), Rafael Delgado-Rodríguez (1), Jesús Ruíz-Maatallah (2) and David Ordóñez Pérez (3)

(1) University of Jaén - Department of Psychology
(2) Perruneando. Canine Education and Animal-Assisted Interventions
(3) International University of Andalusia. Center for Postgraduate Studies, Antonio Machado Campus.

The benefits of human-animal interaction are evident in the relationship between humans and other animal species, and specifically with dogs as the ultimate companion animal. Dogs frequently participate in Animal-Assisted Intervention (AAI) programs. Enjoying the company of a gentle dog can provide support to a person in a stressful situation, and this effect can play an important role in the effectiveness of AAI. The presence of a dog leads to a decrease in sympathetic activation levels that occur in social anxiety situations. It is clear that in a social stress situation, there is an increase in sympathetic activity, as well as subjective anxiety levels. However, these increases are significantly attenuated by the presence of a friendly animal (dog) with which one can interact. We asked university students (N = 36, 80% women) to participate in a study in which they would be exposed to an induced stress situation using the Trier Social Stress Test. This type of scenario produces an increase in heart rate, blood pressure, and subjective anxiety levels. We aimed to verify whether these increases were attenuated depending on whether the participants were alone or accompanied by a friendly dog. Through random selection, half of the students were accompanied by a dog they could pet (experimental group), while the other half had a toy dog (control group). The levels of the three dependent variables were recorded at three different stages: The relaxation phase prior to the test, the stress-inducing test phase, and the post-test relaxation or return to calm phase.
The results showed that the presence of the dog during the test phase significantly reduced the levels of anxiety and heart rate experienced by the experimental group participants compared to the control group. This trend was also observed in blood pressure, but did not reach significant differences. Our results are in line with previous studies reporting the beneficial effects of human-animal interaction, while highlighting the importance of analyzing this interaction in the field of psychology and AAI.

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Talk 3:

The presence of the dog enhances the emotional and security response to scenes of social threat in countries with different levels of security

Rafael Delgado-Rodríguez (1), Rocío Linares(1), Carlos Gantiva (2), David Ordóñez Pérez (3) and Rafael Martos-Montes (1)

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The presence of a dog improves emotional and safety reactions towards scenes in which it is portrayed. This "dog effect" has been observed even in threatening social scenes. In this vein, previous studies examined emotional and safety reactivity to threatening scenes where a man or woman was shown alone or walking a dog. It was found that threatening scenes with a dog (vs. a woman or man alone) made participants feel less negative valence and activation, and greater control and safety. However, the absence of other affective comparison stimuli in previous studies

did not allow for examining whether the presence of a dog converts the threatening scene into less aversive, neutral, or pleasant. Moreover, previous results may have been influenced by the social context in which the studies were conducted: Cities with high security rates (and low crime rates) such as Jaén (one of the safest cities in Spain). People from social contexts with high crime rates present greater fear of being victimized and a higher probability of being so, which leads to trusting others less; this could hinder the dog effect previously observed in social threatening scenes. In this study, we asked participants to evaluate social scenes that were pleasant, neutral, and threatening with a man alone (threat-alone) or walking a dog (threat-dog) in terms of valence, arousal, dominance, and safety. The participants belonged to social contexts that differed in security: Jaén (n=131) and Bogotá (n=120). Bogotá has higher crime rates than the most dangerous cities in Spain (e.g., Madrid) and the sense of security among its citizens is lower than in Jaén. Both samples showed lower negative valence and arousal, and greater dominance and safety in response to threat-dog scenes compared to threat-alone scenes. However, threat-dog scenes made participants feel worse than neutral scenes. These results show that the presence of a dog reduces negative reactions to social threatening scenes in social contexts that differ in security levels; although it still slightly activates the aversive motivational system. This activation is an adaptive response to reduce a potential risk (e.g., an attack by a man). This study deepens our understanding of the dog effect, clarifying the magnitude of its impact in social contexts that differ in security levels.

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Talk 4:

The development of Animal Assisted Intervention

David Ordóñez-Pérez (1), Javier López-Cepero Borrego (2), Rafael Delgado Rodríguez (3) and Rafael Martos-Montes (3)

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(2) University of Seville. Department of Personality, Evaluation, and Psychological Treatment (3) University of Jaén - Department of Psychology

Animal-Assisted Interventions (AAIs) have acquired significant importance in the fields of health, education, and social intervention in Spain over the past few years. Since 2015, when the University of Jaén and the International University of Andalusia launched the first official Master's program in the country, the number of entities that develop this type of intervention with animals has tripled, from 55 in 2015 to 165 in 2024. This increase in the number of entities also means an increase in the number of professionals dedicated to this field and the number of programs developed with various groups, such as: Older adults and institutionalized individuals with disabilities, children with typical development or learning difficulties, hospitalized children and youth, incarcerated individuals, etc. Currently, AAIs are a complementary intervention to those that can be performed conventionally in these groups, so entities dedicated to this field are composed of professionals from different disciplines who work together in a multidisciplinary team and cover various fields such as Psychology, Occupational Therapy, Nursing, Education, and Social Work. In this context, studies have explored the interest, attitudes, and knowledge of different professional groups towards AAIs. For example, a recent study conducted with 110 teachers from infant, primary, and secondary education in the Autonomous City of Ceuta found two relevant aspects: (1) A very high interest in including this type of intervention in the school context (77.3%); and (2) A widespread lack of knowledge about the field, with most of them having no personal experience (79.1%), which determines the need to continue training professionals in this discipline in order to promote practices based on scientific knowledge.

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Talk 5:

Visual processing of animal faces as a possible mechanism for the efficacy of AAI in people with ASD

Carolina Duarte-Gan, Rafael Martos-Montes and María Cruz García-Linares

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The benefits of human-animal interaction are also evident in Animal-Assisted Interventions (AAIs), particularly in the field of autism spectrum disorders (ASD), where there is a significant amount of research. Numerous studies have demonstrated the effectiveness of AAIs in this population, particularly in improving social interactions. However, the understanding of the underlying mechanisms is still limited. Recently, it has been considered that the positive correlation between AAIs (especially with dogs) and social and communicative skills in individuals with autism may be related to a more efficient processing of social stimuli, such as dog faces, compared to human faces. A common observation in interactions with individuals with ASD is their avoidance of direct eye contact, while in neurotypical individuals, the focus tends to be on the face of the interlocutor. Using eye-tracking technology, we evaluated the visual processing of faces in children with ASD and neurotypical children (NT) when observing human and dog faces. The results showed that children with ASD showed a significant preference for looking at dog faces for longer periods, regardless of their position on the screen, and demonstrated greater attention disengagement between dog faces. In contrast, the NT group did not show differentiation between the two categories of faces. In the analysis of individual faces, notable differences were observed in how children with ASD look at the eyes of faces, requiring less time in term of their first gaze towards the eyes of dog faces. They also showed a longer continuous fixation time compared to human faces, especially adult faces. These visual patterns suggest a specific visual processing between species, observing advantages of this processing towards canine faces. These findings point towards possible socio-communicative benefits of interactions between humans and dogs for individuals with autism, particularly in terms of visual processing of social cues. Additionally, this study represents a significant advancement in understanding the mechanisms underlying the demonstrated effectiveness of AAIs in developing socio-communicative skills in ASD.

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Friday 27th – 12:30 to 14:00

Symposium 3: Neuroscience and Behavior

Chair: Dr. Fernando Gámiz

Comparative psychology and animal models are invaluable tools for understanding complex behaviors and their underlying neurobiological mechanisms. This symposium will focus on the interplay between neural dynamics and behavioral manifestations of psychological processes such as appetitive and aversive learning, memory consolidation and recognition, frustrative nonreward, drug addiction, and taste novelty and familiarity. These topics will be explored using a combination of behavioral and neurobiological methods and experimental procedures, including chemogenetic and optogenetic manipulation, c-fos expression quantification, and multiple-response assessment. Overall, this symposium will offer a comprehensive exploration of the intricate connections between neural processes and behavioral responses, shedding light on fundamental neurobiological mechanisms governing learning, memory, reward processing, and adaptive behavior.

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Talk 1:

Neuroscience and behaviours: Lessons from measuring multiple responses

Dominic Michael Dwyer and Patricia Gasalla Canto

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It is obvious that humans and other animals produce multiple behavioural responses, even in the context of the same learning situation. However, one important implication of this fact is often overlooked, namely that measuring a single response may miss critical information about the nature and degree of learning. The dissociation between sign-tracking and goal-tracking is a classic example: after pairings of a signal with food reward, successful conditioning can be displayed either by responding towards the signal itself (sign-tracking) or by responding to the site of food reward delivery (goal-tracking) – or making both responses. Because the distribution of sign- and goal-tracking responses vary across animals and situations, measuring a single response alone cannot fully capture the degree of conditioning. Although this issue is not new, it is commonly neglected. Moreover, there are many other informative response dissociations beyond the classic sign- and goal-tracking. This presentation will review findings concerning dissociations between responses in the context of taste aversion learning as well as sign- and goal-tracking to highlight how measuring multiple response types can contribute to the understanding of behaviour and its biological underpinnings.

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Talk 2:

From back to front: How the cerebellum modulates reinforcement learning

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Although the traditional cerebellum's role has been linked to the high computational demands for motor coordination, recent findings provide compelling support for its involvement in reinforcement learning and goal-directed behavior. Climbing fibers from the inferior olive and

granule cells generate responses in the cerebellar cortex to events that predict upcoming rewards, but they also encode reward omissions. Also, optogenetic stimulation of glutamatergic projections from the cerebellum to the ventral tegmental area (VTA) elicits excitatory synaptic currents in one-third of VTA cells in vivo and induces consistent preference for the location in which the optogenetic stimulation was applied. Altogether, these findings reveal that the cerebellum can encode the goal and the context and regulate behavior to reach the goal. Our research team has been working for years on the role of the cerebellum in drug-induced reward. We have explored the involvement of the cerebellum in cocaine-induced preference conditioning and cocaine self-administration under extended access. Our studies identified the posterior vermis as the locus of drug-related learning hallmarks. The lesion of this cerebellar region dramatically facilitates learning of cocaine-induced conditioned memory and increases neuronal activity in the medial prefrontal cortex and other regions of the addiction circuitry. Moreover, chemogenetic inhibition of the cerebellar output neurons may prevent the effect of the vermis lesion on drug reward learning, supporting a causal link. Accordingly, chemogenetic activation of inhibitory interneurons in this region also facilitates drug-induced reward learning, and their inhibition prevents it. Our findings indicate that the manipulations that reduce the inhibitory control of the cerebellar cortex over cerebellar output neurons encourage drug effects. On the contrary, drug effects are prevented by increasing the inhibitory control from the cerebellar cortex.

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Talk 3:

Exploring sex differences and neural mechanisms of frustrative nonreward

Carmen Torres (1), Marta Valero (1), Alejandro Expósito (1), Mauricio R. Papini and Antonio D.R. Agüera (1)

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Frustrative nonreward (FNR) is a reaction associated with the sudden and unexpected loss of significant sources of reinforcement: the death of a loved one, job dismissal, heartbreak, or restrictions associated with health crises, among others. These experiences can profoundly impact physical and mental well-being. Although the scientific study of frustration using animal models provides abundant information on its psychobiological bases, there remains a gap in knowledge regarding (a) the existence of sex differences in the expression and resolution of frustration derived from loss experiences; (b) its components, including reward detection, comparison, aversion, emotion, and recovery; and (c) the underlying brain circuits involved. This presentation will address some of these issues using the frustration paradigm of consummatory successive negative contrast (cSNC) in rats. The task entails providing animals with daily access to a highly reinforcing sucrose solution (typically 32%), which is then abruptly reduced to 2% over four sessions. Consumption by this group is compared with that of a control group that consistently has access to the 2% solution. The cSNC effect refers to the decrease in consumption of the 2% solution in the experimental group (previously exposed to the sweeter 32% solution) to levels below those of the control group (always exposed to the less sweet 2% solution), despite both solutions being identical in magnitude. The presentation will include studies examining sex differences and the role of aversion in the cSNC task, as well as preliminary findings identifying its neural basis. To this end, expression levels of c-Fos, a marker of neuronal activity, were quantified across Regions of Interest (ROIs), and a neural network based on these results was developed. Graph theory analysis was employed for a preliminary exploration of the network's functional properties, facilitating a more comprehensive understanding of the psychobiological basis of FNR.

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Talk 4:

Taste novelty and familiarity: A behavioral model to study the interaction between emotional and reward brain circuits along the life

Milagros Gallo, Alejandro N. Expósito, Beatriz Gómez-Chacón, Alejandro B. Grau-Perales and Fernando Gámiz

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Taste neophobia and taste familiarization exhibit adaptive changes throughout the life cycle. Recognizing a taste as familiar and safe depends on the complex interplay of brain circuits involved in memory, emotion and reward. Lesion, inmunohistochemical, pharmacological and pharmacogenetic studies indicate the relevant role of the perirhinal cortex (PRC), medial prefrontal cortex (mPFC), basolateral amygdala(BLA) and accumbens nucleus (NAcb) as well as hippocampal (HC) modulation. In addition, aging represents a good model for understanding the functional organization of these brain circuits along the life. Studies performed in adult and aged rats applying exposures to a cider vinegar solution will be reviewed. In adult rats the novel flavor increases activity in PRC but as familiarization takes place during the second exposure an inverse pattern of NAcb versus BLA activity was found. While NAcb and mPFC activity increased, BLA activity decreased. This inverse pattern relays in a reciprocal inhibitory dopaminergic network mediated by D1DRs which has been identified by pharmacological and pharmacogenetic interventions. The effect of aging in this network is complex including altered brain activity patterns that cannot be explained exclusively in terms of decay. Therefore, the comparison between the behavior and brain activity of adult and aged rats supports a view of senescence as the result of a long life of plastic adaptations instead of the dominant approach centered on progressive loss of functions. Supported by project PID2020-114269GB-I00 funded by MCIN/ AEI /10.13039/501100011033. .

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Talk 5:

Perceptual salience: How dopaminergic activity modulates recognition memory

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Understanding the effects of dopamine and noradrenaline on memory and cognition has been a significant challenge in both animal and human research due to the inherent difficulty in controlling the real-time release of these neuromodulators. Recent advances in optogenetic techniques have provided a promising avenue to overcome this limitation, allowing for precise measurement of their influence as it occurs. In our laboratory, we investigate how selective stimulation of dopamine neurons in the ventral tegmental area (VTA) or its dopamine terminals in the cortex modulates the perception of salience in taste and object recognition memories. We are also looking at the role of top-down cortical fibers projecting to the VTA in regulating real-time place preference and its interaction with dopamine release. Furthermore, we investigate how dopamine release in the dorsal hippocampus terminals from the locus coeruleus affects contextual recognition memory updating. By elucidating these mechanisms, we aim to enhance our comprehension of the intricate interplay between neuromodulators and cognitive processes and shed light on fundamental aspects of memory formation and cognition.

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Oral Communications

OC - 1

Instrumental extinction in toads (Rhinella arenarum): Is it really instrumental?

Rocio C. Fernandez (1), Martin M. Puddington (1), Mauricio R. Papini (2) and Ruben N. Muzio (1)

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Instrumental appetitive extinction involves a reduction in strength of a previously reinforced response when its occurrence is no longer rewarded. Previous evidence in toads (Rhinella arenarum) suggests that long-term memories acquired during reinforced training are prone to decay in time when a retention interval (RI) is interpolated between the end of acquisition and the start of extinction. We will report on another factor affecting appetitive extinction in toads: the time of exposure to nonrewarded goal-box stimuli. In Experiment 1, toads that received the same acquisition training (15 sessions, 1 session/day, 300 s of access to water in the goal box) were randomly assigned to two extinction groups. In Group 600, each individual spent 600 s in the goal box at the end of each extinction session (8 sessions, 1 session/day, water present but inaccessible). In Group 0, individuals performed the runway response but were removed as soon as they entered the goal box, thus having minimal exposure to nonrewarded goal-box stimuli. Although the runway response was weakened in Group 600 across extinction trials, toads in Group 0 exhibited almost no evidence of response reduction. In Experiment 2, toads were randomly assigned to two groups after the same acquisition training. Animals in Group 0 were treated as in the previous experiment during 13 extinction sessions. Group RI remained in their home cage for 13 days. Finally, all animals received 4 extinction sessions (300 s in the empty goal box, 1 session/day, water present but inaccessible). There was little behavioral change in Group 0 during the 13 sessions of extinction with minimal exposure to the goal box. In extinction, however, both groups exhibited a significant reduction in response strength, but there was no evidence of differential extinction rates. Although the procedures were instrumental, the mechanism underlying extinction in toads appears to depend on two factors: (1) time since the last reward, and (2) time of exposure to an empty goal box. These and previous results can be accounted for in terms of a Pavlovian approach response to stimuli paired with reward and nonreward in the goal box, with a relatively labile long-term memory that decays in time. Further experiments will explore whether these factors apply to aversive situations, to more complex spatial situations, and whether the runway response is sensitive to omission training.

Keywords: Extinction; Pavlovian conditioning; Approach responses; Toads

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OC - 2

A shock in disguise: The impact of a deconditioning strategy on the prevention of spontaneous recovery in human fear conditioning

María J. Quintero (1,2), Joaquín Morís (1,2), Francisco J. López (1,2) and Bram Vervliet (3,4)

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Fear extinction is more vulnerable than the original acquisition memory, as response recovery phenomena have systematically shown. In recent years, several strategies have been proposed to mitigate relapse. One of them is the deconditioning treatment, in which the intensity of the US is gradually reduced across the extinction intervention so that by its end the US will be still presented but having no relevant arousing effect. In this study, we tested the effect of this extinction procedure to prevent spontaneous recovery in comparison to the standard treatment. After learning the relationship between a figure and an electric shock using a differential conditioning paradigm, participants were randomly assigned to one of the two conditions. Finally, after a 20-minute retention interval, spontaneous recovery was tested. By and large, we did not find any relapse preventive effect produced by the deconditioning treatment in comparison to standard extinction. Our results are discussed in relation to recent evidence and different theoretical accounts regarding extinction learning.

Keywords: fear conditioning, fear extinction, deconditioning, return of fear, relapse prevention

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OC - 3

Extinction of an instrumental response produces an extinction burst and changes in attention

Roberto Jiménez-Castillo, Alberto Monroy-Olvera and Javier Vila

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The extinction of an instrumental response is associated with a temporary increase in that response, known as an extinction burst. This phenomenon is prevalent in literature but has not been systematically studied in humans. One method to investigate this phenomenon involves examining the increase in prediction error, which refers to the discrepancy between expected and actual events. This can be considered a transition between stable states of behavior (Sidman, 1960). If the extinction burst can be seen as an effect related to prediction error, it might also have an attentional dimension. The first experiment demonstrates the extinction burst in humans transitioning from reinforcement schedules (FR1 and FR5) to extinction. The results showed that the extinction burst occurred when moving from FR1 and FR5 to extinction. The timing of the burst depended on the reinforcement schedule, as participants encountered the absence of reinforcement at different times, consistent with Lattal (2022). A second experiment replicated the FR1 and FR5 conditions and added eye-tracking measures. The results were consistent with Experiment 1. Eye-tracking data indicated that the extinction burst in response was associated with increased attention and subsequent dispersion of fixations. These results highlight the relationship between the extinction burst, prediction error, and attentional changes. This behavioral variation could be linked to the transition between stable states.

Keywords: extinction burst, humans, prediction error, attention, eye-tracking

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OC - 4

Can pavlovian extinction be enhanced by compound presentation with novel stimuli?

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We present some experiments with rats that tested whether learning during pavlovian extinction of a target stimulus (A) can be enhanced by presenting novel stimuli (N) in compound with it. This hypothesis is derived from our theoretical model (Hall and Rodríguez, 2010), in which we assume that the presentation of a novel stimulus induces the activation of the expectation that an event will occur. It follows that under conditions of nonreinforced exposure, where no relevant consequence occurs after the presentation of the stimuli, this initial expectation will be contradicted by experience, thus producing a prediction that drives learning. We have obtained evidence for this assumption by studying latent inhibition, a phenomenon in which nonreinforced exposure takes place prior to conditioning. Our recent studies have shown that the presentation of novel stimuli during the preexposure of a target stimulus A can enhance the inhibitory learning to the extent that it endow such a latent inhibitor with net inhibitory properties, allowing it to pass both the retardation and summation tests. Extrapolating this to extinction, we expect that the presentation of novel stimuli could also enhance inhibitory learning during nonreinforced exposure after conditioning. We assessed this prediction in experiments using appetitive and aversive conditioning procedures.

Keywords: Extinction; Inhibitory learning; Prediction error

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OC - 5

Human AAB, ABC, and ABA renewal from extinction in a fully immersive virtual reality ecological task

A. Matías Gámez (1), Rodolfo Bernal-Gamboa (2), José E. Callejas-Aguilera (3), Jesús Moreno-Arjonilla (3) and Juan M. Rosas (3)

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(3) Universidad de Jaén

Three experiments were conducted with the goal of testing the reliability of a fully immersive virtual reality ecological task to study learning and retrieval processes in human beings. Participants played the role of archaeologists searching for hidden treasures within an arena surrounded by natural scenarios such as a forest or a desert. The positions of the treasures were marked by discriminative stimuli of different colors. Participants had to use a pick to dig below the discriminative stimuli to find whether the treasure was hidden there or not. The picking response under the correct discriminative stimuli was reinforced under a variable ratio. The experiments were conducted in three phases: acquisition, extinction, and testing. In Experiment 1, acquisition and extinction were conducted in context A, and the test was conducted either in context A or in context B. In Experiment 2, acquisition was conducted in context A, extinction was conducted in context B, and the test was conducted either in context B or in context C. Finally, in Experiment 3, acquisition and testing were conducted in context A while extinction was conducted either in context B or in context A. The three experiments included groups that received the extinction treatment and groups that did not. Renewal from extinction was found in all the groups that received the test in a context different from the extinction context (AAB, ABC, and ABA in Experiments 1, 2, and 3, respectively). Thus, the task proves to be a useful tool for studying instrumental performance and the context-dependency of information in human beings. Additionally, the system includes an integrated eye-tracking system that allows for the monitoring of the evolution of fixations to contexts and cues throughout training.

Keywords: Renewal AAB, ABC, ABA, Instrumental learning, Virtual reality.

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OC - 6

Effects of expected and unexpected uncertainty on cue processing

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Recent findings have shown that uncertain cues receive more attention than certain ones, but this elevated attention does not appear to improve learning. These findings challenge the view that higher attention equates to greater cue processing in humans. The current experiments tested recognition memory for cues as an index of cue processing. Participants were trained on a true discrimination: AX-O1, AY-O1, BX-O2, BY-O2. Subjects experimented either a certain (p = 1) or uncertain (p= .8) contingency of the cues and outcomes. At the end of the task, participants were given a forced-choice recognition memory test. Moreover, we present a series of experiments, in which the moment uncertainty was introduced in training was varied. Subjects trained under certainty consistently showed better memory for the predictive cues, whereas subjects that experienced uncertainty did not show this difference. Furthermore, when subjects experienced uncertainty since the beginning of training, memory in uncertain group was equal to certain group, but when uncertainty was introduced after a period of certain training, those subjects showed an enhanced memory compared to those that were trained with certain contingency. The results are discussed in relation with attentional theories of learning.

Keywords: Uncertainty, learned predictiveness, cue processing, recognition memory

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OC - 7

Novelty may endow a context with excitatory properties

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In recent years, our laboratory has been dedicated to evaluating the inhibitory properties acquired by stimuli during nonreinforced preexposure in latent inhibition, employing the retardation and summation tests. Our observations indicate that the presentation of the target stimulus together with several different novel stimuli allows it to acquire inhibitory properties to pass both the retardation test and summation tests. The rationale for investigating these specific conditions of novelty exposure arises from the analysis of the predictions of our theoretical model (Hall & Rodriguez, 2010), according to which novel stimuli induce a prediction error during nonreinforced exposure, thereby promoting the learning of an inhibitory stimulus→ no event association. In this presentation we report two experiments with rats, employing aversive and appetitive conditioning procedures, in which we have tested whether the presentation of novel stimuli can also confer inhibitory properties to the context in which these presentations occur. We found some evidence that, contrary to our hypothesis, a context associated with constant novelty is capable of enhancing the conditioned response elicited by a discrete conditioned stimulus that had been trained in a different context.

Keywords: context; nonreinforced exposure; novelty.

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OC - 8

Timing in chronic consumption of methylphenidate during adolescence induces differentially a loss of parvalbumin neurons in prelimbic and disrupts sustained attention processes

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Adolescence involves significant reorganization within the medial prefrontal cortex (mPFC), particularly in the GABAergic inhibitory network mediated by parvalbumin (PV) interneurons. Methylphenidate (MPH) is one of the primary drugs prescribed to treat patients with attention-deficit/hyperactivity disorder (ADHD). Most patients are diagnosed at an early age and consequently consume the drug long-term. In this study, we analyze whether chronic consumption of MPH (over 20 days) during different developmental windows could influence GABAergic neural activity and, in turn, affect related PFC tasks such as sustained attention.
MPH was administered ad libitum dissolved in home cage water bottle at 5mg/kg (equivalent to therapeutic dose to human) to both female and male Wistar rats for 20 days from different onsets: early adolescence (PD35-55), middle adolescence (PD42-62) or late adolescence (PD49-69). From PD100 onwards animals were considered adults and were used in attentional behavioral tests. The attentional task required 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', CR). 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 the expression of parvalbumin inmunoreactive neurons (PV+) across prelimbic and infralimbic levels in the prefrontal cortex (PFC). Our results showed a differential loss of parvalbumin-positive neurons in the prelimbic but not in infralimbic region in animals exposed to MPH during PD49-69 alongside with different patterns in attentional acquisition, suggesting distinct windows of vulnerability in the functional maturation of mPFC.

Keywords: Parvalbumin, adolescence, methylphenidate, attention, prelimbic

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OC - 9

Why it matters that dog point-following is sensitive to chance rate

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Humans use pointing gestures to communicate with dogs. However, efforts to study of how dogs receive this communicative signal have produced ambiguous results. Large-sample studies that present dogs with a choice between two locations have shown that dogs choose an option that a human point to above chance levels, but just barely. One problem with such studies is inherent in presenting only two options: a too-high probability of choosing correctly by chance weakens the signal. After replicating the 2-option task, this study changed the task's parameters by presenting dogs with six options, while pointing to one. This should reduce the number of correct choices made by chance, but not affect instances of genuine point following. We find that dogs chose the location pointed to a barely above chance rates in both the 2-choice and 6-choice versions of the task. This pattern is discouraging of the belief that dogs interpret human pointing as a communicative act. Rather, these results are more consistent with an attentional bias by which something about the act of pointing draws the dogs' attention subtly to one side of the arena. Additional patterns that become visible with more than two options bolster this interpretation. Dogs chose the correct side of the arena and succeeded on second choices more often than expected by chance. All considered, dogs appear not to interpret human pointing as referring to a specific location, supporting the view that dogs lack the capacity for referential communication.

Keywords: Domestic dog; Point following; Human-dog communication; Object choice task; Intentionality

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OC - 10

Consequences of early alcohol exposure influenced by maternal consumption and an antioxidant diet

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Early exposure to alcohol, especially during gestation and adolescence, can lead to abusive consumption and harmful alterations. In Spain, it is estimated that 40% of women consume alcohol during the first trimester of pregnancy, and 70% of adolescents have consumed alcohol in the last year. These consumption patterns can alter the metabolism of oxidative stress and cause behavioral effects such as anxiety and memory alterations. These effects have been studied in animal models exposed to alcohol during gestation or to episodic excessive alcohol consumption (EEAC). Attempts have been made to mitigate these effects with dietary supplements such as folic acid (FA) and selenium (Se), which can help restore oxidative balance. In our research, we seek to expand our knowledge about the treatment with diets enriched with FA and Se in situations of early exposure to alcohol. Mothers are exposed to different forms of alcohol consumption during gestation and to different forms of supplementation, and then their antioxidant capacity is analyzed. The offspring are exposed to a supplemented diet and their voluntary alcohol consumption in adolescence, their anxious/depressive phenotype, and their hippocampus-dependent recognition memory are analyzed. Preliminary data show a decrease in weight and food consumption in rats whose mothers were exposed to alcohol. Additionally, these offspring consume more alcohol compared to those whose mothers did not consume alcohol. This design allows us to analyze possible interactive effects between the different treatments to pregnant mothers and adolescents. This approach is novel both for the design and for the variables to evaluate, as the behavioral consequences associated with the treatment with diets to restore the antioxidant capacity altered by early exposure to alcohol remain largely unexplored.

Keywords: Animal model, folate, selenium, early alcohol exposure

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OC - 11

Saline blocks the expression of conditioned place preference using light and dark cues in planarians (Dugesia japonica).

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At SEPC 2023, we reported that salt (NaCl) interferes with habituation of photophobic responses (Tazumi, Urcelay, & Prados, 2023). The goal of the present study was to clarify why salt interfered with habituation. First, we examined the possibility that salt induces impairments in visual function (Study 1). Next, we investigated the effects of saltwater on the expression of conditioned place preference (CPP), using light and dark cues, to disambiguate whether salt acted as a trigger stimulus for dishabituation or blocked the expression of habituation learning (Study 2). In Study 1, we used 48 Y-mazes whose left or right arm was painted black and could be covered to become dark. After exposing planarians to either 0.6% saltwater (n=48) or water (n=48) during 30 mins in a light-blocking box, we recorded which arm, dark or light, they first entered on the Y-maze. The results showed that 92% of animals in both groups showed a preference for the dark arm, the natural photophobic response of the planarians, indicating that exposure to saltwater did not impair visual function. In Study 2, we developed a new procedure for the assessment of light-dark CPP in our planarian colony. For the duration of one year, the animals were kept in a transparent container within a dark box (that is, in dark conditions). The colony was split in three groups (kept in three separate dark boxes). During the conditioning trials (twice per week), the transparent containers were withdrawn from the dark boxes and exposed to light (under a fluorescent lamp) for a period of 75 min, and then to dark (with the lamp off) for another period of 75 min. The animals in the group Light were always fed during the light period; the animals in the Dark group were always fed during the dark period; and a third Control group was fed in the light and dark contexts in alternation. Following each conditioning trial, the food was removed, and the water replaced. Following the conditioning phase, 18 planarians were randomly selected from each condition and tested for light-dark preference (CPP): the animals were placed in a rectangular plate divided into half-light and half-dark areas for 20 mins, and the number of planarians that remained in the light area was counted every 30 seconds. The results showed that the median number of planarians staying in the light area in the Light condition was significantly higher than that in the Dark condition, indicating the acquisition of CPP with this new procedure. Furthermore, in a separate experiment, animals in the Light condition were exposed to either 0.6% saltwater or water for 30 mins in a light-blocking box before the test was carried out. As a result, the cohort exposed to 0.6% saltwater showed a significantly low median number of planarians staying in the light area compared to the cohort exposed to water, indicating attenuated CPP expression. These results suggest that salt blocks the expression of learning in planarians.

Keywords: planarians, salty solution, Y-maze, expression of learning, conditioned place preference

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OC - 12

Overtraining and sensitivity to devaluation in flavor preference learning

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Pairing a palatable taste (Unconditioned Stimuli; US) with an initially neutral flavor cue (Conditioned Stimuli; CS+) results in a conditioned preference for the CS+. Several experiments with rats have shown how conditioned preferences are sensitive to devaluation procedures, suggesting that these are mediated by the US representation (S-S association). In a previous experiment, we found that, as in Instrumental Learning, sensitivity to the US devaluation depended on the extension of training. Consistent with previous literature, a short training regime led to a conditioned preference that was weakened after a US devaluation (S-S). However, when rats were subjected to a 'massive' training procedure, the CS+ preference remained intact regardless of the value of the US (suggesting S-R learning). These series of experiments involved a training procedure in which a single US (e.g., sucrose) was paired with a CS+ and employed Sensory-Specific Satiation as the devaluation procedure. In the present study, we tried to replicate this effect and overcome some limitations of the previous designs by pairing two CSs+ (vanilla or almond) with two different USs (sucrose or maltodextrin), and comparing the training length with a between-subjects design. The method of devaluation consisted of presenting a sucrose or malotextrin solution before a preference test between the sweet paired CS+ or the maltodextrin paired CS+. Our results showed again that the minimally trained group expressed a devaluation effect (S-S type), while the overtrained group exhibited no preference for any CS+ after the pre-feeding phase (S-R type). This experiment suggests that, as in the instrumental paradigm, overtraining can promote S-R learning in classical conditioning, at least with a flavor preference learning paradigm.

Keywords: Preference Learning, Stimulus-Response, Overtraining, Sensory-Specific Satiation, Devaluation

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OC - 13

Devaluation of the US in the snail Cornu aspersum

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The present study asses the devaluation of the unconditioned stimulus (US) in the snail Cornu aspersum using both Conditioned Taste Aversion Learning (CTA) and the Satiation of the US (Sat.) procedures. The appetitive Pavlovian Conditioning of Tentacle Lowering was employed as the experimental paradigm. Initially, all the subjects were exposed to the conditioned stimulus (CS) paired with the US in both experiments. Subsequently, during devaluation phase of CTA experiment, subjects from devalued group received the US followed by quinidine, whereas subjects from non-devalued group received quinidine and US uncorrelated. Meanwhile, in Sat. experiment, subjects from devalued group were exposed to the US ad libitum for 4 hours and 30 minutes, while subjects from the non-devalued group were not exposure to the US. Both experimental procedures demonstrated significant effectiveness in devaluing the US, i.e., subjects which had received the US paired with the quinidine or subjects which had received the US ad libitum during the devaluation phase, showed a decrease of the tentacle lowering response in contrast with subjects from no-devalued groups. This finding provides a robust comparative psychology framework for investigating various complex phenomena, including context specificity in habits and goal-directed actions, which are considered evidence of knowledge integration.

Keywords: Devaluation of the US, Pavlovian Conditioning of Tentacle Lowering, Conditioned Taste Aversion Learning, Satiation, terrestrial snails, habits and goal-directed actions.

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OC - 14

Comprehensive analysis of sexual differences in prepulse inhibition: Hormonal and evolutionary insights

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Prepulse inhibition (PPI) of the startle response is an operational measure of sensorimotor gating, understood as the inhibition of the startle response to an intense stimulus (pulse) when it is temporally preceded by a less intense stimulus (prepulse). It has been observed that this response may exhibit sexual dimorphism, with women appearing to have lower PPI than men. However, the results in the scientific literature are not entirely consistent. Therefore, the present project introduces two lines of research: 1) a systematic review to analyze sexual differences in PPI in both humans and rodents, and 2) a PPI experiment with men and women to observe potential differences in real-time. For the systematic review, an exhaustive search was conducted in PubMed, Web of Science, and PsycInfo, using the search strategy preregistered in PROSPERO (CRD42023396872, 15/02/2023). After literature analysis, a total of 58 studies were included in the review (human studies=32 / rodent studies=26). The results were quite enlightening, with 78.8% of human studies and 69.2% of rodent studies reporting higher PPI among males compared to females. To experimentally confirm this trend, an experiment on sexual differences in PPI was conducted with 54 healthy young participants, comprising 33 women (mean age=20.91 years, SD=4.03) and 21 men (mean age=21.29 years, SD=3.94). Electromyographic response of the orbicularis muscle of the right hemiface was recorded to measure the startle response in participants. Results indicated no differences between men and women, contradicting previous literature. However, when the female group was divided based on whether women were in the follicular (n=18) or luteal (n=15) phase of the menstrual cycle, a main effect of the menstrual cycle was observed, indicating lower PPI values in women during the luteal phase compared to both men and women in the follicular phase. These results highlight that sexual differences in PPI may be modulated by circulating hormones during the menstrual cycle, as other authors have previously suggested (Swerdlow et al., 1997; Jovanovic et al., 2004), with higher levels of estrogens and progesterone being associated with reduced PPI in women during the luteal phase. Similarly, in rodent studies, the level of circulating hormones linked to the estrous cycle period appears crucial for detecting these sex differences. Thus, it becomes highly relevant to consider the menstrual/estral cycle in studies of pre-cognitive measures like PPI. Functionally, women exhibiting lower PPI values than men could be explained by the evolutionary Hunter-Gatherer theory, where women, evolutionarily, may have had to divide their attention more among different stimuli and threats in the environment than men. In the case of studies with rodents, it appears that the greatest sex differences emerge among Wistar rats.

Keywords: Prepulse inhibition; Startle response; Menstrual cycle; Sex differences; Evolution

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OC - 15

Frustrative nonreward in male and female Wistar rats: No evidence of sexual dimorphism in behavior.

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Rats exposed to an unexpected reduction from a large to a small reward exhibit suppression of consummatory behavior and increased activity relative to rats exposed only to the small reward. This consummatory successive negative contrast (cSNC) effect has been analyzed at the behavioral, psychopharmacological, and neurobiological levels as a paradigm involving frustrative nonreward—the aversive emotion triggered by unexpected reward loss. cSNC and appetitive extinction have been proposed as animal models of some aspects of anxiety and depression, both of which have shown sex differences in clinical research with human participants. However, inconsistent sex differences have been reported for cSNC. This study is part of an extensive effort to examine possible sex differences in behavior in the cSNC paradigm by extending the spectrum of behaviors recorded during reward downshift. Thirty-two, adult, experimentally naïve, Wistar rats, half males and half females, were randomly assigned to one of two groups. Animals in Group 32-2 (n=16, 8 males, 8 females) received access to 32% sucrose and water for ten 5-min preshift sessions followed by four similar postshift sessions of access to 2% sucrose and water. Animals in Group 2-2 (n-16, 8 males, 8 females) received access to 2% sucrose and water during 14 sessions. In addition to the usual recording of sucrose consumption (mL/kg), time in contact with the sucrose sipper tube and sucrose preference, sessions were videotaped to assess behavioral variations across groups using BORIS software for behavioral recording. This approach yielded the following results. First, during preshift sessions 1-10, females consumed more 32% and 2% sucrose per unit of weight than males. Second, sucrose consumption and time in contact with the sucrose sipper tube was significantly reduced in Group 32-2 relative to Group 2-2 during postshift sessions 11 to 13 for females, and session 11 for males, but this was attributable to differences among unshifted controls. In both sexes, consummatory suppression was accompanied by a significant increase in the frequency of head dipping, rearing and sipper-tube biting. These behavioral changes were not observed in unshifted controls. These results extend previous studies that searched for sex differences in the response to reward downshifts in the cSNC paradigm, providing no evidence of sexual dimorphism in the emotional response to frustrative nonreward.

Keywords: Reward loss; Consummatory successive negative contrast (cSNC); Sex differences; Rats.

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OC - 16

Sex differences in conditioned inhibition with a conditioned taste aversion preparation in rats.

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We present two experiments to test sex differences in conditioned inhibition with a conditioned taste aversion preparation. After a discrimination training—where stimulus A was followed by an intraperitoneal injection of Lithium chloride when it was presented alone, but not when such stimulus was presented with a second stimulus B— male and females rats received either a summation (Experiment 1) or retardation test (Experiment 2). In both experiments, males and females displayed progressive discrimination learning among four trials, which was facilitated for male rats. On the summation test, all the rats received a preference two-bottle test trial involving a subsequently conditioned stimulus C, either with B or alone. While male rats preferred to consume the compound involving B, females consumed a similar amount of the two solutions. In the retardation test, B conditioning was similar for both males and females. However, in a further preference two-bottle test where the stimulus B was presented in one bottle and water in the other, males preferred B to a greater extent than females. Such results might indicate conditioning inhibition in males but not in females. But they can be also explained as the result of a stronger generalization in females. Further research will be conducted to elucidate such possibilities.
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Keywords: Conditioned inhibition, Conditioned taste aversion, Generalization, Sex differences

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OC - 17

Methylphenidate's impact on extinction learning in wistar rats: A sex-based analysis

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One of the most prescribed drugs for ADHD is the Methylphenidate (MPH). This drug is commonly used to for cognitive enhancement, especially in adolescent and adult population. To date, studies on the effects of methylphenidate use in adults are limited and the results are controversial. For this purpose, we analyzed the effects of methylphenidate administration on fear extinction in a population of 67 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. Experimental sessions were carried out over ten days, a conditioning session (tone + shock), seven days of extinction during treatment administration, and finally two test session performed 48 and 72 hours after drug withdrawal (one in the extinction context and the other in the conditioning context). Methylphenidate was administered orally by pipette at a dose of 5 mg/kg dissolved in a saccharin solution. Half of the animals received methylphenidate 30 minutes before the beginning of the extinction sessions, and the rest received a saccharin solution. The results of this experiment showed that the effects of methylphenidate on the extinction of the conditioned response were modulated by sex.

Keywords: Fear conditioning, Metylphenidate, Extinction, Sex differences, Contextual cues

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OC - 18

Prenatal conditioning and social learning affect the aversion of male and female lambs to pine leaves

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The literature regarding prenatal conditioning and the impact of social learning on diet is vast. However, interactions between these forms of learning and conditioned taste aversion have received less attention. Here, we present a study to test if social learning and prenatal conditioning might lead to deep conditioned aversion of male and female lamb to the pine flavor and/or hinder the extinction of such conditioned aversion. To do this, four groups of lambs received one conditioning and six extinction trials using pine leaves as the conditioned stimulus (CS) and LiCl as the unconditioned stimulus (US). Before, one group received a prenatal conditioning trial with the same CS and US during the last third of pregnancy (PN Group). The other group had the opportunity to observe adult (conditioned) sheep rejecting pine in a preference test (SC Group) during the third postnatal month. Finally, a third group (PS) received both treatments, while the fourth control group (CG) did not receive any of these treatments. The experiment found that social aversion hinders neophobia habituation and deepened aversion. Prenatal conditioning effect varied according to sex, hindering conditioning for females and facilitating extinction for males. The present findings are discussed concerning the usefulness of the procedure for developing mixed agricultural systems.

Keywords: Conditioned aversion; Extinction; Neophobia; Pre-natal conditioning; Social learning.

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OC - 19

Examining the timing hypothesis through serial reversal learning in starlings

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Serial reversal learning tasks are among the most effective experimental frameworks for studying animal intelligence, particularly their capacity to adapt behavior in response to environmental changes. In one such task, the mid-session reversal task, animals choose between two options, S1 and S2, over the course of 80 discrete trials. Rewards are given for S1 choices during trials 1 to 40 and for S2 choices during trials 41 to 80, with the reward contingency reversing halfway through the session. Previous studies with birds show that the proportion of S1 choices decreases across trials from 1 to 0, crossing indifference (0.5) around trial 40. Anticipatory errors (choosing S2 before trial 41) and perseverative errors (choosing S1 after trial 40) indicate that birds use the passage of time within the session as a cue to reverse preference from S1 to S2. The timing hypothesis suggests that increasing the trial duration will shift the choice function to the left and reduce its indifference point by half, while decreasing the trial duration will shift the function to the right and double its indifference point. We tested this hypothesis by varying trial spacings. Fourteen starlings learned the task with random trial spacings averaging T seconds, and then they were exposed to test sessions with random spacings averaging either 2T or T/2. The observed shifts in the psychometric function, both in direction and magnitude, were compared with a) the results obtained with constant trial spacings and b) with the predictions of the timing hypothesis. The results suggest, the behavior of most subjects appears to be guided by time during the second test, supporting the timing hypothesis. However, in the first test, behavioral control seems to be influenced by local cues.

Keywords: Serial reversal learning, timing, psychometric function, indifference point, trial spacings, starlings.

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OC - 20

Optimizing learning through pretesting: The role of timing

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The pretesting effect suggests that testing and receiving corrective feedback on unfamiliar information, significantly enhances long-term memory, compared to traditional errorless study methods. This effect can be explained through the lens of prediction error learning. When a learner attempts to guess information during a pretest and fails, it shows a prediction error that signals the need for learning and increases attention. This improves the encoding of the correct information provided as feedback. However, the delay in receiving feedback may reduce the salience of the prediction error, potentially impairing the learner's ability to effectively associate the cue with the correct response. The delay in testing, may also lead to some forgetting and increase interference. Thus, this study investigated two key factors: the timing of feedback after an unsuccessful pretest (immediate vs. delayed one or two days) and the timing of the final test (immediate vs. delayed one day). Experiment 1 employed a mixed factorial design: the pretest group completed an initial cued-recall test on weak-semantically related Spanish word pairs. Half of the pairs received immediate feedback, while the rest received feedback after a one-day delay. In addition, half of the pairs were tested immediately or after a one-day delay. The control group had a read-only session with equivalent time and it was tested immediately or after a one-day delay. In experiment 2 a fully within-subjects design was used. Half of the pairs were studied under pretest or read-only conditions, and received immediate or two-days delayed feedback. Our results replicated previous research showing that pretesting led to better performance compared to the errorless condition. Furthermore, the benefits of pretesting persisted after 24 and 48 hours of feedback delay and when the final test was delayed by 24 hours. Additionally, participants were asked to predict their performance and rate the effectiveness of each learning condition. Although they rated both conditions as equally beneficial, they underestimated their performance on the pretest but not on the read condition. Last, error type analysis showed no difference in intrusion errors between immediate and delayed final tests, suggesting little proactive interference. Overall, this study shows the robustness of the pretesting effect in improving long-term memory and it highlights the flexibility of timing of the corrective feedback and the final test.

Keywords: pretesting effect, feedback timing, prediction error, testing, error learning

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OC - 21

Verbal causal information affects time estimation

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The temporal binding effect is defined as the bias in judging the time of occurrence of two events by estimating that these events have occurred closer together than they have. Although other explanations for this effect have been put forward, perhaps the one that has received most support is the one that suggests that temporal binding occurs when participants infer a causal relationship between events. Interestingly, contiguity has been seen traditionally as a cue-to-causality, and these studies suggest that it could also be the other way around, that is, causality might be a cue-to-contiguity. Traditionally, this effect has been studied with tasks in which participants are exposed to these events and, in a trial-by-trial procedure, they have to infer the causal and temporal relationship between events. However, humans can acquire knowledge also verbally, without the need to experience the stimuli. In 6 experiments, we show temporal binding effects using a verbal task. Instead of exposing participants to physical events, they were exposed to a list of fictitious events presented verbally. Afterwards, some participants were informed of the causal relationship between two of these events also verbally. Participants who received this causal information estimated the events to be closer to each other than participants who did not receive this information. These results support the idea that it is causality that promotes the temporary binding effect. Moreover, it provides a new paradigm for studying it in a more ecological way.

Keywords: temporal binding, causality, verbal instruction, time estimation, causal binding

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OC - 22

Do zebras go for more? Quantity discrimination in common zebras (Equus quagga)

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Quantity discrimination describes the capacity of animals to discern differences in magnitude or discrete numerical information and appears to play a crucial role in animal survival. In fact, this ability is crucial for animals to make decisions about social interactions, territories, and food. This study aimed to evaluate quantity discrimination in a non-domestic ungulate species, the common zebra (Equus quagga), to determine (i) whether these animals could select the larger of two quantities under different conditions, and (ii) how food size and density could affect these decisions. This species forms what are considered stable and non-dynamic social groups, and presents ecological and dietary characteristics considered simple (they are grazers, feeding on a small number of plant species of homogeneous and abundant distribution). Therefore, following current evolutionary hypotheses, we predicted a poor performance of this species in quantity discrimination tasks. We followed the procedures used in previous experiments with other ungulates to allow for data comparison. In Condition 1, captive zebras at the zoo of Barcelona had to choose between two visible sets containing different amounts of identical carrot pieces. In Conditions 2 and 3, the two sets could also differ in the size and distribution of the carrot pieces they included. The results showed that common zebras did not select the larger of the two sets above chance, in any of the study conditions. Other ungulates species with more dynamic societies and wider dietary breadths, such as the giraffe (Giraffa camelopardalis) or the phylogenetically close Grevy's zebra (Equus grevyi), were tested in exactly the same experiment, and performed above chance levels in most conditions. These findings contribute to shed light into evolutionary origins of quantity discrimination capacity. However, further studies are needed to fully understand the distribution of this cognitive ability in ungulates and the effects of different socio-ecological factors, such as domestication, on it.

Keywords: Ungulate cognition. Social structure. Dietary breadth. Quantity discrimination. Zebras.

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OC - 23

Retrospective revaluation and representational change following test-stimulus pre-exposure in perceptual learning

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Two experiments examined mechanisms through which exposure to a test stimulus (BX) can reduce generalization to a similar stimulus which has undergone conditioning (AX+). The design was completely within-subjects. In a video-game suppression task participants were exposed to visual stimuli consisting of BX, CY, and DZ followed by subsequent conditioning of AX and AY. In Experiment 1 testing was conducted with B, a pre-exposed element with a conditioned associate (X) or D, a pre-exposed element whose associate (Z) had not been conditioned. These elements were each tested in compound with X and Y, each of which had an associated element. Suppression to BX and BY was reduced relative to DX and DY. The B element, whose associate had been conditioned, was more effective in reducing generalization than the D element whose associate had not, suggesting some form of retrospective re-evaluation or a change in effectiveness to B had occurred permitting it to pass a summation test. Testing in Experiment 2 consisted of a retardation test where B and D were combined with W and reinforced on separate trials. Acquisition of suppression to BW was more effective than to DW, suggesting that the BW compound was more salient than was DW. Final tests of B, D, and W showed no difference in response to B and D, with more suppression to W. The results are consistent with the idea that exposure to BX facilitates a subsequent discrimination with AX by way of B becoming more salient than other pre-exposed stimuli, perhaps by way of its evocation during AX+ trials.

Keywords: Perceptual learning, humans, retrospective revaluation, salience

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Compound-stimulus salience test of the unique elements in an acoustic discrimination task with human participants

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In the present series of experiments the human participants were alternately pre-exposed to three compound acoustic stimuli, two of which, XA and XB, shared the common feature X, and a third compound (YC) that does not share that component. After pre-exposure, a categorization task was performed with two novel acoustic stimuli, each assigned to one of two different responses associated with two fictitious categories: Blue or White. Finally, all participants performed a summation test in which the pre-exposed single components A or C were presented sequentially or simultaneously together with the categorization learning stimuli. The results of these experiments are discussed taking into account the differential representation hypothesis of Perceptual Learning (see Ballesta et al., 2021) according to which, as a consequence of the elementary representation of stimuli A, B, and X resulting from the intermixed pre-exposure to XA and BX, the unique item A (from XA) is expected to show a smaller interference effect on the summation test trials than the equivalent element C (from YC) from the third pre-exposed compound which does not share the common element X.

Keywords: Perceptual learning; stimulus salience; unique and compound elements.

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OC - 25

Beyond conditioning: The impact of affective congruency and contingency on generalization gradients

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Recent research has established affective valence as an important variable in shaping generalization gradients. We conducted two online predictive learning experiments to explore the effects of affective congruency and contingency variations on stimulus generalization. In Experiment 1, 229 participants were divided into two groups: one experiencing affective congruency (matching valence between predictive cues [words] and a virtual outcome) and the other experiencing affective incongruency (mismatching valence) during training. Afterwards, a generalization test was conducted, assessing non-trained stimuli varying along the valence dimension. Affective congruency (i.e., similar valence for cues and outcomes) led to a sharper generalization gradient as a function of the affective distance from the predictive stimulus. This result suggests a facilitation of access to the valence dimension as a product of the affective congruency between cue and outcome. In Experiment 2 (389 participants), we manipulated both the valence of the conditioned stimulus (CS+) and the contingency between cues and outcomes. In both scenarios, there was affective congruency between cue and outcome during training. For some participants, the CS+ was of positive valence (paired with a positive outcome), while for others, it was of negative valence (paired with a negative outcome). Additionally, some groups experienced a deterministic relationship (CS+ always followed by the outcome), while others experienced a probabilistic relationship (CS+ followed by the outcome in only 33% of trials). In the generalization test, lower contingencies resulted in broader generalization gradients, replicating previous findings with physical dimensions. However, no significant differences were found based on the affective value of the CS+. Both experiments further emphasize the role of valence in shaping generalization gradients while also highlighting the influence of other factors beyond valence. Overall, they show a promising path to further evaluate the key role of affective processing in basic learning phenomena.

Keywords: generalization, valence, predictive learning

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Inductive learning benefits from spacing and interleaving in recognition and categorization tests

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Repeated presentation of exemplars from a category can lead to the extraction of the regularities and features of that category through inductive learning. The effect of phenomena like spacing and interleaving on inductive learning have been studied in the last decade. In a massed and blocked condition (MB), all of the exemplars of a category appear close in time with each of them right after the previous one. On the other hand, in a spaced and interleaved condition (SI), the exemplars are presented mixed with exemplars of other categories, having a longer interval between exemplars of the same category than in the case of the MB condition. Kornell & Bjork (2008) reported that training following a SI schedule enhanced inductive learning using stimuli from natural categories, paintings from different artists. In their first experiment they used a categorization test with feedback, leading to relearning during that phase. In their second experiment they used a recognition test, with participants indicating if the painting belonged to an old or new category instead of having to choose the correct name of the artists.
In this study we report two experiments that use different tests to check the possible effect of SI versus MB on short term inductive learning. In Experiment 1 we replicated the second experiment of Kornell & Bjork (2008) using a recognition test. In Experiment 2 we used a categorization test without feedback to prevent relearning. In both of them SI improved inductive learning compared to MB, but the sensitivity of the categorization test was higher than the sensitivity of the recognition test.

Keywords: Inductive learning, spacing effect, interleaving, category learning, recognition

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Evaluating the difference in performance of pigeons and starlings on the ephemeral reward task

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In the ephemeral reward task, an animal is presented with two stimuli, A and B. Choosing A results in a reward and ends the trial. Choosing B also results in a reward, but the animal can then respond to A and receive an additional reward, making B twice as rewarding as A. Therefore, choices of B are considered optimal. In an initial replication of this task with pigeons and starlings, we observed differing behaviors between the species. Pigeons struggled with the task, choosing optimally in only 50% of the trials, whereas starlings quickly mastered it, choosing optimally in at least 85% of the trials. We hypothesized that the equipment used for the starlings allowed them to quickly chain responses to B and A, which might explain the difference in performance. To test this hypothesis, a new set of starlings were trained in the task, but an infrared sensor was added to the feeder, requiring them to collect the reward after choosing B, before A was made available. This manipulation made the task more similar to the one used with pigeons. Despite this change, starlings continued to maximize their rewards. Finally, we introduced progressively longer delays between the initial food consumption and the second choice following a B selection. This led to a shift in the animals' behavior towards indifference. When the delays were removed, the animals reverted to responding optimally. These results suggest that the time between stimuli presentations can significantly influence animals' performance. This variable should be considered before attributing the differing performances of species to evolutionary or interspecific factors.

Keywords: Animal behavior, suboptimal choice, ephemeral reward task

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OC - 28

Is all information worth It? The observing response in the suboptimal choice task

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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, in 20% of the trials, a stimulus (S+) is presented, and after 10 s, food always ensues; in the other 80% of the trials, a different stimulus (S-) is presented for 10 s, but always ends without food. If they choose the Non-informative option instead, one of two stimuli is presented (S1 or S2), 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 two experiments, we investigated the role played by the information conveyed by the terminal stimuli (S+, S-, S1, and S2). We implemented a variation of the task where the terminal stimuli were withheld unless the starlings performed an observing response, indicating their willingness to see such stimuli. In the first experiment, all stimuli where available for observation whereas in the second, only the S- and S2 could be observed (the S+ and the S1 were always withheld). The proportion of observing responses and suboptimal preference was generally high in the first experiment, but in the second, preference was reversed and the S- was not observed. Apparently, when information consists only of “bad news”, starlings do not seek it and behave optimally.

Keywords: Observing Response; Suboptimal Decision Task; Animal Decision Making

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Polydipsia and extended training on a delay discounting task eliminate differences in impulsive choice between spontaneously hypertensive (SHR) and Lewis (LEW) rats.

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This study analyzed impulsive choices made by Spontaneously Hypertensive (SHR) and Lewis (LEW) rats in the initial link of a concurrent-chains procedure with presses on two levers arranging entries to two terminal links, one delivering 1-food pellet immediately and the other 4-food pellets with a delay of 0.1, 5, 10, 20, 40, or 80 s randomly selected in the session. A bottle with water could be available for the rats to drink (B) or it was not available (A) according to an ABA design. Both strains produced discounting function with hyperbolic shape indicating that their preference for 4-pellets (LLF) switched to 1-pellet (SSF) with the increasing delay to get the LLF. Estimations of discounting rate and sensitivity to the magnitude of the LLF increased with their experience in the choice situation. They developed polydipsia with the water available to drink during the session, but it did not cause their impulsive choices to decrease indicating no between strain differences in impulsivity and inattention. All rats sipped more water during the blackouts separating the delays to LLF than during the initial link and terminal links. The last no water condition (A) showed that licking the spout of an empty bottle persisted more in the SHRs than in the LEWs. The laws of allocation, induction, and covariance describe these results well.

Keywords: Choice, impulsivity, polydipsia, SHR, LEW.

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OC - 30

Exploring mechanisms of contingency-based cognitive flexibility in adults with attention-deficit/hyperactivity disorder and obsessive-compulsive disorder

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Obsessive-compulsive disorder (OCD) and attention deficit hyperactivity disorder (ADHD) are characterised by lack of cognitive flexibility. However, the mechanisms underlying learning and flexibility under uncertainty in OCD and ADHD need further understanding. In the present study, we aimed to identify the mechanisms related to the contingency-based cognitive flexibility in a sample of 144 Spanish-speaking adults (43 OCD, 49 ADHD and 52 healthy controls). For this purpose, participants completed a probabilistic reversal learning task (PRLT). Our task consists of four blocks (one acquisition block and three reversal blocks), in which participants must choose the optimal stimulus on each trial. 'Optimal' refers to the most rewarded stimulus (80%) and 'non-optimal' to the least rewarded stimulus (20%) in the first two blocks, in the last two blocks the probabilities change to 70 and 30%. Previously, we obtained a record of resting-state functional connectivity (rsFC) between several regions of frontoparietal networks using functional near-infrared spectroscopy. Contingency-based cognitive flexibility was explored using Bayesian statistics and modelling. We found that the groups showed optimal performance in the discrimination phase and superior performance of healthy controls compared to OCD or ADHD patients in reversal blocks. We also studied the mechanisms that predict task performance differently by phase and group, based on reinforcement models and the connectivity of frontoparietal areas. Thus, understanding mechanisms underlying learning and flexibility under uncertainty and its influence on the decision-making may be important for designing case-specific interventions.

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Keywords: Obsessive-compulsive disorder, attention deficit hyperactivity disorder, probabilistic reversal learning task, cognitive flexibility, frontoparietal networks

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Posters

P - 1

The impact of an extinction cue on renewal of instrumental avoidance in humans

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In one experiment we used a within-subjects design, in which college students learned to avoid a loud noise signaled by visual stimuli by pressing a button on the computer screen in Context A. Then, the avoidance response was placed in extinction in the same Context A; half of the participants experienced this phase in the presence of an extinction-cue. Finally, participants were tested in the extinction context (Context A) and in the renewal Context (Contex B). With the present task we found that college students increased avoidance responses during training, and decreased responding during extinction. Moreover, responding was higher when testing took place in the renewal context (AAB renewal). Furthermore, we observed a reduction in the AAB renewal effect when participants received an extinction-cue, but not when testing involved presenting a new stimulus. These findings extends the efficacy of the extinction-cues to renewal of negatively reinforced behavior.

Keywords: Avoidance, Extinction Cues, Humans, Instrumental Conditioning, Renewal

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P - 2

Rats with slower extinction of conditioned taste aversion showed higher anxiety-like behavior, but only in males

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Some studies on fear conditioning have found a positive relationship between individual differences in the rate of extinction and anxiety-like behavior, suggesting that rats with higher anxiety show slower extinction. However, no similar studies have been conducted using the conditioned taste aversion (CTA) procedure. In the present experiment, rats of both sexes received two conditioning trials in which the consumption of a flavored solution was paired with a LiCl injection to induce taste aversion. The acquired taste aversion was then extinguished by the presentation of the same solution but without any associated consequences. After a 16-day interval, a spontaneous recovery test was conducted. Finally, the level of anxiety was assessed using the Light/Dark Transition (LDB) and the elevated plus maze (EPM) tests, both of which measure the tendency to avoid exploring potentially dangerous environments. We find the expected relationship only in males, observing that subjects with slower extinction rates also spent less time exploring potentially dangerous places, indicating higher levels of anxiety-like behavior. On the contrary, in the case of females we observed that there is no positive relationship between extinction and anxiety. Indeed, females with slower extinction rates tend to show more exploration of the potentially dangerous place, which would indicate a lower level of anxiety. We interpret these results as alternative strategies implemented between males and females in the avoidance-approach conflict.

Keywords: extinction; taste aversion; sex differences; anxiety

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P - 3

Stress and renewal: The effects of stress on memory and learning, a preliminary study

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Prior work (Drexler et al., 2017; Merz et al., 2018) has stated that acute stress prior to extinction reduces the renewal effect. Post hoc analyses suggest a renewal effect in a non-stressed control group, but none in a stressed group. Nevertheless, the critical Renewal x Stress interaction was not significant, indicating that the size of the effect in each group, significant or not, did not vary based on context. A preliminary experiment re-evaluated this stress effect on renewal. Replicating the procedures of Drexler et al. (2017) a sample of 44 participants received either stress (Socially Evaluated Cold Pressor Task), or not, prior to extinction in a predictive learning task. On the first day, two stimuli were paired with a stomachache outcome in context A and were then extinguished the next day in Context B following the stress manipulations. On the following day, stimuli were presented in both contexts without feedback. Results showed that participants were successfully able to associate the cues with the presence and absence of stomachache on the corresponding days. On test, renewal was present in both stress and control groups, as manifested by an increased stomachache predictions in context A, however, renewal across groups did not differ. There was power of .1, .36 and .72 to detect a small, medium, and large effects, respectively. Evidence regarding effects of stress over renewal in a non-arousing paradigm is discussed.

Keywords: learning extincition renewal stress context

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Parallelisms between latent inhibition and extinction: The role of the prediction error generated by novel stimuli

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There are parallels between latent inhibition and extinction. At the procedural level, both effects depend on the presentation of a stimulus without being followed by consequences, which results in a reduction in the ability of that stimulus to elicit the conditioned response. At a theoretical level, we argue that the contents of learning and the underlying mechanisms are similar in both phenomena. According to our theoretical framework, both latent inhibition and extinction involve the learning of a new stimulus-absence of consequences association, which acts by inhibiting the activation of the conditioned association (CS-US). We also assume that this inhibitory learning depends on the magnitude of the prediction error, with greater learning occurring in cases where the discrepancy between the subject's initial expectation of consequences and the actual outcome of the experience is more pronounced. Furthermore, our model incorporates an additional assumption about prediction errors generated by novelty: the presentation of a novel stimulus produces the expectation that some event may occur, which will contribute to the prediction error by increasing the overall net expectation of the occurrence of consequences. In this presentation, we will review the studies that have evaluated the effect of presenting other novel stimuli during nonfeinforced exposure of a stimulus in latent inhibition and extinction. We also present some recent data with human participants.

Keywords: Latent inhibition, extinction, prediction error, Hall-Rodríguez model

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P - 5

Retrieval practice: Effect stability and anxiety

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Retrieval practice or the testing effect is a learning strategy that involves interleaving tests during study sessions, which significantly improves long-term memory compared to repeated study. Over the past decades, considerable research has shown that retrieval practice is a highly beneficial strategy for improving long-term learning. However, it is still unclear (1) whether the magnitude of this effect is stable over time or modulated by the number of learning cycles; and (2) whether the anxiety associated with testing can be modulated by the practice of testing. The present study compares four groups of participants undergoing different number of learning cycles (5, 10, 15) and different learning experiences: the test group, with interleaved tests between the study cycles, and three study groups, with repeated study. In the study cycles, participants are asked to memorize 60 Swahili-Spanish vocabulary word-pairs. In the test cycles, they perform cued-recall tests giving the Swahili word followed by the first letter of the corresponding Spanish target word. The schedule of the testing group included the following sequence of study (S) and test (T) cycles: day 1 – SSTST; day 2 – TSTST; day 3 – TSTST; and day 4 – T. This group is compared with three study groups, study 1 group (day 1 – SSSSS; day 2 – T), study 2 group (day 1 – SSSSS; day 2 – SSSSS; day 3 – T), and study 3 group (day 1 – SSSSS; day 2 – SSSSS; day 3 – SSSSS, and day 4 – T). This design ensures an equal level of exposure to the study material between the test group and each of the study groups; and it prevents testing experience prior to the final test in the study groups. Anxiety level is measured before the first test on days 2, 3, and 4 for the testing group, and before the final test for each study group. To evaluate the test effect, the final test scores of each study group were compared with the corresponding test scores of the test group using t-test analyses. In addition, the effect sizes (Cohen´s d') of the t-tests after 5, 10, and 15 learning cycles were compared by calculating confidence intervals. Results of a pilot study with 16 participants (4 per group) showed that the test effect was significant only after 15 learning cycles. Therefore, a modification of the original design is proposed to achieve the effect and to be able to analyze the effect size evolution. Finally, there was no increase in anxiety associated with the use of testing during learning.

Keywords: testing effect, retrieval practice, exam anxiety, memory, learning

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P - 6

Exposure to non-caloric sweet taste: Exploring possible underlying mechanisms

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Various studies conducted in our laboratory have shown that exposure to a sweet taste both with or without post-oral consequences can alter subsequent learning when such a substance is used as the unconditioned stimulus (US). The usual — but not only — explanation for this US preepxposure effect involves blocking mechanisms based on context-calories or taste-calories associations. However, these studies have also generated different outcomes depending on the motivational state of the animals, and we have suggested that (due to the effects observed when using substances without caloric properties) rather different mechanisms might be playing a role when observing the effects of preexposure to non-nutritive sweet tastes. In the review presented here, we explore two main alternatives for explaining the US preexposure effect under these circumstances. In particular, we will examine the evidence suggesting that extensive exposure to a non-nutritive sweet taste could lead to habituation of the sensory (sweet taste) properties of the substance. Finally, we will discuss the potential implications of this line of research for explaining the detrimental effects of overconsumption of artificial sweeteners in our current “obesogenic environment". Research funded by PID2022-136219NB-I00 (MINECO/FEDER)

Keywords: exposure, learning, non-nutritive sweetener, obesogenic environment

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Persistence of the value-modulated attentional capture (VMAC) effect using a reward-only variant task and specific extinction of the increase-signal in reward magnitude

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The VMAC effect has been considered a measure of human attentional sing-tracking wherein a task-irrelevant stimulus that signals a larger reward (high-value distractor) captures attention, increasing reaction time (RT) without affecting response accuracy. The effect may stem from a strategy—attending to a stimulus that provides information about an increase in reward magnitude—or from an involuntary bias produced by the distractor-reward pairings (Pavlovian conditioning). Previous studies have shown that the effect persists when the reward is completely removed in a second phase (Watson et al., 2019; Garre-Frutos et al., 2024). In these studies, the high-value distractor signaled an increase in the magnitude of both reward and punishment (in errors) during the acquisition phase, and both outcomes were completely omitted in an unrewarded phase (i.e., also for the low-value control stimulus). Here, in Experiment 1, we omitted punishments and specifically extinguished the increase in reward signaled by the high-value distractor by equating its value with that of the control stimulus. During acquisition, we observed a VMAC effect in RT (slowed response in the presence of the high-value distractor) and, unlike in previous studies, also in accuracy (worst performance for the high-value distractor). Interestingly, during the extinction phase, the VMAC effect decreased significantly across blocks until it disappeared by the end of the phase. We also observed the same temporal pattern in accuracy. In Experiment 2, we used a mixed reward-punishment variant of the task and the same extinction procedure. In this case, we did not observe a reduction in the VMAC effect on RT during the extinction phase, nor did we see an effect on accuracy in any of the phases. Taken together, the results suggest that 1) while VMAC can also affect response accuracy, punishment seems to overshadow this effect specifically, and 2) in the reward-only variant, extinction of the VMAC effect in RT could be observed when the value of the high-value distractor is equated to that of the control stimulus. Funding: Grant #PID2021-127985NB-I00 (MCIN-AEI-FEDER).

Keywords: attentional sign-tracking, extinction, reward, punishment, VMAC

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Cognitive benefits of nature on Stroop performance

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The present study investigates whether exposure to different environmental images (natural vs. urban) affects performance in an attentional control task (Stroop). To do this, students from the University of Almeria completed two sessions, in which they were evaluated in a Stroop task before and after observing 40 environmental photographs (either natural or urban depending on the session) for 6 minutes. To counterbalance the influence of the order in which both context images were visualized, half of the subjects were assigned to ORDER 1 (1st Natural, 2nd Urban), and the other half were assigned to ORDER 2 (1st Urban, 2nd Natural). Our results showed a 4-way interaction between the variables Time, Context, Congruency, and Order. Post-hoc analysis revealed that all participants improved significantly their performance in incongruent trials during their first session, likely due to practice effects. However, only those who watched natural images improved their performance in their second session. This was observed both in accuracy and reaction time measurements. These findings suggest that exposure to natural environments can enhance attentional control beyond practice effects alone. Thus, incorporating natural elements into daily environments may offer cognitive benefits, particularly in tasks requiring executive control.

Keywords: Executive Function, Nature, Stroop, Basic Psychology

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P - 9

Spacing and interleaving effects improve long-term inductive learning

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Inductive learning is a cognitive process by which we can infer rules and general patterns from particular examples. Previous research has studied the influence of spaced and interleaved presentation to improve inductive learning. Kornell & Bjork (2008) reported two experiments comparing two conditions. In the first one, the massed and blocked condition (MB), all stimuli from a single category appeared one after another in a single block. On the other hand, on the spaced and interleaved condition (SI) stimuli from several categories were intermixed and presented separated in several blocks across training. They found that SI enhanced correct categorization of new exemplars compared to MB in a short term test with feedback. Our experiment replicates and extends the original experiment of Kornell & Bjork (2008) exploring if SI would produce a long term effect in inductive learning by introducing a delay of one week between the learning session and the test session. The categorization test did not have feedback to preclude relearning during this phase. Consistently with previous results, those categories which were presented following a SI presentation showed a higher proportion of correct categorization responses compared with those with a MB presentation.

Keywords: inductive learning, category learning, spacing effect, interleaving, long term memory

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Exploring the mechanisms underlying reward and punishment driven learning in a modified probabilistic reversal learning task: A pilot study.

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In everyday life, situations can change unexpectedly, requiring adaptable responses for success across various scenarios. The effectiveness of this adaptation can vary based on the challenges faced, with both positive and negative feedback impacting the learning process and behavioral adjustment. Furthermore, the level of uncertainty in choosing responses can influence this process. Personality traits such as anxiety, and impulsivity like negative and positive urgency, are also key factors. The aim of this study was to explore the behavioral and personality factors that drive decision-making in learning, particularly how different levels of uncertainty and feedback on rewards and punishments affect outcomes. We employed a modified Probabilistic Reversal Learning Task with 60 participants, involving 320 trials across eight blocks under "Low Uncertainty" and "High Uncertainty" conditions. Feedback types were varied across phases: the reward-driven phase offered positive reinforcement without negative punishment, whereas the punishment-driven phase offered negative punishment without positive reinforcement. We assessed participants using the UPPS-P and STAI tests and analyzed the learning process using a reinforcement learning model to derive reward learning rate, punishment learning rate, and inverse temperature. A Bayesian Generalized Logistic model evaluated behavioral performance across task phases and its correlation with UPPS-P and STAI scores, as well as learning parameters. Results indicated superior overall performance under low uncertainty conditions, particularly in the reversal punishment-driven phase. Higher punishment learning rates were linked to better performance in punishment-driven phases at both uncertainty levels, whereas a higher reward learning rate was significant only under high uncertainty in the reward-driven phase. Lower anxiety levels predicted better performance in low uncertainty punishment phases, while higher anxiety levels were advantageous in high uncertainty conditions. Positive urgency from UPPS-P scores enhanced performance in the acquisition phase under reward conditions and was detrimental under punishment conditions at high uncertainty. Conversely, lower negative urgency scores improved performance in high uncertainty reward phases. These findings shed light on the complex interplay between uncertainty, feedback type, and individual traits in shaping learning and decision-making processes. Funding: PID2023-147063NB-I00

Keywords: Reinforcement learning, decision-making, cognitive flexibility

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Safety signals reinforce instrumental avoidance in humans

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Safety signals have been found to reinforce instrumental avoidance behaviour in non-human animals. However, the available evidence in humans has been obtained with subjective measures and hence there are no objective demonstrations of this phenomenon in humans. Using human participants in an avoidance task, four experiments (1-3 and 5) were conducted online to assess the reinforcing properties of safety signals and a fifth experiment (4) was conducted in the laboratory. Participants were presented with a CS+ and a CS-, and they could avoid an aversive outcome during presentations of the CS+ by pressing their spacebar at a specific time. If successful, the aversive outcome (IAPS image or a loud noise in the laboratory) was not shown but instead a safety signal was. Participants were then tested – whilst on extinction - with two new ambiguous test CS's. If during test participants avoided, one of the new stimuli produced the trained safety signal and the other was a control. In Experiments 1 and 4 the control was followed by no signal, In Experiment 2 the control was followed by a signal that differed in one dimension (colour) with the safety signal, and in Experiments 3 and 5 the control was followed by a signal that differed in two dimensions (shape and colour) from the safety signal. We observed that participants made more avoidance responses to the ambiguous test CS when followed by the trained signal in Experiments 1, 3, 4 and 5. We conclude that the trained safety signal reinforced avoidance behaviour. However, in Experiment 2 there was no difference in avoidance behaviour suggesting that when the trained signal and the control signal are similar, generalisation occurs. Overall, these results suggest that trained safety signals can reinforce avoidance behaviour in humans.

Keywords: Safety Signals, Reinforcement, Avoidance Behaviour, Instrumental, Relief.

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Unconditioned and conditioned effects of naloxone on fear conditioning

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The analysis of associative processes triggered when drugs are used as unconditioned stimuli allows for the examination of the interaction between the nervous system and learning processes. On one hand, it enables the analysis of behavioral and/or cognitive changes that occur in response to the neurobiological processes triggered by drugs. On the other hand, it highlights that such neurobiological processes also change when the organism anticipates drug exposure. To analyze these relationships within the opioid system, we conducted two experiments with animals (Wistar rats) to investigate the effect of naloxone administration on fear conditioning. In the first experiment, naloxone (3 mg/kg) was administered before pairing a CS (auditory tone) with the US (naloxone) for the experimental group, while a saline solution was injected for the control group. A subsequent extinction phase in the absence of the drug revealed a significant increase in the conditioned fear response in the group that had received naloxone. In the second experiment, naloxone (or a saline solution in a control group) was repeatedly administered in the presence of a novel context before proceeding to pair the CS with the shock in the same context where naloxone had been previously administered, but in the absence of the drug. The results again revealed an increase in fear conditioning. This finding suggests that naloxone, when associated with a novel context, can trigger a conditioned response similar to that unconditionally generated by the drug. These results provide new insights into the mechanisms by which naloxone can affect fear conditioning and could have implications for understanding the mechanisms underlying the so-called placebo effect.

Keywords: Fear Conditioning; Naloxone; Drug Conditioning; Rats

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An evaluation of resurgence in dogs

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One well-known example of reoccurrence of extinguished responses is resurgence. Although resurgence has been studied in different laboratory animals (e. g., rats, pigeons), as far as the authors know, it has not been systematically studied with domestic animals. Thus, the main goal of the present experiment was to explore whether resurgence can be found in dogs. An experimental apparatus was built to test domestic dogs in their homes. Therefore, during the initial phase (Phase 1) one response was reinforced (target response). Then, in the following phase (Phase 2) the target response was placed in extinction while simultaneously an alternative response was reinforced. Finally, during the Test Phase no reinforcement was available for either behavior. The number of occurrences of the target response were measured as resurgence. The results of this experiment indicated an increase of the target response during testing, suggesting that resurgence can be observed in domestic dogs. Theoretical and methodological implications are discussed.

Keywords: Dogs, Extinction, Instrumental Conditioning, Reoccurrence, Resurgence

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The effect of context familiarity on habituation of the retraction response in earthworms

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Recent studies on habituation in invertebrates have demonstrated that earthworms are context-sensitive even in simple learning processes such as short-term habituation. This experiment compares the effect of a familiar versus an unfamiliar context on the habituation of the withdrawal response in earthworms (*Dendrobaena veneta*). The familiarity of the contexts was defined by the surface of the experimental Petri dish, impregnated with a mixture of food (familiar or unfamiliar) and water. The experiment consisted of a habituation training phase to a light (2100 lux, 3 sec) over 80 trials (30 sec. ITI), and pre- and post-training phases. The latter (pre- and post-training) involved exposure to 60 light trials of different intensities (700, 2100, and 6300 lux) arranged in a pseudo-random order. To measure the degree of habituation, we conducted a test under common conditions for both groups, thus distinguishing learning from performance (t1-t2 framework). Results showed no significant differences between the two groups in either the pre-training or training phases. However, marginally significant differences were observed in the post-training phase, suggesting that the familiar context produced less habituation than the unfamiliar context. These findings are discussed in light of various learning theories and contribute to our understanding of habituation processes in invertebrates.

Keywords: habituation, earthworms, context, familiarity.

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Effects of contextual surface change on habituation of the retraction response in earthworms (*Dendrobaena veneta*)

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Given the evolutionary distance between our species, one of the difficulties in studying learning in earthworms is to define which stimuli and contexts are appropriate for each species. Preliminary experiments on habituation of the withdrawal response have demonstrated the sensitivity of earthworms to a change in the odour of the context presented on the lid of the experimental Petri dish (Reyes-Jiménez, Iglesias-Parro and Paredes-Olay, 2020). When an odour change is introduced between habituation and rehabituation, a recovery of the retraction response is observed. In this poster, we present a procedure in which new contextual cues are used. In this case, the context is defined by the surface of the experimental Petri dish, a cloth soaked in a mixture of food and water. In this experiment, two groups of worms were habituated to light (1600 lux, 3 sec, 30 sec ITI) and then re-habituated in the same context (Same group) or in a different context (Different group). The results of this experiment showed a general recovery of the response in the rehabituation test. However, the contextual change affected the development of habituation in the groups differently at this stage, confirming the sensitivity of the earthworms to these changes.

Keywords: habituation, earthworms, context, odour

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Habituation is context-specific in invertebrates: New data on the earthworm (*Dendrobaena veneta*)

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Habituation has traditionally been considered a phenomenon of non-associative learning. However, increasing research indicates that it is a more complex phenomenon than previously thought. The context in which habituation occurs plays an important role in modulating the expression of the habituated response. When a test is conducted in a different context from where habituation occurred, a reinstatement of the habituated response is observed. Although there is data on the appearance of habituation in different species, in invertebrate species it has been questioned whether habituation can be explained in associative terms. We present an experiment demonstrating the contextual specificity of the habituated head retraction response to a light stimulus. A group of 48 worms was habituated not to respond to a three-second light stimulus presented at 30-second intervals. Each half of the subjects was habituated in a different context (1%v/v ethanol vs water). In a second testing phase, the light stimulus was presented again in either the same or a different context. The results showed that when there is a change in context, the habituated response recovers compared to the response given in the same context. These results support the contextual specificity of habituation in invertebrate.

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

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The effect of devaluation on food brand logos: An assessment from an attentional response

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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 and motivate eating behavior, leading to excessive food consumption even in a satiety state. Several studies have investigated how food has a great capacity to capture attention and how this effect can be transferred to arbitrary stimuli that had been artificially paired with food in the laboratory. In a previous study we found that food cues paired with food in our environment (logotypes), can capture attention as food does even after a general satiation procedure, suggesting that food cues elicit appetitive responses even when food does not preserve its value. To test this hypothesis, in an experiment we examine if this attentional effect of logos is maintained after a specific devaluation of the food they are paired with. The devaluation procedure consisted in pairing images of food stimuli with aversive pictures (unclean toilets). We used an odd one out task to measure attentional capture of devaluated and non-devaluated food images and of their corresponding logos. Contrary to expectations, our results showed an absence of a devaluation effect for food stimuli (no difference between devalued vs. non-devalued food´s attentional capture) while a devaluation effect was observed for food logos (lower attentional capture for logos whose associated food had been devalued). Possible methodological artifacts for the dissociation in the devaluation effect for food and logos are discussed.

Keywords: Attentioal bias, pavlovian learning, food brand logos, devaluation

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An initial observational study for an intervention program to reduce stereotypic behaviors in giraffes at the Madrid Zoo

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Stereotypic behaviors are indicative of poor quality of life in captive animals. Additionally, studies link the presence of stereotypies with a reduction in species-typical behaviors, which occur more frequently in captive environments. The Zoo Aquarium of Madrid reported that five giraffes (4 females and 1 male), aged 10-17 years old, show stereotypic behavior (object licking) towards non-nutritional materials continuously and excessively. The objectives of this research were the creation of an observational instrument to identify and measure the behaviors of this group of giraffes, and subsequently evaluate the implementation of an environmental stimulation program. This research was divided into three phases: 1) creation of the instrument for the observation and measurement of behaviors; 2) implementation of the program; and 3) re-evaluation. In the first phase, an ethogram was created and validated, using an expert judgement methodology. Subsequently, the behaviors were filmed and coded to obtain frequency of the behaviors displayed by the giraffes. In the second phase, a learning tasks will be adapted to the ethological characteristics of giraffes. In the final phase, the frequency of the behaviors will be re-evaluated using the same observational instrument as in the first phase, to determine if the program was useful in reducing the frequency of stereotypic behaviors and increasing the frequency of species-typical behaviors. The study is expected to contribute to improve the general well-being of the giraffe group, as well as to obtain scientific information about how this group of animals solves learning tasks compared to other animal species and to previous studies.

Keywords: stereotypies, giraffes, captivity, environmental stimulation, observation

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Place preference conditioning: Evaluating the motivational properties of different doses of ethanol in the earthworm (*Dendrobaena veneta*)

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Conditioned place preference (CPP) is a commonly used method to evaluate the motivational value of drugs. Studies involving earthworms suggest that these animals are capable of learning associations between stimuli, making them excellent subjects for CPP studies. Due to the limited number of studies using invertebrates, such as earthworms, we designed a study conducted to determine the minimum dose required to produce significant changes in contextual preference as inferred from the dose-response curve. Using earthworms (*Dendrobaena veneta*) as study subjects, we measured the initial place preference responses on the habituation day in two tactile contexts (smooth and rough), which, according to previous literature, will show a preference for the smooth soil. In the subsequent conditioning phase, we trained the animals over the course of 8 trials to associate the rough floor with a specific concentration of ethanol according to their group: 0% (control group), 3.5%, 7%, and 14% (v/v), while the smooth floor was associated with water. In the final phase, the time spent in both contexts was measured again. The results indicate an initial preference for the smooth soil; however, after the intervention, animals exposed to ethanol (3.5% and 7%) preferred to spend more time on the rough soil. These findings are interpreted as evidence for the capacity of ethanol as a motivational stimulus in earthworms and its potential use for future research. (This work was supported by the Grant PID2021-128650NA-I00 funded by MCIN/AEI/ 10.13039/501100011033).

Keywords: Conditioned place preference (CPP); Earthworm; *Dendrobaena veneta*; Ethanol.

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Exposure to docosahexaenoic acid (DHA) attenuates the ethanol-induced place preference in earthworm (*Dendrobaena veneta*)

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Conditioned place preference (CPP) has been widely used with a diverse range of vertebrate and invertebrates species to assess the reinforcing properties of drugs based on contextual associations. In our laboratory, we have recently demonstrated that earthworms (Dendrobaena veneta) develop a conditioned place preference for ethanol. Recent studies have shown that omega-3 polyunsaturated fatty acids (n-3 PUFAs) can reduce ethanol-associated context preference in mice (1) and that earthworms has the ability to absorb and accumulate DHA when soil is enriched with n-3 PUFAs (2). This study aimed to assess the potential impact of DHA on ethanol-induced place preference in the earthworm (*Dendrobaena veneta*). The study employed a total of 16 adult earthworms weighing between 0.6 and 1.4 grams. In the habituation phase, the earthworms' preference between two contexts differing in soil texture (smooth or rough) was recorded for a period of 10 minutes. In the training phase, eight alternating trials were conducted in which the worms were exposed to two contexts for 10 minutes each. One context consisted of rough soil moistened with 3.5% ethanol (v/v), while the other was of smooth soil moistened with water. During the trial of exposition to ethanol, earthworms were additionally exposed to a DHA-rich oil (EtOH+DHA group) or sunflower oil (EtOH+CO group). Finally, in the test phase, the time spent in each context was assessed for 10 minutes. The results showed a greater preference for the smooth context in both groups during the habituation phase. During the test phase, only the EtOH+CO group exhibited a higher preference for the rough soil. In our study, DHA attenuated ethanol-induced place preference in earthworms suggesting that n-3 PUFAs are promising for treating of the reinforcing effects of alcohol (This work was supported by the Grant PID2021-128650NA-I00 funded by MCIN/AEI/ 10.13039/501100011033).

Keywords: Conditioned place preference (CPP); earthworm (*Dendrobaena veneta*); DHA; Omega-3; invertebrates

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Influence of maternal stress and breastfeeding on growth during early ontogeny

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Parenting conditions could be determining factors in the growth and development of offspring. Previous evidence shows that resource scarcity can increase maternal stress responses. The influence of maternal variables on offspring growth has been scarcely studied. The aim of Study 1 was to assess growth measures of adult rats that were raised during infancy under maternal stress condition, elicited by the scarcity-adversity model of low bedding. During postnatal days 8 to 12, litters under the scarcity condition were housed with 100 ml of bedding in the nest. Litters in the control group received 4000 ml of bedding. Scarcity-adversity reared pups exhibited decreased growth measures (lower body weight, length, and skull length in adulthood). One hypothesis that could explain these results is that maternal stress alters breastfeeding, being one of the factors affecting long-term growth measures. There is abundant literature demonstrating that maternal stress impacts breastfeeding, likely attributed to changes in feeding behavior and hormonal mechanisms. In humans, a condition that may reflect the scenario depicted in Study 1 could be parenting under conditions of poverty, characterized by a scarcity of resources for caregiving, which, in some instances, leads to child malnutrition. Children suffering from malnutrition experience impaired growth measures. In order to support the hypothesis proposed, the objective of Study 2 was to assess the influence of exclusive breastfeeding on growth measures of children with child malnutrition attending CONIN Foundation centers in Argentina. Mothers were interviewed to gather information on the progression of breastfeeding, while growth measures were documented using clinical records. It was found that children who received exclusive breastfeeding exhibited greater growth measures than those without exclusive breastfeeding (z-score for weight-for-age, weight-for-height, body mass index, head circumference, and height-for-age) upon admission to the institutions assisting them. The difference in height-for-age remained consistent even in the final assessment. The results of both studies suggest that the growth conditions of offspring are affected in stressed mothers, with breastfeeding being one of the mechanisms behind this phenomenon. Prevention and treatment strategies for childhood malnutrition should consider maternal variables such as maternal stress and social buffering, which contributes to reducing stress responses and involve the transfer of resources to the mother, such as emotional support, practical assistance, and information. In this regard, information about breastfeeding starting from pregnancy, provided by healthcare teams, could be a key resource for preventing childhood malnutrition.

Keywords: maternal stress - breastfeeding - growth - ontogeny

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Beer sensory-specific satiety is modulated by alcohol in rats

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Sensory-Specific Satiety (SSS) refers to the temporary hedonic decline of the sensory properties of recently eaten foods or beverages compared to other non-consumed stimuli. This mechanism reduces the consumption of these devalued stimuli and also generalizes to other similar ones, even when those have not been previously ingested. Since there are no previous studies on SSS with alcoholic beverages, we aimed to assess in a sample of 35 rats the effect of SSS on beer consumption and its interaction with alcohol. The experiment involved two groups of rats, the Different Group was tested on two similar beers with different alcohol content (0% vs. 1%), and the Same Group was tested on two similar beers with the same alcohol content (0% or 1%). The experiment consisted of two main phases: a Familiarization phase and a Sensory-Specific Satiety phase. In the Familiarization phase, the rats were exposed to the two target beers (A and B) in order to reduce their neophobic response. Following this, in the Sensory-Specific Satiety phase, the rats were first presented with one of the beers (A) to be satiated, followed by a choice test (A vs. B) after 2 hours. An increased preference at test for non-satiated beers (B) indicates a basic SSS effect, while an absence of preference between beers is interpreted as a lack of effect. Results showed that rats in general consumed more 0% beers than 1% ones. In the Different Group, rats consumed more 0% beers regardless of which one was satiated. In the Same group, rats tested with two 0% beers showed a SSS pattern, preferring the non-satiated beer over the satiated one, while those tested with two 1% beers presented the opposite pattern, preferring the satiated beer over the non-satiated. The results from the Different group are inconclusive, as the ceiling effect caused by the differences in alcohol preferences overshadowed any SSS effect. On the other hand, the Same Group suggests that SSS effect can be obtained when beers have no alcohol but, unexpectedly, showed a reversed SSS effect when beers had 1% alcohol. These results are interpreted in terms of the rats‘ low preference for alcoholic substances, and the possible implications of the SSS phenomenon for alcohol consumption in today's society are discussed.

Keywords: Sensory-Specific Satiety, Beer, Alcohol, Generalization, SSS

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Maternal auto-antibodies during gestation: A potential link to behavioural deficits with an animal model of autism spectrum disorder

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Autism Spectrum Disorders (ASD) encompass a range of conditions characterized by varying degrees of difficulties on socialization, deficits in verbal and non-verbal communication, and the presence of stereotyped and/or repetitive behaviours. While a neurodevelopmental origin for ASD is well established, their specific etiology remains unclear. One potential etiology of this disorder lies in the activation of the maternal immune system against the fetus. Therefore, it is hypothesized that autoantibodies specifically present in maternal blood may disrupt the normal development of the fetal nervous system. This hypothesis is supported by previous in vitro research. In order to test this hypothesis using in vivo animals we designed a Maternal Induced Autism (MIA) model. Pregnant Wistar rats were allocated to five groups: those injected with antibodies (IgG) from human mothers of children with ASD, mothers of healthy children, children with ASD, healthy children, and a non-injected control group. Upon reaching adolescence, the pups were individually subjected to a battery of behavioral tests assessing several components, including neophobia attenuation; open field exploration – assessing anxiety, social interaction, and Y-maze exploration – assessing cognitive flexibility. Results showed no significant differences in performance on attenuation of neophobia or Y-Maze, but some effects were found in open field, specially between the groups exposed to healthy children antibodies or no exposed during gestation and other groups; and in social interaction, related with an overall interaction of those groups exposed to IgGs from mothers in comparison with groups exposed to IgGs directly from children or non-exposed mothers. Additionally, some related sex effects were found, driven by a greater global activity in males than in females in open field test, and a higher preference to interact with a fellow by males than females in the social interaction test. In this regard, these results suggest that MIA models using IgG exposure may be useful to explain some specific traits of ASD, but might be insufficient to explain the whole phenomena.

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Keywords: Autism, Rats, Neophobia, Anxiety, Social Interaction

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Socialization does not impede the development of activity-based anorexia, but tempers its development

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Social context influence health in all animal species that live in groups, including humans, where societal conditions and social interactions are a relevant factor to the emergence of several psychological disorders. The present study aims to analyse the effect of poor social conditions in adolescence in the development of activity-based anorexia (ABA) in rats, as an animal model of anorexia nervosa (AN). Sixty Wistar Han rats underwent two phases in this experiment (socialization and the ABA procedure). In the socialization phase, housing conditions were manipulated, and subjects were exposed to either social stability, instability, or isolation for 20 days. In the ABA development phase, all rats had restricted access to food for 1 h/day during the light period and either had access to a running wheel for two 2 h periods or not. The current experiment showed that socialization prevented fatal weight loss compared to isolation during the ABA procedure. Furthermore, rats exposed to social stress through housing instability were resilient to diet restriction compared to socially stable and more so, isolated rats. Weight loss developed similarly between groups that had access to a running wheel, although adaptation to the procedure happened earlier in the socially stable rats compared to the instable or isolated ones. Additionally, food intake was significantly lower in the isolated subjects compared to the socialized ones. In general, these results show that socialization, whether stressful or stable, can have a protective effect against ABA development, although it does not prevent it. Social factors need to be considered when approaching the emergence, development and recovery of AN.

Keywords: socialization, social instability, activity-based anorexia, anorexia nervosa

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Going nuts! The impact of acute stress induction on cognitive function

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How different cognitive functions fluctuate depending on the organism's stress level has been a hot topic in research over the last century. However, the results seem somewhat inconclusive, as while some researchers find cognitive deficits when participants are exposed to stressors, others find cognitive enhancement in various functions due to stress. Therefore, the aim of this study is to analyze the effects of experimental stress induction on a wide range of cognitive functions. A total of 108 young adult participants were exposed either to the standardized Maastricht Acute Stress Test (MAST) stress induction protocol or to a non-stressful control task, forming the stress (n=54) and control (n=54) groups, with very similar ages (21.1 years, SD=4.02, and 21.06 years, SD=3.96, respectively). Following stress induction, participants completed neuropsychological tests of sustained and alternating attention (Trail Making Test, TMT), inhibition (Stroop test), phonological (letter P) and semantic (Animals) verbal fluency and working memory (Backward Digits and Letter-Number Sequencing [LNS] from WAIS-IV). Results showed no significant differences between the two groups in any of the cognitive tests evaluated, except for the working memory tests. Participants in the stress group exhibited lower performance in both the Backward Digits test and the LNS test compared to participants in the control group. The absence of differences in the remaining tests may have been due to a ceiling effect in these tasks, considering that the sample consisted of young adults; this bias did not affect the working memory tests, which generally require higher cognitive demand and are therefore more difficult to mask the effect of stress (e.g., Gierski et al., 2020). Based on the results obtained, it can be affirmed that acute stress induction with the MAST protocol leads to poorer performance in working memory tests. Future studies will need to test the remaining cognitive functions with ad-hoc tasks where it is more difficult to mask the effects of stress.

Keywords: Stress; Cognition; Working memory; MAST; Human participants

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Effetcs of pre-exposure to food-diet and wheel-activity on the subsequent development of semi-starvation induced hyperactivity

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The role of food restriction and excessive physical activity in the rapid weight loss observed in anorexia nervosa disorder is studied in the laboratory using the "activity-based anorexia" (ABA) and "semi-starvation induced hyperactivity" (SIH) rodent models. In the ABA model, food is offered for one hour per day, while in the SIH model, the daily amount of food is limited but the time for its consumption is unlimited. In both cases, the animals have free access to an activity wheel. Previous studies have shown that pre-exposure to restricted dieting slows the development of ABA, while prior physical activity experience accelerates weight loss in ABA. The aim of the present study is to compare whether pre-exposure to food diet or activity wheel affects the subsequent development of SIH with respect to weight loss, amount of food eaten in an hour, and the number of wheel turns. Forty female Wistar Han rats, 4-5 weeks old, were divided into four groups: SIH-PD (pre- exposure to diet – 40% of their baseline intake each day – and then SIH), SIH-PR (pre-exposure to wheel – 22 hours daily – and then SIH), SIH-NP (no pre-exposure before SIH) and control (no pre-exposure and with food restriction and no access to wheel after). The pre-exposure phase lasted 5 days, after which the animals were restored to their ideal weight before undergoing the SIH procedure. While the work is underway, what we expect to achieve is a delay in the development of SIH due to pre-exposure to the food regime and an acceleration of the same due to pre-exposure to the activity wheel. The results showed that pre-exposure to the food regimen delayed the development of SIH, while pre-exposure to the activity wheel accelerated it. This aligns with previous ABA experiments, as indicated in the literature.

Keywords: starvation-induced hyperactivity, pre-exposure, food diet, physical activity, weight loss.

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Nonphase gamma activity: The potential role of this band in visual processing.

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Most studies based on electroencephalography have focused to date on phase modulations associated with stimulus onset. Thus, this type of activity has been studied across different spectral bands and assigned specific roles based on scalp location or task type. However, recent studies have shown that a separate analysis of non-phase activity can reveal other psychophysiological roles of these spectral bands that have not been evaluated thus far, potentially providing valuable insights into how we process information. Specifically, the phase gamma band has been linked to a multitude of higher cognitive processes such as attention, memory, or visual binding. In the present study, we employed a 58 chanels EEG and analyzed phase and non-phase gamma activity separetly in response to a visual oddball paradigm. The sample consisted of 21 subjects across two separate measurements spaced by an average of 48 days. The results not only demonstrate differential behavioral patterns for both types of activity, potentially reflecting distinct roles in visual information processing, but also show that both activities are highly stable over time. We conclude that in this paradigm, gamma phase could respond to visual binding processing, as indicated by previous studies and gamma nonphase could respond to an anti-binding mechanism.

Keywords: Keywords: Electroencephalography, nonphase activity, gamma band, visual processing.

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Frustrative nonreward and reward relativity

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A downshift in the quality or quantity of a reward can induce frustrative nonreward (FNR), a negative emotion triggered by unexpected reward omissions or reductions. Tasks such as consummatory successive negative contrast (cSNC) can induce FNR and provide evidence for reward relativity: Rejecting a less preferred, but acceptable, reward in a situation associated with a more preferred reward. But evidence of FNR in the cSNC task is usually tied to evidence of reward relativity. An experiment was designed to test the dissociability of FNR and reward relativity using the nonselective, opioid-receptor antagonist naloxone (Nlx) as a tool. Nlx increases the behavioral suppression that follows a sucrose downshift by blocking the action of endorphins released during an event involving reward loss. Prior research indicated that Nlx would enhance consummatory suppression after a 32-to-4% sucrose downshift (8:1 reduction) and had no effects in unshifted controls always exposed to 4% sucrose. The question of interest was whether animals exposed to a 16-to-4% sucrose downshift (4:1 reduction), which was not expected to produce a cSNC effect, would nonetheless trigger FNR. Nlx was expected to have such an effect only if there was some level of FNR, even if minimal, but to have no effect if such a mild downshift generated no FNR at all. Rats were randomly assigned to three groups exposed to different sucrose concentrations during 10 preshift sessions: 32%, 16%, or 4%. During postshift sessions 11-14, all animals had access to 4% sucrose. Half the animals in each condition received an injection of Nlx (2 mL/kg, ip) and half received a saline injection (equal volume), 15 min before each postshift session. There were 6 groups: 32/Nlx, 32/Sal, 16/Nlx, 16/Sal, 4/Nlx, and 4/Sal. Lick frequency was the dependent variable. Each session lasted 5 min from the first recorded lick. As expected, there was evidence of cSNC after a 32-to-4% sucrose downshift, but not after a 16-to-4% sucrose downshift, relative to unshifted controls. Moreover, Nlx enhanced consummatory suppression after a 32-to-4% sucrose downshift, but had no effect on behavior in unshifted controls. Importantly, significant suppression was observed in Group 16/Nlx relative to 16/Sal. Although the small reward disparity may be insufficient to generate a reward relativity effect such as cSNC, the strength of FNR can be enhanced by opioid blockage, thus producing an observable cSNC effect.

Keywords: Frustrative nonreward; successive negative contrast; opioid receptors; naloxone; rats.

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Sustained attention in female rats: Effects of methylphenidate on attentional performance

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Sustained attention plays a crucial role in various cognitive tasks. Methylphenidate (MFD), a medication used to treat Attention Deficit Hyperactivity Disorder (ADHD), has been shown to enhance cognitive performance. However, its sex-differential effect on sustained attention remains largely unexplored. In this study, we evaluated the effect of MFD on a sustained attention task in female rats. Female rats were trained on an attentional task consisting of 120 trials with an 80-minute time limit. During each trial, two levers (right and left) and three lights (right, center, and left lights) were presented. The central light indicated the beginning of the trial, followed by the illumination of one of the side lights (cue light). The subject responded by pressing the lever corresponding to the illuminated side light to receive a reward (pellet). Baseline attentional performance was established, followed by administration of MFD at variable doses (0.5 mg/kg, 2 mg/kg, 5 mg/kg, or 10 mg/kg) on alternating sessions with a 4% saccharin solution. Finally, a post-treatment reversal phase was conducted. Our results suggest a potentially sex-dependent effect of MFD on female rats' performance in the sustained attention task. These findings are relevant for understanding the mechanisms of action of MFD and its potential application in the differential treatment of cognitive disorders.

Keywords: Methylphenidate, sustained attention, female rats, ADHD, cognitive function

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Interaction between the olfactory and gustatory systems in early development: Flavor learning through breast milk

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Breast milk conveys sensory cues to offspring based on the mother's diet. Infants are consistently exposed to the chemosensory signals of milk throughout the lactation period. The innate aversion to bitter foods serves as a protective mechanism, as many toxic and poisonous substances often carry this taste profile. However, the more diverse the maternal diet, the broader the array of new tastes introduced to the baby, potentially expanding their taste preferences, including an increased acceptance of bitter foods in the future. To assess intake-related behaviors in early ontogeny, newborn rats can be employed, providing them with the opportunity to suckle various fluids administered through an artificial nipple. The presence of pre-exposed odors exerts an influence on intake responses in the early ontogeny of rats. The aim of this study was to evaluate whether 3 day-old rat pups would increase their ingestive behavior towards commonly rejected solutions if presented with a lemon scent, previously exposed through the dam's milk. 95 Wistar, 3-day-old rats, derived from 17 mothers, served as subjects. A 2 (solution administered to the dam: lemon scent or distilled water) x4 (solution delivered via the nipple: quinine, citric acid, saline, distilled water) factorial design was employed. At post natal day 3, 8 dams received an i.g. of 0.015 ml/g of lemon solution (16.8% v/v) while 9 received an equal volume of vehicle (distilled water). After that procedure, they were immediately returned to the nest. Four hours later, during which the litters remained in the nest with their dams, the pups were removed from the nest and assessed with the artificial nipple. During the test the pups randomly received either citric acid, quine, saline solution or water. The following dependent variables were considered based on the active behavior of grasping the artificial nipple: 1. Percentage of body weight gained, 2. Number of grasps, 3. Total time of grasp, 4. Mean grasp duration (total time of grasp/number of grasps), and 5. Latency to grasp. The pups pre-exposed to the scent showed an increase in seeking and ingesting behavior toward an artificial nipple containing quinine or citric acid, when compared to pups receiving saline or control (non-pre-exposed) pups. The pups could be identifying the sensory cues in the breast milk and an exacerbated response to bitter and acid tastes would be triggered in their presence. During early development, pre-exposure to a scent through breast milk may influence subsequent intake patterns and even reverse a typical reaction pattern such as the aversion to bitter or acid tastes.

Keywords: early development - breastfeeding - odor – taste

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Role of cerebellum in executive functions through transcranial direct current stimulation (tDCS)

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Traditionally, the cerebellum has been associated with motor function, especially to the coordination, precision, and regulation of motor movements, contributing to the fluidity and effectiveness of daily motor activities. However, within recent years, the cerebellum has been studied on its role in cognitive functions, finding its involvement in high order human behaviours such as executive functions. In this way, transcranial direct current stimulation (tDCS) offers the possibility of discerning the role of brain regions through its non-invasive stimulation by means of exciting or inhibiting the targeted region. Recent studies have shown the modulation of executive functions with anodal tDCS over the right cerebellum. Therefore, the presented study aimed at studying the role of the cerebellum in the three main executive functions through the stimulation with anodal tDCS of N = 33 healthy participants on the right cerebellum. During the stimulation, participants performed the Go/No-go task, the Probabilistic Reversal learning task, and the n-back task, to measure inhibitory control, cognitive flexibility and working memory, respectively. The stimulation lasted for 30 min at 1.5 mA with 5x5 electrodes. The design was an intra-subject double blinded and sham-controlled study with two counterbalanced sessions for each participant: active and sham tDCS. Results indicated that during active stimulation participants showed differences in executive functions compared to the sham stimulation, which are disclosed and discussed in the present work. These results encourage continuing the study of the cerebellum over executive functions in a larger and even pathological population to increase the basic knowledge of this region and its implication in high order behaviours.

Keywords: cerebellum, transcranial direct current stimulation, inhibitory control, cognitive flexibility, working memory

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Function of perineuronal nets in the frontal cortex of high drinkers compulsive rats: Studies on schedule-induced polydipsia.

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Perineuronal nets (PNNs) are cartilage-like structures of extracellular matrix which enwrap the cell-body and proximal dendrites of neurons and stabilize their incoming connections and restrict plasticity. Consequently, they have been proposed as a candidate mechanism for habit learning. Aberrant activation and plasticity in the Frontal Cortex (FC) have been widely associated with compulsive behavior, a key manifestation of inhibitory control deficit and a core trait in different neuropsychopathological disorders. The present research aimed to investigate the activation and the role of PNNs in different regions of the FC through immunolabeling and confocal microscopy in rats selected as high or low compulsive drinking (HD, LD) on Schedule-Induced Polydipsia (SIP). Our results show that HD rats presented an increased number of PNNs in the Infralimbic Cortex and increased intensity and integrity of PNNs in Orbitofrontal Cortex. There were no differences between HD and LD either in the number, intensity, and integrity of PNNs in the Prelimbic Cortex or activity in none of the regions evaluated. These results showed that SIP exposure induced neuroplasticity alterations which may underlie the behavioral deficits present in the compulsive phenotype. Specifically, PNNs upregulation in Infralimbic Cortex may be linked with the development of repetitive behaviors, and the increased intensity and integrity of PNNs in Orbitofrontal Cortex may be related to the expression and maintenance of them. Finally, these neuroplastic patterns in the FC may serve as a promising marker for the prevention, diagnosis, and ongoing treatment of compulsive spectrum disorders.

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Keywords: Perineuronal Nets; Compulsive Behavior; Frontal Cortex; Infralimbic Cortex, Orbitofrontal Cortex.

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Dha reduces binge-like ethanol drinking in adolescent mice without influencing anxiety levels

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Alcohol is a widely used drug in our society, particularly among young people and adolescents, who exhibit a distinctive pattern of consumption know as binge-like drinking. This pattern has been associated with cognitive, neurobiological and behavioral alterations. One potential mechanism through which alcohol could induce these damages is by amplifying the proinflammatory signaling. In this way, binge-like ethanol consumption has been shown to induce proinflammatory cytokines even prior to the development of dependence. On the other hand, docosahexaenoic acid (DHA) is an omega-3 acid known for its role in brain growth and neurodevelopment, as well as its anti-inflammatory properties. The aim of this study was to evaluate whether DHA administration could modulate binge-like ethanol drinking using the Drinking-In-the-Dark (DID) procedure. For this purpose, young adolescent mice were acutely administered intragastrically with DHA fish oil (1ml/kg, 700mg DHA/ml) or sunflower oil (1ml/kg) and binge-like ethanol drinking and anxiety-like behavior were assessed. The results showed that DHA administration significantly decreased ethanol consumption, without altering food intake. Finally, administration of DHA-enriched fish oil had no effect on anxiety-like behavior as assessed by the plus maze test. These findings suggest that DHA could be a promising tool to counteract alcohol consumption and its effects (This work was supported by the Grant PID2021-128650NA-I00 funded by MCIN/AEI/ 10.13039/501100011033 European Union NextGenerationEU/PRTR and the research contract CPRE2023-066 funded by PPIT-UAL, Junta de Andalucía ERDF 2021-2027. Programme: 54).

Keywords: Binge-like ethanol drinking, Adolescence, DHA, Plus maze, Mice

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Early chronic administration of delta-9-tetrahydrocannabinol (THC) effects on activity-based anorexia

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The animal model of activity-based anorexia (ABA) is used to understand the factors underlying the development of anorexia nervosa in humans, simulating its fundamental characteristics such as reduced intake, weight loss and hyperactivity. The effects of chronic delta-9-tetrahydrocannabinol (THC) administration during the early developmental period on the later establishment of ABA were studied. For this purpose, 36 female Wistar Han rats were used, to which 5 mg/kg/day of THC (or vehicle) had been administered intraperitoneally for 14 consecutive days. After a 7-day washout period, the ABA groups (ABATHC and ABAVH) had access to an activity wheel for 22 hours per day, while the control groups (FCTHC and FCVH) did not. All animals had access to food for 1 hour per day. During the first few days, the FCTHC group had greater weight loss compared to the other groups. However, towards the end of the procedure, the ABA groups showed the greatest weight loss, regardless of whether they received THC or VH, and did not differ from the FCTHC rats. The ABAVH rats ate significantly less than the FCVH and FCTHC control groups, which was also true for the ABATHC group compared to the FCVH group. No significant differences were observed in the activity of the ABA groups, but the ABATHC rats showed a tendency to run more. Treatment with THC had no effect on the withdrawal time of the animals from the experiment, nor on the recovery time after the procedure. Early administration of THC increased food intake of ABA rats without affecting motor activity. However, this had no effect on attenuating weight loss, did not mitigate the delay in ABA development, nor accelerate its recovery. The tendency of THC to increase activity in the wheel suggests a possible susceptibility that would favor the development of ABA.

Keywords: Activity-based anorexia, chronic administration, delta-9-tetrahydrocannabinol, food restriction, wheel running

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Exploring peak-shift as a function of valence dimension

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Generalization is defined by the transfer of previous learning to novel stimuli. In a typical training paradigm (CS+), the response usually peaks at the CS+ and symmetrically declines as novel stimuli vary along a particular dimension, resulting in a generalization gradient. However, when training involves a discrimination of stimuli belonging to the same dimension (CS+ and CS-), a common observation is a shift in the peak of the response beyond the CS+ in the direction away from the CS-. Recently, we observed that the valence dimension (i.e., the hedonic tone of a stimulus, from unpleasant to pleasant) may guide the generalization gradient. Based on this finding, in the current study we explored the extent to which the peak-shift could be observed as a function of the valence dimension. Two hundred and thirteen English participants were assigned to two groups (Peak and Control). Both groups engaged in a discrimination training using words as predictive cues and virtual money as outcome. In the Peak group, the CS+ was a word of medium-high valence (7), and the CS- of medium-low valence (3). For the Control group, the same word was used as the CS+. In contrast, a word from an unknown language to participants was used as the CS-, preventing the opportunity to conduct an intradimensional valence comparison. After training, during the generalization phase, non-trained words varying on the whole valence dimension (15 words from 1.5 to 8.5 scores, in 0.5 intervals) were used.
Results showed that both groups displayed the same gradient in the stimuli beyond the CS+ and this response was lower than the CS+, indicating no peak-shift. At the end of the experiment, participants were asked about their strategies used during the generalization test and were subdivided into two strategy-based subgroups: those who declared they focused on the emotional features of words (subgroup Valence) and those who did not (subgroup Other). While the Other subgroup showed a flat response across stimuli, indicating no gradient, the Valence subgroup showed a clear gradient aligned with changes in valence, even when they did not show peak-shift. Similar to other results using non-emotional stimuli, the formation of generalization gradients appears to be influenced by individual differences, highlighting the importance of participants' strategies for achieving task-goals in associative learning.

Keywords: Emotion, Generalization gradients, Peak-Shift, Valence, Associative learning

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Behavioral flexibility in mice: Effect of fixed or variable change and continuous or variable reinforcement

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Behavioral flexibility is the ability of human and non-human animals to adapt to environmental changes through response change. The Midsession Reversal Task (MSR) measures this type of flexibility. Studies report that strategies to adapt to MSR depend on the task and the species: 1) timing and 2) win stay/lose shift. Mice's performance in this procedure is yet unknown. The objective of this study was to analyze mice's performance in an MSR task with fixed (midsession) and variable reversal changes, as well as continuous (100%) or variable (50%) reinforcement. Sixteen CD1 mice were exposed to three phases with a Fixed Ratio 1 schedule. They were deprived of water. Condensed milk diluted in water was used as a reinforcement. The procedure in the first phase was a fixed reversal change with continuous reinforcement (F100). Then, in the second phase a reversal change was variable, and the reinforcement continuous (V100). Lastly, the reversal change was variable in the third phase, and so was the reinforcement (V50). For half the subjects, the order of phases 1 and 2 was reversed. Preliminary results suggest the use of both strategies. The behavior was controlled by the contingency to which they were exposed (F100 and V100) regardless of the order of presentation. However, in V50, the choice was biased based on previous experience of the subjects.

Keywords: Behavioral flexibility, MSR task, strategies, variable, fixed

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The impact of docosahexaenoic acid (DHA) on binge-like consumption of caloric and non-caloric palatable substances in C57BL/6J mice

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Binge eating disorder (BED) is characterized, in part, by recurrent episodes of consuming excessive amounts of food in a short period of time, leading to discomfort. As repetitive binge intake episodes are a common pattern of consumption in the early stages of the addiction cycle, and increase the transition to BED, it is crucial to develop new therapeutic and/or preventive strategies aimed at protecting vulnerable binge-prone individuals from progressing to BED and eating disorders. Evidence suggests that n-3 polyunsaturated fatty acids (n-3 PUFA) may have promising applications in the prevention and/or treatment of several clinical and nutritional pathologies. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are the most studied n-3 PUFA for their beneficial effects on the inflammatory, cardiovascular and nervous systems. In the brain, they promote anti-inflammatory activity, mediated in part through specialized pro-resolving mediators, and modulate brain cell signalling, including dopaminergic and serotonergic pathways. All of these aspect have been shown to contribute to the development or maintenance of binge eating. The present study used a pharmacological approach to evaluate the therapeutic benefits of DHA on excessive binge-like consumption of highly palatable substances (sucrose and saccharin) in ad libitum-fed C57BL/6J mice. The main finding of this study is that intragastric administration of DHA-enriched fish oil (700 mg/kg, Brudy Technology), significantly decreased binge-like consumption of sucrose (3% w/v) and saccharin (0.15% w/v) during the test day in a drinking-in-the-dark procedure in ad libitum-fed animals, without evidence of significant changes in spontaneous locomotor activity. There was also no significant sex difference in any of the variables studied. The present results show for the first time that acutely administered DHA protects animals from binge-like consumption of palatable substances. Dietary supplementation with DHA, even acutely administered, may represent a novel nutraceutical approach to the treatment of binge eating behaviour, a symptom that can precede the development of binge eating disorder.

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Keywords: Binge-like consumption; Drinking in the Dark (DID); DHA; Omega-3; Palatable substances

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ABA and ABC renewal of instrumental response in primary education students

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To assess the presence of ABA and ABC renewal effects in Primary Education students, an experiment was conducted in which participants were required to click on several colored circles to learn which one led to a smiling face and 10 points. During the extinction phase, which took place in a different context from the acquisition, the response was not followed by any reinforcer. Finally, the test phase consisted of four trials identical to those of the extinction phase. In one group of children, this phase took place in the same context as the extinction phase (ABB group). In another group, the test phase was conducted in the same context as the acquisition phase (ABA group). In yet another group of children, the test was conducted in a novel context (ABC group). The results showed ABA and ABC renewal when comparing these groups with the control ABB group and when comparing performance during the test with the end of the extinction phase. This finding opens the door to the study of this and other relapse effects in children.

Keywords: renewal; instrumental learning; children

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Attenuation of Overshadowing Depends on Increased Prediction Error: A Study of Order Effects

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It is noted that once corrected, prediction error can increase again when the current relationship between events changes, such as during extinction trials (Holland & Schiffino, 2016). Attenuation of overshadowing occurs during the increase in prediction error, while the organism learns and corrects these discrepancies until prediction error decreases. However, if a compound stimulus is presented when the prediction error has already been corrected, attenuation of overshadowing would not occur. This study aimed to observe whether the order of presentation of trials with a compound stimulus during the extinction phase affects the attenuation of overshadowing. Three groups were trained to respond to a sample stimulus (SS) Y during the first phase. In the second phase, this response was extinguished, and a response to a compound SS, AX, was conditioned. The acquisition trials with a compound SS varied for the three groups: for Group F, extinction trials were presented at the beginning of the second phase, followed by AX trials. For Group L, the order of presentation was reversed, with AX trials first, followed by the extinction of Y. Finally, for Group M, the presentation of trials was mixed. All three groups were separately presented with elements A and X during a test phase. The results showed overshadowing of X in Groups F and L, and attenuation of overshadowing only in Group M. The results suggest that attenuation of overshadowing occurs during the increase in prediction error.

Keywords (max 5): prediction error, overshadowing, humans, order effects, attention

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ABSTRACT BOOK