

Opening Note

The Spanish Society of Experimental Psychology (SEPEX) was born from an agreement of 16 pioneering researchers from different Spanish universities, gathered in the University of Almería on July 1st, 1997, for its foundation. In that first meeting, the first statutes of SEPEX were drafted and the first Board of Directors was elected, whose composition partially changes every 2 years. The objectives of the Society are to promote the development of scientific knowledge in all fields of Psychology; promote research and the dissemination of its results among researchers and promote the relationship with national and international homologous societies and organizations; organize and promote scientific meetings; periodically inform members of the Society about activities related to Experimental Psychology. From its foundations in 1997, SEPEX has grown to more than 400 members and has become the referent in the field for the exchange of scientific research in Spain. From the first SEPEX Conference held in Granada in 1998 to the last one held in Almería in 2022, the Society has promoted the holding (on a biannual basis) of fourteen consecutive editions. All of them included plenary conferences given by Spanish and foreign researchers of recognized international prestige. The XIV SEPEX Conference at the University of Almería has featured 125 Oral Communications, including 9 Thematic Sessions, 113 written communications (Posters), one Emerging Researcher Award Lecture given by Dr. Garikoitz Lerma-Usabiaga (Basque Center on Cognition, Brain and Language), and three plenary talks. The Pio Tudela lecture given by Professor Nuria Sebastián (Universitat Pompeu Fabra, Barcelona), and the keynote lectures given by Professor Kimberly Noble (Columbia University, New York, USA) and Professor Michael Anderson (University of Cambridge, UK). This XIV meeting has also included a special symposium to commemorate the 25th anniversary of the foundation of SEPEX. In this symposium, 7 of the founding researchers have illustrated their beginnings in the field of psychological research, a good reflection of the conditions in which research was carried out in our country at that time. Through the presentation of their experimental work, they tried to explain the questions of interest in their respective fields of study, the resources and equipment they had at their disposal, and the various vicissitudes that usually accompanied research work at that time. You can find further information about SEPEX in <https://websepex.com/>

Plenary Lectures

Pío Tudela Lecture. Language learning throughout life

Nuria Sebastián

Pompeu Fabra University, Barcelona

Adults are amazed at how young children learn language in the first years of life. By six months of age they can recognize a few words, at 18 months they may say more than a hundred. This ease in language learning is in stark contrast with the difficulties that humans experience in learning a second language later in life. The concept of the existence of a "critical period" has been at the center of heated debates, with the hypothesis that language learning takes place in a continuous way throughout life contrasted with the hypothesis that different mechanisms are in place before and after the critical period. In the present talk I will review different types of evidence supporting and challenging the different points of view.

Plenary Lecture 1. Socioeconomic Inequity and Child Brain Development

Kimberly Noble

Teachers College, Columbia University, New Your, USA

Socioeconomic disparities in childhood are associated with notable differences in cognitive and socio-emotional development during a time when dramatic changes are occurring in the brain. Recent work has focused on understanding the neurobiological pathways through which socioeconomic factors may shape development. It is likely that socioeconomic factors operate via multiple mechanisms to explain the development of different neural circuits. A theoretical model will be presented whereby differences in the home language environment and family stress likely impact particular brain systems, which in turn support distinct neurocognitive skills. Evidence for the model, as well as ongoing and future work testing aspects of the model, will be discussed. Finally, the question of interventions will be addressed, along with an overview of early findings from the first US clinical trial of unconditional income support in early childhood.

Plenary Lecture 2. Brain Mechanisms Underling the Inhibitory Control of Thought

Michael Anderson

Cambridge University

Controlling action and thought requires the capacity to stop mental processes. Over the last two decades, evidence has grown that a domain-general inhibitory control mechanism supported by the right lateral prefrontal cortex achieves these functions. However, current views of the neural mechanisms of inhibitory control derive largely from research into the stopping of action. Whereas action stopping is a convenient empirical model, it does not invoke thought inhibition and cannot identify its unique features. Here I review research using a different model of inhibitory control that addresses how organisms stop a key process driving thoughts: memory retrieval. Retrieval stopping shares right anterior dorsolateral and ventrolateral prefrontal mechanisms with action stopping, consistent with a domain general inhibitory control mechanism; however, retrieval stopping also recruits a distinct fronto-temporal pathway that determines mental control's success. For example, GABAergic inhibitory networks within the hippocampus, driven polysynaptically by prefrontal input uniquely contribute to thought suppression. These unique elements of mental control raise the hypothesis that hippocampal disinhibition is a trans-diagnostic factor underlying intrusive thinking, linking the proposed fronto-temporal inhibitory control pathway to preclinical models of psychiatric disorders and to fear extinction. I suggest that transdiagnostic retrieval-stopping deficits underpin broad vulnerability to psychiatric disorders and are reflected in robust aberrations in large-scale brain network dynamics.

SEPEX Emerging Talent Award. Quantifying reliable MRI metrics in reading and vision

Garikoitz Lerma-Usabiaga

Basque Center on Cognition, Brain and Language (BCBL)

My research focuses on 1) utilizing behavioral, functional, and structural Magnetic Resonance Imaging (MRI) techniques to investigate the neural basis of reading and vision, and 2) developing advanced functional and structural MRI methods to further explore cognitive functions and enhance the reproducibility, validity, and generalizability of neuroimaging studies. In this talk, I will recount my professional journey, spanning the years before and after my formal scientific training, and present my primary research findings and ongoing research lines.

Thematic sessions

Thematic session 1. Experimental Advances in Numerical Cognition

Coord.: Ismael Gutiérrez-Cordero (UMA)

Do Numbers and Letters help each other? Evidence from Masked Priming

Ana Calviño

University of the Basque Country (UPV/EHU)

In this research report, we want to determine whether letters and numbers share the same identification process or if they are fundamentally separate. There are two positions on this issue: one that supports shared processing and another that argues letters and numbers only share visual identification processes. To explore this, we examine the temporal progression of facilitation between letters and numbers to determine whether both stimuli undergo a common identification process (resulting in facilitation) or if, conversely, the identification processes are distinct, suggesting that letters and numbers should not enhance each other. Continuing with this idea, we conducted two masked priming studies with university students. Participants had to decide whether the presented stimulus was a letter, number, or a different symbol. The primes were either similar to the target stimulus (e.g., 2-2, Z-Z, 2-Z, Z-2) or not (e.g., 0-2, Q-Z, 0-Z, Q-2), and belonged to the same category as the target or not. We found that the effects of perceptual similarity disappeared in pairs with different categories (letter-number or number-letter), suggesting an early categorical distinction between letters and numbers.

Representation of the magnitude of symbolic and non-symbolic fractions

Josetku Orrantia

University of Salamanca (USAL)

Although fractions are important both in the academic context and for being competent in everyday life, understanding them poses a particular challenge for many elementary students. In contrast to whole numbers, for which children have an implicit conceptual understanding from birth, it has been assumed that understanding fractions requires extensive formal instruction because quantities reflected in fractions are a relatively recent cultural artifact for which students lack any implicit knowledge. However, a growing number of studies suggest that we have a primitive system for processing nonsymbolic fractions that would serve as a basis for learning symbolic fractions. In fact, some studies suggest that the ability to process non-symbolic fraction magnitudes is related to the knowledge of symbolic fractions, although the findings on this relationship are not consistent. In this study, which is part of a larger project that analyzes rational number processing, we examined the association between non-symbolic and symbolic fraction processing in a sample of 320 students from 4th to 6th grade of elementary school. After controlling for intelligence, general mathematical competence, and integer processing, we found a significant, albeit moderate ($\beta = .22$), relationship between nonsymbolic and symbolic fraction processing. These results suggest that non-symbolic fraction magnitude processing may constitute a tool for building the foundations of fraction knowledge and are interpreted within the framework of the "Integrative Theory of Numerical Development", which postulates that the common core of numerical development lies in the understanding of numerical magnitudes.

The production of multi-digit numbers is not special: An error-based study in Aphasia

Ismael Gutiérrez-Cordero

University of Malaga (UMA)

The phenomenon Stimulus Type Effect on Phonological and Semantic errors (STEPS), by which people with aphasia (PWA) produce more phonological errors (e.g., pencil → fensil) with words and more semantic errors with numbers (e.g., twenty-seven → thirteen), can be hardly explained by classical models of language processing, as both types of errors would stem from different sources (impairments at phonemic level or the semantic system, respectively). The current work offers an alternative account to the Building Blocks hypothesis (proposed to explain the STEPS) based on interactive models of language processing, in which the different levels of the language system interact with each other. From an interactive perspective, semantic errors in numbers are expected regarding their high-lexical-frequency and the high memory load (usually multi-digits) and homogeneous context in which they are assessed (García-Orza et al., 2020). Two PWA with conduction aphasia, suffering from phonological deficits (one located at the phonological input buffer and the other at the phonological output buffer), who predominantly produced phonological errors during speech production, are assessed in three production tasks (naming, repetition, reading) with multi-digit numbers (e.g., 365), and color sequences varying in lexical frequency and sequence length. We found that high-frequency color-sequences (e.g., green-red-blue), like multi-digits, were produced with more semantic errors, while the phonological errors emerge again with low-frequency color-sequences (e.g., beige-mauve-ocher). In addition, we observed that length increased errors in number and color sequences rather than changing their nature. These findings lead to rejecting the Building Blocks hypothesis while adopting an interactive account, claiming that the STEPS is rather the result of the combination of both the intrinsic material properties (lexical frequency and memory load) and the evaluation context (semantic context) during clinical assessment. This study holds significant importance in the current discussion of language and number production models and the understanding of speech error mechanisms in aphasia.

Math performance and state- and trait-math anxiety: the mediating role of executive functions

Rocío Linares

University of Jaén

Emotions may influence performance on numerical tasks. We aimed to investigate the possible contribution of executive functions to explaining the well-documented negative relation between math performance and math anxiety (MA). We used a structural equation modeling (SEM) approach to comprehensively examine the potential mediating role of updating, inhibition, and switching in the relationship between state- and trait-MA with math performance. 205 undergraduate students completed three computerized tasks for each executive function along with MA questionnaires. Confirmatory factor analysis (CFA) confirmed the negative relationships between both state- and trait-MA and math performance, with trait-MA emerging as a stronger predictor of individual differences in math performance. Notably, among the different executive functions, only working memory updating mediated the relationship between MA and math performance. These findings are discussed in terms of their implications for views that have put forth an explanation for the detrimental effect of MA on math performance, particularly the deficit and interference proposals.

Thematic session 2. Insights from the interplay between semantic and episodic memories

Coord.: M^a Jesús Maraver (UGR)

Disentangling the contributions of semantic and inhibitory control processes in creative problem-solving

Raquel Lezama

University of Granada (UGR)

When confronted with everyday challenges, we often use past effective solutions and prior experiences to address them, even though some problems require novel and creative solutions. The generation of original, useful, and innovative ideas or solutions to problems requires the access and combination of distantly associated pieces of episodic and semantic-based information in memory as well as the downregulation of interfering traces that might hamper the creative process. Across three experiments, we investigated a) individual differences in associative processes in semantic memory and memory inhibitory control) and b) the brain activity associated with these processes contributing to creative behavior. In Experiment 1 (N = 124), we aimed to test whether larger semantic priming and inhibitory control were associated with more creative responses. With this aim, participants performed a lexical decision task, and a Remote Associates Test (RAT) after engaging in repeated selective retrieval (SR) of previously presented items. Critically, some RAT problems could be solved with words from earlier phases of the experiment, including those that might be less accessible due to inhibition while other problems required novel, non-presented words. Our results indicated that larger semantic priming with strong associates and inhibitory control indexes were associated with better RAT performance. In Experiments 2 and 3, transcranial direct current stimulation (tDCS) was used to investigate the distinct involvement of two relevant cortical hubs in semantic processing (the left anterior temporal lobe, IATL) and inhibitory control (right dorsolateral prefrontal cortex, rDLPFC) in solving creative problems. Experiment 2 (N = 64) showed that anodal tDCS over the IATL had a negative effect on the production of correct responses to baseline RAT problems but left unaffected those problems that required inhibited solutions. Experiment 3 (N = 40) yielded the reverse pattern with cathodal tDCS over the rDLPFC. Finally, before and after administering tDCS, resting-state EEG recordings were obtained, revealing site-specific changes in frequency bands induced by tDCS. Overall, this joint evidence underscores the involvement of semantic and control processes in creative problem-solving, which are linked to different brain networks.

The effect of episodic and semantic retrieval on creativity in children and adults

Guillermo Tomás

University of Granada (UGR)

Creativity has been related to the recombination of associations between distant concepts in semantic memory. However, recent studies have also highlighted that generating creative solutions also requires access to episodic information and the recombination of this information into new ideas (Gerver et al., 2022). Episodic Specificity Induction (ESI) (Madore et al., 2014) is a well-known procedure that has been shown to enhance episodic retrieval by biasing retrieval orientation into specific details of a video. ESI also improves performance in creative tasks (i.e. Alternative Uses Task, AUT), suggesting that these tasks engage not only the recombination of semantic associates but also the recombination of episodic information. ESI effects have been observed in older and younger adults, but they have not yet been studied in children. Developmental studies indicate that episodic memory is not fully developed in children and that the capacity to recall episodic information develops with the maturation of the prefrontal cortex (Shing et al., 2010). In two experiments, we study if ESI enhances children's episodic retrieval and if it transfers to creative tasks to the same extent in children and adults. We also evaluated ESI effects when the episodic induction was elicited by difficult materials (Experiment 1) or easy (Experiment 2) to integrate into a pre-existing schema. In Experiment 1 children (10-11 years old) and young adults watched a difficult-to-integrate video followed by an ESI or a control condition. Finally, they carried out a creativity task (AUT) in which participants generated as many unusual uses as possible for everyday objects. The same procedure was employed in Experiment 2 but using an easy-to-integrate material. Although no improvement was found in AUT following ESI, results showed that both young adults and children recalled more episodic details (vs. general/more semantic details) in the ESI condition when compared to the control condition. Interestingly, there were developmental differences in the proportion of episodic details depending on the integrability of the materials. Thus, in the more difficult-to-integrate condition, children reported fewer episodic details compared to younger adults (Experiment 1) but this pattern was reversed in the easy-to-integrate condition (Experiment 2). Results are discussed in terms of the interplay between episodic and semantic memory and their connection with idea generation.

Contextual incongruity triggers memory reinstatement and the disruption of neural stability

Lluís Fuentemilla

University of Barcelona (UB)

Schematic knowledge or schemas are internal models representing our environment and are considered fundamental in organizing our daily behavior by providing stability and predictability to our understanding of the world's structure. However, when an element within an unfolding event does not align with our schema-based expectations, it disrupts the coherent narrative, necessitating an update to our current event model. In this study, we investigated the neural mechanisms that support the perceived incongruence of an element within an unfolding event and its impact on memory. We conducted three experiments involving human participants who encoded images of objects following trial-unique sequences of events depicting daily routines. We found that neural stability patterns gradually increased during exposure to schema-consistent episodes and that the encoding of an object incongruent with the ongoing schema disrupted this stability pattern. The decrease in neural stability for low-congruence items occurred approximately 1000 ms after object encoding onset and was preceded by enhanced N400 ERP activity and increased neural reactivation of the just-encoded episode. Current results offer new insights into the neural mechanisms and their temporal orchestration that are engaged during the online encoding of schema-consistent episodic narratives and the detection of incongruity.

Have I told you this story before? The challenging dialogue between episodic and semantic processes on destination memory

Pedro B. Albuquerque

University Do Minho

Have I told you this story before?" In various contexts, such as classes, conversations with friends, or family gatherings, we often experience the embarrassment of being told, "You've already shared that story with me before!" Remembering to whom we've conveyed certain information relies on destination memory, which involves associating what is said with the intended recipient. Past research has consistently found that recalling the recipient of information (destination memory) is more challenging than remembering the source of the information (source memory). This imbalance has been attributed to differences in attentional focus and resource allocation. When sharing information, attention tends to be directed towards the transmitter and the content itself, leaving fewer resources available for encoding the association between the information and the recipient. This explanation is supported by studies demonstrating that an internal focus on personal details during transmission impairs destination memory. Research shows that when reporting personal information, the internal attentional focus decreases the resources available to associate that information with recipients, resulting in worse destination memory (Gopie & MacLeod, 2009; Johnson & Jefferson, 2018). We will deepen this discussion throughout the presentation of three experiments. Considering the poorer destination memory when participants transmitted personal facts was always compared with the transmission of interesting facts, in Experiment 1 (between-participants) and Experiment 2 (within-participants), we compared the generation and transmission of personal facts with the transmission of familiar proverbs. Again, the generation and transmission of personal facts hampered destination memory. Besides the type of information (personal vs. familiar proverbs), the conditions differed regarding the kind of process (generation and transmission vs. only transmission of information). In Experiment 3, we intended to clarify the influence of generation on destination memory since participants (1) transmitted and (2) generated and transmitted familiar proverbs and no significant differences in destination memory between the conditions were observed. In general, our experiments seem to support the assumption that transmitting personal information leads to worse destination memory, not because of participants but because personal facts drive the attentional focus to the self

Thematic session 3. The fallible but malleable nature of memory

Coord.: M^a Teresa Bajo (UGR)

Social network structure shapes the formation of true and false memories at collective level

Lluís Fuentemilla

University of Barcelona (UB)

Societal structures and theoretical models of memory organization share network-like features, suggesting potential mutual insights into how information spreads and shapes collective memories. Here, we used experimental manipulations of the topological structure in lab-created community networks during a computer-mediated conversational recall task of lists of words from a DRM paradigm to test a central premise from the spreading of activation account in cognitive psychology: the emergence of true and false memories. We hypothesized that social network structure, whether clustered or not, would influence the formation of true and false memories. We found that information exchange promoted true memories in clustered networks by reinforcing the mnemonic convergence of the community members' memories. Conversely, nonclustered networks lead to a greater number of false memories by increasing widespread cross-activation of nonoverlapping memories, blurring the boundaries between true and false memories. Current findings provide empirical evidence that mnemonic spreading within the social network influenced the emergence of true and false memories and highlight the dynamic interplay between network topology, memory dynamics, and collective knowledge evolution, shedding light on memory processes in both individual and social contexts.

Semantic activation and semantic control modulate episodic memory distortions: Evidence from non-invasive brain stimulation

Angel Fernández

University of Salamanca (USAL)

Research on memory distortions has consistently shown that presenting a list of words associated with a critical word not presented for study produces high levels of false recall and false recognition of that critical word (the DRM paradigm). There is strong behavioral evidence of a relationship between the memory illusion typically obtained with the DRM paradigm and aspects of semantic representation and semantic processing. These memory illusions have been shown to always depend on the existence of semantic relatedness between studied items and critical items, pointing to the central role played by the structure and dynamics of the representational systems supporting specific inter-item relations. There is also empirical evidence that the production of these kinds of memory distortions is reliably modulated by control mechanisms aimed at controlling error production at encoding and monitoring operations at retrieval. The presentation will summarize the results of three studies in which transcranial direct current stimulation (tDCS) was used to interfere with the either error generation or error control, by applying the stimulation over specific cortical regions while participants studied DRM lists. The results of recognition tests that followed the study of the lists demonstrated an effect of anodal stimulation that was dependent on the particular locus of stimulation. Applying anodal tDCS over the left anterior temporal lobe (ATL) led to a decrement in the rate false recognition, while the same type of stimulation applied over the right ATL did not significantly affect false recognition. The application of anodal stimulation over the left posterior middle temporal gyrus (pMTG) had the opposite effect, provoking an increment in the rate of false recognition of unstudied items. The effect of tDCS on the left ATL (false memory decrement), but not in the right ATL, is interpreted as evidence that this lateralized cortical region plays a critical role in the generation of semantically-related errors at encoding. And the effect of tDCS on the left pMTG (false memory decrement) is interpreted as evidence for the role of this cortical brain region as a key component within an anterior-posterior control network that regulates the intrusion of available but contextually-inappropriate semantic information.

Memory, is it easy to fool?

Malen Migueles

University of the Basque Country (UPV/EHU)

On the 25th anniversary of SEPEX, a review of research and presentations at previous meetings is made where the fragile power of memory has been highlighted. Working with ecologically valid materials, but emphasizing experimental rigor, I will present 3 lines of research showing various situations where the malleability of memory has been observed. First, using the post-event information paradigm popularized by Elisabeth Loftus, evidence will be presented on the impact of introducing false information into memory. In this case we will analyze which contents are easier to be introduced into memory as a Trojan horse. Specifically, we will analyze variables such as the type of suggested content (actions vs. details and central and peripheral information), emphasizing that there are some false contents that are remembered and recognized with great confidence in the response –as if they were really perceived facts– opposite to other contents that are more resistant to suggestion. However, it is not always necessary to include false information to see the malleability of memory and observe false memories. Thus, we have observed that, on many occasions, the activation of our prior knowledge is sufficient to distort memory. In a series of experiments, we obtained normative data for scripts, or scripts for different types of crimes such as a bank robbery, and observed that participants accept actions and details that, although absent in the presented material, are consistent with the participants' prior knowledge. These errors derived from the activation of our knowledge baggage are more accentuated in older people who, to compensate for their limitations, introduce erroneous data, confuse the origin of the information and give to their false memories a high confidence in their answer. A final line that we will analyze are the future thoughts of participants of different ages collected during confinement by COVID-19. Through experiments where participants had to evaluate sentences about the future after the pandemic or had to produce their own ideas and plans and recall them afterwards, we have observed a bias towards positivity. When recalling, participants transform the information to make it more positive and pleasant. This bias, also more accentuated in older people, shows that memory transformations and distortions would sometimes contribute to personal well-being and to compensate and resist in the face of a hard and complex situation

Learning from memory errors, did that really happen?

M^a Jesús Maraver

University of Granada (UGR)

Schacter's notion of the "fragile power" of memory is evident in its inherent susceptibility to various forms of distortion. Of the many experimental paradigms that exist for the study of memory distortions, sentences containing pragmatic implications are particularly useful for the study of memory errors that arise from the erroneous recall of events that did not occur - at the episodic level - but were rather inferred from semantic activation (Brewer, 1977; McDermott & Chan, 2006), when using examples from everyday situations. Because the malleable nature of memory not only acknowledges its limitations but highlights its strengths, research on errorful learning and memory updating has shown how memory failures can be corrected. This presentation will summarize the evidence from a series of experiments demonstrating that failed retrieval attempts can be amended when corrective information (feedback) is provided to allow memory updating and learning from errors. All experimental procedures involve the comparison of memory performance across retrieval tests before and after the presentation of corrective feedback, in healthy young adults and combining different methodological approaches. First, results from behavioral experiments have demonstrated that retrieval seems to enhance memory malleability, improving the incorporation of feedback, compared to restudy. Moreover, we have also observed that the mere presentation of feedback is already enough to correct memory errors, and it doesn't matter whether the feedback is simply corrective or incorporates additional metacognitive aids. Second, neurophysiological evidence from EEG recordings allows us to identify the neural mechanisms and the temporal course of error detection (e.g., N400 or Error-Related Negativity) and memory updating (e.g., theta brain oscillations). And third, using neuromodulation methods such as transcranial Direct Current Stimulation (tDCS) we can study the causal role of neural hubs in the generation of memory errors and their correction due to their role in semantic integration (e.g., the Anterior Temporal Lobe, ATL or memory encoding (e.g., Dorsolateral Prefrontal Cortex, DLPFC). Through the exploration of the cognitive and neural mechanisms of learning from errors, this research aims to contribute to a deeper understanding of memory retrieval and updating processes as adaptive properties of memory, which compensate for its failures.

Thematic session 4. Experimental studies of psychedelics in mental health

Coord.: Elena Martín-González (UAL)

Psychedelics and mental health: unlocking the therapeutic promise from animal models

Elena Martín-González

University of Almería (UAL)

It is expected that Mental Illness will be the main cause of disability in the world for 2030. Compulsivity, a key factor in the loss of control over behavior, is being considered as a transdiagnostic trait present in different disorders, such as obsessive-compulsive disorder, pathological gambling, addiction, and eating disorders. However, few therapeutic advances has been made in recent years in psychopharmacological treatments. Psychedelics are a new hope for the treatment of mental disorders, due to their plasmatic properties that promote structural and functional neuronal plasticity in circuits important for the proper functioning of the brain. Moreover, psychedelic specific action on the 5HT_{2A} receptor has been proposed as a possible explanatory mechanism of therapeutic effects. Our group has experience testing the effect of different drugs on a preclinical model of compulsivity, as well as mapping other behaviors associated with transdiagnostic symptoms. This presentation aims to show our most important results on the topic, having two differentiated parts.

First, we studied the effect of different substances on the compulsive phenotype of rats and explored the possible action mechanism. Second, we tested the potential therapeutic role of two agonists of the 5HT_{2A} receptor, ibogaine and tabernanthalog on transdiagnostic clinical symptoms such as compulsivity, anhedonia, anxiety, and reactivity to novelty. We will discuss the importance of the hallucinogenic component in the therapeutic effect and will evaluate these promising candidates of this substance as treatment for different neuropsychiatric disorders. The results might constitute new experimental evidences in preclinical models for the development of new psychopharmacological treatments.

Ibogaine as a promising tool for the treatment of substance use disorders

Genis Ona

Rovira i Virgili University (URV)

Ibogaine, a psychoactive compound derived from the *Tabernanthe iboga* shrub, primarily found in Central West Africa, is positioning as a promising candidate for the treatment of substance use disorders. Our group has performed pharmacological and clinical research with ibogaine. This presentation is an overview of these studies. We will delve into the multifaceted pharmacodynamics/pharmacokinetics of ibogaine, illustrating its unique mechanism of action on the central nervous system, with a particular focus on its interaction with multiple neurotransmitter systems, including serotonergic, dopaminergic, and glutamatergic pathways. Furthermore, the presentation will highlight significant clinical research outcomes, emphasizing ibogaine's potential in treating substance use disorders, notably opioid dependence, by mitigating withdrawal symptoms and reducing both drug tolerance and cravings. Ethical considerations, including the cultural significance of ibogaine in traditional practices and the need for integrating indigenous knowledge with contemporary medical research, will be also examined.

Evaluation of the antidepressant effect of psilocybin in an animal model of disease

Jorge Emilio Ortega

University of the Basque Country (UPV/EHU)

Depression and anxiety are invalidating and high incidence mental disorders characterized by phenotypic heterogeneity. Currently available treatments show severe limitations. Thus, there is an urgent need for effective treatments in this population. In the search for novel rapid-acting antidepressants, the psychedelic psilocybin has emerged as a promising therapy in several clinical trials. Nevertheless, the role of psychedelic-induced subjective effects in therapeutic outcomes is still debated. In order to address these issues, preclinical evaluation of psilocybin treatment in translational animal models of disease is imperative. First, we aimed to study in vitro pharmacological profile and in vivo acute mechanism of psilocin/psilocybin. Competition binding studies with psilocin were performed in brain and cell cultures. The role of 5HT_{2A}, 5-HT_{2C} and 5-HT_{1A} receptors on the psychosis-like head-twitch response (HTR) and on body temperature in mice after psilocybin administration were evaluated. In addition, a dose-response study for acute psilocybin-induced head-twitch response was performed in order to support dose finding for psilocybin long-lasting effects evaluation. Secondly, chronic unpredictable mild stress (CUMS) mouse model of depression was treated with psilocybin (1 mg/kg, i.p.) and a wide behavioural evaluation was conducted. Psilocybin reversed impairments in anhedonia and behavioural despair dimensions of depressive phenotype but not in apathy-related behaviour. Anxiety-like phenotype was also improved by the drug. Physiological alterations caused by stress, indicative of a hyperactive hypothalamic-pituitary-adrenal axis (HPA), were not reversed by psilocybin. When neuroplasticity-related proteins were assessed in cerebral cortex, brain-derived neurotrophic factor (BDNF) was found to be decreased in stressed animals, and treatment did not reverse such impairment. Psilocybin administration increased expression and function of serotonin-2A- receptor (5HT_{2A}R) in brain cortex of control and CUMS groups. However, psilocybin treatment caused a selective increase in the expression of glucocorticoid-receptor (GR) in brain cortex of CUMS mice.

Altogether, this work provides new knowledge on the behavioural actions of psilocybin and contributes to the understanding of the therapeutic mechanism of action of psychedelics.

Thematic session 5. On the neuro-affective response to violation of expectations

Coord: Manuela Ruzzoli (BCBL)

The “sweet spot” of cognitive conflict

Marta LaPietra

Basque Center on Cognition, Brain and Language (BCBL)

Cognitive conflict is an effective trigger for control, flexible behaviour, and adaptation. It is considered effortful, detrimental to performance and affectively aversive. However, converging evidence also indicates that, when successfully resolved, cognitive conflict has positive consequences. In this talk, we propose a radical change in perspective advocating that some degree of cognitive conflict can be beneficial for subsequent performance or pursued, instead of, as commonly assumed, be a cost or aversive. First, we will examine if instances of cognitive conflict can positively impact subsequent cognitive processes and, therefore, human behaviour. In a second experiment, asked participants to decide how much cognitive conflict they wanted to perform at each block of a Stroop task and to rate enjoyment, mental effort, and emotional state on an Arousal- Pleasantness grid. Altogether, our findings challenge the inherently aversive nature of cognitive conflict, highlighting its potential for positive engagement and enhanced performance, paving the way for a more nuanced understanding of the cognitive processes involved.