UNIVERSIDAD DE GRANADA · UNIVERSITAT DE BARCELONA · VNIVERSITAT DE VALÈNCIA · UAM Universidad Autónoma de Madrid

21st-22nd of April 2021

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Workshop description

The current situation caused by the SARS-CoV-2 pandemic forced us to postpone the biannual congress of the SEPEX (Spanish Society for Experimental Psychology) from 2020 to 2022. However, the steering committee of the SEPEX, following the proposal of several members, has taken advantage of the opportunities offered by digital tools to organise the SEPEX Virtual Conference 2021.

The SEPEX Virtual Conference 2021 intends to be an interactive meeting point for the members of our scientific society, which will generate constructive debate and discussion around the research topics of the experimental psychology. New empirical results, relevant theoretical contributions, and systematic reviews and/or meta-analyses will be discussed in two keynote lectures, seven symposia and 62 poster presentations.

As our keynote speakers, we proudly welcome the participation of Dr. Pandelis Perakakis (Universidad Complutense de Madrid) and Dr. Soledad de Lemus (Universidad de Granada). Symposia include sets of 20-minute talks on critical topics, such as consciousness, social attention, attentional orienting, vigilance, grammatical gender representation and processing, and public health. Posters on a wide variety of topics of interest will be defended in a mixed format: Twitter plus videoconference. Finally, the SEPEX Virtual Conference 2021 will award the best poster presentation, according to the votes of the registered attendees.

On behalf of the scientific and organising committees, please, be welcomed to the SEPEX Virtual Conference 2021.

Acknowledgements

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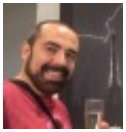

Joan Rodriguez Ruiz

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We thank Universidad de Granada, Universitat de Barcelona and Universidad de Valencia for providing technical support and online resources to celebrate the virtual meetings and other associated activities.

Program

	April 21st		
	Room 1	Room 2	Plenary
8.45-9.00			**Presentation**
9.00-11.30	Symposium 1 **Consciousness** Chair: Ana Chica	Symposium 2 **How does language sculpt us?** Chair: María Fernández-López	
11.30-12.00	**Break**		
12.00-14.00			Keynote 1 **Pandelis Perakakis**
14.00-15.30	**Lunch**		
15.30-18.00	Symposium 3 **Grammatical gender representation** Chair: Montserrat Comesaña	Symposium 4 **What Do We Mean By Vigilance?** Chair: Elisa Martín Arévalo	
18.00-19.30			**Poster Session 1**

	April 22nd		
	Room 1	Room 2	Plenary
9.00-11.30	Symposium 5 **Attentional Orienting and Distraction** Chair: Fabiano Botta		
11.30-12.00	**Break**		
12.00-14.00			Keynote 2 **Soledad de Lemus**
14.00-15.30	**Lunch**		
15.30-18.00	Symposium 6 **Social Attention** Chair: Andrea Marotta	Symposium 7 **From Exp. Psychology to Public Health** Chair: Helena Matute	
18.00-19.30			**Poster Session 2**

Keynote speakers

April 21st

¿Hay vida más allá de las editoriales? La revista Psicológica y la nueva generación de comunicación científica

Pandelis Perakakis
Universidad Complutense de Madrid

Resumen

La ciencia abierta está de moda. Igual que lo estuvo el acceso abierto hace un par de décadas. En el caso del movimiento de acceso abierto el fracaso fue épico. Lo que empezó como una demanda de acceso gratuito a la producción investigadora (al menos la financiada con dinero público) acabó siendo una mera vuelta de tuerca al modelo del negocio editorial en el que ahora son los autores los que pagan en lugar de los lectores, y en muchos casos incluso más. Se cierne el peligro de que la ciencia abierta acabe también en un mercado de servicios rentables que poco tendrán que ver con los verdaderos intereses de la ciencia y la sociedad. Pero no hay que desesperarse. Las soluciones existen aquí y ahora, y a diferencia de otros ámbitos de la vida, su adopción y promoción depende únicamente de la comunidad académica. En esta charla presentaré las importantes innovaciones que pronto implementará Psicológica, la revista de la Sociedad Española de Psicología Experimental. Explicaré por qué estas

innovaciones son únicas a nivel internacional y cómo pueden impulsar una nueva generación de comunicación académica orientada exclusivamente al beneficio de la ciencia y la sociedad.

Biografía

Mi relación con la investigación académica empezó en 2003 como becario FPI. Desde el comienzo de mi carrera investigadora me sorprendió el nivel de dependencia de la ciencia en revistas comerciales, revisiones anónimas y precios exorbitantes para acceder a resultados de investigación financiada con dinero público. Así, decidí dedicar gran parte de mi tiempo académico en la investigación y promoción de modelos de publicación alternativos. En 2010, fui coautor del artículo "Natural Selection of Academic Papers", que proponía un modelo de comunicación científica basada en la infraestructura pública de los repositorios institucionales. En 2012, participé en la fundación de Open Scholar, una organización internacional de académicos voluntarios dedicada al desarrollo de modelos e infraestructura para una comunicación científica más eficiente, abierta y transparente. He participado en varios grupos de expertos internacionales con el objetivo de rediseñar el modelo de publicaciones científicas, y he impartido conferencias invitadas en numerosas universidades y bibliotecas europeas. En 2015, dirigí un proyecto financiado por la Comisión Europea para desarrollar el primer módulo de revisiones abiertas en repositorios institucionales. Desde 2016 colaboro con la "Confederation of Open Access Repositories" (COAR) para desarrollar un modelo sostenible de publicación y evaluación científica basada en infraestructura pública.

April 22nd

Hombres y Ciencia: Estereotipos, prejuicio y privilegios

Soledad de Lemus
Universidad de Granada

Resumen

Año 2021, cuatro nombres de mujeres pasarán a la Historia (o eso esperamos) como descubridoras de las vacunas frente a la Covid-19: Chen Wei, Kizzmekia Corbett, Sarah Gilbert y Katalin Karikó (ARN-mensajero). Los nombres de las mujeres científicas se empiezan a oír y revindicar para evitar caer en el olvido (#NoMoreMatildas). No obstante, las cifras sobre la brecha de género en Ciencia se mantienen en todos los niveles, aunque en unos más que en otros (e.g., las llamadas STEM o ciencias "duras"). ¿Qué factores psicosociales sustentan este fenómeno? En esta sesión abordaremos las barreras que encuentran las mujeres y niñas para acceder a la ciencia y progresar (o sobrevivir) en ella, o bien, los privilegios que aúpan a los hombres al Olimpo de las ciencias y de la Historia. Revisaremos la evidencia científica al respecto y debatiremos acerca del papel de unos y otras como agentes de cambio social.

Biografía

Inicié mi carrera investigadora en 2004 como becaria FPU. Actualmente soy Profesora Titular de Universidad desde 2018 en la UGR. En este tiempo mi investigación se ha centrado en el estudio de los procesos de resistencia y confrontación en las relaciones intergrupales desiguales, así como en el estudio

de nuevas formas de prejuicio (sexismo) y estereotipia. Actualmente dirijo un proyecto de I+D sobre cooperación intergrupal y alianzas entre grupos aventajados y desaventajados. He publicado los resultados de mis investigaciones en revistas como Personality and Social Psychology Bulletin, Psychological Science, European Journal of Social Psychology, Sex Roles, Journal of Social Issues, Frontiers in Psychology. En estas dos últimas, he sido co-editora de dos números monográficos sobre identidad social y cambio social. También he trabajado en la transferencia y divulgación elaborando un manual de Coeducación. He realizado estancias de investigación en Cardiff University (UK), University of Groningen (Netherlands), Jagiellonian University (Poland). He impartido conferencias y seminarios invitados en la Université de Genévè (Suiza), y en St Andrews University (Reino Unido).

Symposiums April 21st

Symposium 1
Consciousness

Chair: Ana B. Chica
Universidad de Granada
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MEG recordings allow to disentangle the distinct contributions of nonpredictive and predictive peripheral cues to visual conscious perception

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Do we need attention to become aware of an external event? The answer seems to be: "yes". Or at least, attentional orienting can help in detecting near-threshold stimuli. In a recent study, we used magnetoencephalography (MEG) in human participants to assess the effects of nonpredictive and predictive supra-threshold peripheral visual cues on the conscious perception of near-threshold Gabor patches. We observed that neural activity induced by nonpredictive and predictive spatial cues can enhance conscious visual perception through distinct mechanisms, mostly relying on frontoparietal activity in the right or left hemisphere, respectively. Results are in line with previous literature examining the existence of two distinct brain attention networks (dorsal vs ventral) and how they support goal-directed vs stimulus-driven attentional processes, and she light on their unique spatiotemporal dynamics.

Shared neural correlates for executive control and conscious perception

Martín-Signes, Mar, Paz-Alonso, P.M., Cano-Melle, C. & Chica, Ana B.
Department of Experimental Psychology, and Mind, Brain, and Behavior Research Center (CIMCYC), University of Granada, Granada, Spain.

Executive control elicited by conflict situations modulates conscious perception of near-threshold stimuli. In this series of studies, we explored shared neural resources for the executive control network and conscious perception in frontoparietal regions and white matter tracts. To this aim, participants responded to a Stroop task, which was presented concurrently with a detection task of near-threshold Gabor stimuli. In the first study, functional magnetic resonance imaging was employed, while in the second study, we used transcranial magnetic stimulation (TMS) over relevant nodes from the previous study. In addition, the three branches of the superior longitudinal fasciculus (SLF I, II, III) and the frontal aslant tract (FAT) were delineated by using diffusion-weighted imaging (DWI) tractography. Functional connectivity analysis revealed an interaction between executive attention and conscious perception in the functional connectivity between frontal and parietal regions (e.g. right supplementary motor area [rSMA] and right superior parietal lobe). Accordingly, online TMS was applied over the rSMA and two control sites (the vertex and a control frontal region, the frontal eye field). Result demonstrated a causal role of the rSMA on the modulation of perceptual sensitivity by executive control only when the microstructure of the right SLF III or the left FAT were taken into account. Also, microstructure of the SLF was related with neural measures of the interaction between executive control and consciousness and TMS effects. These results add evidence in favor of shared neural correlates for executive control and conscious perception in fronto-parietal regions, and highlight the role of white matter in cognitive and perceptual processes in healthy people.

An investigation of intracranial EEG response to sounds of different intensities in the presence and absence of a task

Daphné Rimsky-Robert[1], Tal Seidel-Malkinson[4], Jacobo Sitt[4], Ghislaine Labouret[1], Martina Corazzol[1], Benoît Chatard[2,3], Pierre Bourdillon[4,5,6,7], Sylvain Rheims[2,3,8], Claude Adam[4,5,6,9], Virginie Lambrecq[4,5,6,9], Vincent Navarro[4,5,6,9] & Claire Sergent[1]
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Finding clear-cut neural correlates of conscious access is a current challenge in consciousness research. While some markers are characterized in healthy participants performing active tasks –including an increase of activity in sensory areas together with the late activation of a broad network comprising frontoparietal and cingulate areas, these can be difficult to evidence when participants are not attentive to the stimuli, or not performing a task relating to them. Here, we investigated the dynamics of neural activity in response to auditory stimuli around the perceptual threshold in patients implanted with stereotaxic electrodes (sEEG), in the presence and absence of a perceptual task. We hypothesized that conscious access would correlate with the occurrence of an all-or-none pattern of activity, the presence of which would inform us on whether a given trial was consciously perceived or not. This investigation focuses on finding a taskindependent marker of conscious access, and better understanding the underlying mechanisms using the high temporal and spatial resolution of sEEG. The preliminary results presented here provide insight on the different processes underlying perception of sounds at different intensities around the perceptual threshold, comparatively in the presence and absence of a task. They also evidence a burst of inter-trial variability in participant behavioral responses around the perceptual threshold, as well as in the recorded EEG data, suggesting that conscious access correlates with the presence of an all-or-none pattern that appears to be independent from sound intensity rather than with a graded, sound intensity dependent response.

The role of brain oscillations on illusory perception

María I. Cobos[1], María Melcón[2], Pablo Rodríguez-San Esteban[1], Almudena Capilla2 & Ana B. Chica[1]

[1] Department of Experimental Psychology, and Brain, Mind, and Behavior Research Center (CIMCYC), University of Granada, Spain.
[2] Department of Biological and Health Psychology, Autonomous University of Madrid, Spain

From all the information that reaches our senses, we can only consciously report a small part of it. However, we have the impression of perceiving much more information than we can report, which is known as phenomenological consciousness. Some authors argue that phenomenological consciousness is nothing more than a perceptual illusion according to which we believe to perceive more information than we can correctly report. In this study, we used high-density electroencephalography to explore the brain oscillations associated to correct or illusory perception using a dual task paradigm in which a percentage of perceptual illusions (erroneous conjunctions of features) are produced. Participants reported if a central digit was larger or smaller than 5, and then reported the color of a letter inside a peripherally presented string of characters. This string of characters included the target "L", the distractor "O", and two flankers. Behaviorally, all participants reported ~30% illusions (reporting the color of the distractor), and these responses were comparable for the more or less demanding attentional conditions of the central task. Time-frequency analyses demonstrated that alpha (9-12Hz) power was reduced for hits as compared to illusions before the target was presented, demonstrating that attentional preparatory processes (related to sensory suppression) are

associated to feature integration. Beta (17-23 Hz) power was also reduced for hits as compared to illusions, which might be related to more efficient attentional shifts for hits in the divided attention task used in this study. This results shed light on the brain mechanisms that dynamically interact to filter sensory information during visual perception.

Symposium 2
How does a foreign language sculpt us?

Chair: María Fernández-López
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The effect of bilingualism on the brain is modulated by language experience

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Research has shown that lifelong bilingualism may contribute to cognitive reserve in neurodegenerative diseases as shown by a delay of the age at symptom onset in bilinguals with different types of dementia. However, the study of the neural mechanisms behind this bilingual advantage is limited, especially for the preclinical stages of dementia, such as Mild Cognitive Impairment (MCI). Additionally, most of the studies have operationalised bilingualism as a dichotomous variable, despite the fact that language experience results from a combination of different factors (language usage, frequency of language switching, age of second language acquisition, and language proficiency). In the present study we investigated cortical and subcortical grey matter structure volume, and episodic memory performance, in a group of bilingual individuals with MCI by considering their linguistic profile. Specifically, we compared active bilingual speakers of Spanish and Catalan and bilinguals who have good knowledge of their second language but without any active usage of it. This classification is based on the results of a previous study in which we found that actively speaking the two languages promotes the delay of symptoms in individuals with MCI. The results reveal that active bilingualism significantly delays the onset of MCI symptoms. Additionally, active bilingualism is also shown to result in increased cortical grey matter in the right supramarginal gyrus, increased bilateral hippocampal volume and reshaping of the right amygdala and right caudate nucleus. These results are compatible with the hypothesis that bilingualism protects against cognitive decline via neural compensation mechanisms and by increasing neural efficiency in individuals with MCI.

Processing of mispronunciations in foreign-accented speech

Leah Gosselin[1,2], Clara D. Martin[2,3], Eugenia Navarra[2] adn Sendy Caffarra [2,4]
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Previous research suggests that native listeners may overlook syntactic errors when they are produced in a foreign accent. Yet, results on foreign-accented semantic errors remain conflicting. The current study examined the effects of mispronunciations leading to semantic abnormality in foreign-accented speech (e.g., Se escapó el pelo de tu tía, 'Your aunt's hair escaped' where perro 'dog' is mispronounced as pelo, 'hair'). Thirty-six native Spanish speakers listened to semantically correct and incorrect sentences, during EEG recording. Sentences were all in Spanish, produced by Spanish and Mandarin-Chinese speakers. The anomaly in the incorrect sentences was always caused by a subtle mispronunciation that occurred during a critical word. Results revealed that mispronounced words elicited significantly more negative responses in an early N400 time-window, with no effect of accent. In a later timewindow, we observed an N400 effect in the foreign-accent but not in the native-accent condition (accent x correctness interaction). These findings suggest that foreignaccented mispronunciations are more difficult to integrate than native-accented errors. Unlike similar syntactic studies, participants did not show tolerance to semantic errors when they were foreign-accented.

Are we more analytical when reading fake news in a foreign language?

María Fernández-López[1] and Manuel Perea[1,2]
[1] Universitat de València
[2] Universidad Antonio de Nebrija

The proliferation of fake news in internet requires understanding which factors modulate their credibility and take actions to limit their impact. A number of recent studies have shown an effect of the foreign language when making decisions: reading in a foreign language engages a more rational, analytic mode of thinking (Costa et al., 2014, Cognition). This analytic mode of processing may lead to a decrease in the credibility of fake news. Here we conducted two experiments to examine whether fake news stories presented to university students were more credible in the native language than in a foreign language. Bayesian analyses in both experiments offered support for the hypothesis that the credibility of fake news is not modulated by language. Critically, Experiment 2 also showed a strong direct relationship between credibility and negative emotionality regardless of language. This pattern suggests that the driving force behind the engagement in an automatic thinking mode when reading fake news is not language (native vs. foreign) but emotionality.

The effect of foreign language in fear acquisition and extinction

Azucena García-Palacios[1], Isabel Ortigosa[2], Jon Andoni Duñabeitia[3,4], Víctor Costumero[2] and Albert Costa[2]
[1] Universitat Jaume I
[2] Universitat Pompeu Fabra. Center for Brain and Cognition
[3] Universidad Antonio de Nebrija
[4] The Arctic University of Norway

Fear conditioning is an essential mechanism in the development of emotional disorders. Emotional words or expressions do not seem to prompt the same emotional reaction in the native and foreign languages. There is evidence that emotional reactivity is reduced when we use a foreign language. In this work we present the results of two studies in which we explore whether this emotional distance could modulate fear acquisition and fear extinction, essential features of fear conditioning. We conducted two experiments in which participants were verbally informed in a foreign versus a native language that two different stimuli could be either cueing the potential presence of a threat stimulus or its absence (electric shock). We registered pupil size and electrodermal activity. Our findings supported the hypothesis, providing evidence that fear processing may be affected by language context. These findings open a new line of research exploring the potential use of foreign language in the understanding and treatment of mental disorders.

Symposium 3
Grammatical gender representation and processing

Chair: Montserrat Comesaña
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Is it a matter of basal activation level? A cross-linguistic approach to grammatical gender processing

Ana Rita Sá-Leite
University of Santiago de Compostela

The study of the representation and processing of grammatical gender during noun lexical access in language production has reached controversial results across languages. For Germanic and Slavic languages, a context of agreement has been widely found to be necessary for the emergence of gender competitive effects (e.g., slower responses when two nouns of different gender compete for selection than when these nouns are of same gender – gender congruency effect). For Romance languages, the results are instead puzzling, since some studies find that this context of agreement is necessary, but others do not. Thus, available evidence seems to support the idea that gender nodes would behave differently across language families. Here, we will present a recent hypothesis, the Gender Acquisition and Processing (GAP) hypothesis, which aims to explain these inconsistencies as a result of differences in the basal activation level of gender nodes due to the disparity in the degree of phonological gender transparency of each language. Data on a series of picture-word interference tasks with native speakers of European Portuguese is analysed. In these tasks, gender congruency and gender transparency effects (slower responses when two nouns of different transparency categories compete for selection than when these are of the same transparency category) intertwine, becoming evident the slipperiness of gender-based effects. Individual differences among participants are further discussed to explain the gender incongruence effect observed in Italian and Spanish.

Representation and processing of grammatical features: the case of gender and classifiers

Niels O. Schiller
Leiden University

Many Indo-European languages employ grammatical gender in their nominal system as a way to categorize words. Research in the last 30 years has demonstrated the (neuro-) cognitive reality of grammatical gender. However, how do languages that do not mark grammatical gender categorize their nominal system? Many Sino-Tibetan languages, such as Mandarin Chinese, make use of so-called classifiers. Classifiers fulfill a very similar function as grammatical gender in Indo-European languages. Yet they are implemented quite differently in the language. I will present recent behavioral and electrophysiological work on the representation and processing of classifiers in Chinese. The results of these studies demonstrate that languages may use different ways to categorize the nominal part of their lexicon. Nevertheless, grammatical gender and classifiers show many similarities regarding their processing.

How do we treat formal gender cues when we comprehend sentences?

Sendy Caffarra
BCBL & Stanford University

Grammatical gender is a morphosyntactic feature shared by several languages, which allows to group nouns into different categories (e.g., masculine, feminine). Critically, this grammatical feature does not always entail consistent correspondences with the meaning of the nouns and, for this reason, it represents a challenge for second language learners. However, the grammatical gender category can be indexed by the presence of regular formal cues (e.g., transparent noun endings) which might facilitate the recovery of this morphosyntactic information. In this talk I will consider electrophysiological studies testing whether gender-to-ending consistency has an impact on how readers establish dependencies between words and finally comprehend sentences. Different linguist profiles will be considered, from monolinguals to bimodal bilinguals, in order to have a wide picture of how these form-to-function mappings are used by different types of readers.

Grammatical gender in bilinguals

Daniela Paolieri
University of Granada

The Grammatical Gender is one of the more puzzling of the grammatical categories. It plays an important role in the processing of languages with two, three or more grammatical genders. Recently, the importance of grammatical gender in bilingual's comprehension and production has been observed by means of different tasks, and different bilingual populations: with

languages of different degree of similarity in the grammatical gender systems. The results confirm that the grammatical gender of the native language affects language processing in a second language: words with a similar gender value across languages are rapidly accessed with regard to words that do not match in gender, and faster response latencies are observed. To explain the grammatical gender effect, we consider that grammatical gender is represented as an abstract nominal feature and it is always available in lexical processing. In addition, we assume that both languages of a bilingual are simultaneously active in the bilingual mind and that congruent gender nouns share more between-language information than incongruent gender nouns. However, an increasing amount of empirical evidence also shows that semantic and formal variables modulate the gender congruency effect, suggesting a close relationship between different word levels in bilingual language processing.

Symposium 4
What do we mean by vigilance? Executive and arousal components, neuroanatomy, and applications

Chair: Elsa Martín-Arévalo and Fernando G. Luna
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The vigilance decrement comes along executive control decrement: testing the resources-control hypothesis

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Does executive control drop with time-on-task during prolonged tasks? Could it be related to the typically observed "vigilance decrement"? Do the different vigilance components behave differently in their relation with executive control? The main aim of this work is to test the predictions of the resource-control account in order to answer these questions. Specifically, this theory predicts that the vigilance decrement is mainly due to a decrease in executive control. This decline induces a misallocation of the attentional resources, devoting progressively more resources from the task at hand to mind-wandering as time-on-task progresses. Data gathered from a large sample size (N = 617) who completed the Attentional Networks Test for Interactions and Vigilance – executive and arousal components in Luna, Roca, Martín-Arévalo, and Lupiáñez (2020) were reanalyzed to particularly test whether the vigilance decrement is associated to a decline on executive control, since this task provides at the same time a cognitive control and two vigilance measures – arousal and executive vigilance. The results show a decrease in cognitive control together with a decrease in both types of vigilance across time-on-task, providing evidence that supports some aspects of the resource-control theory.

Event-related potentials associated with attentional and vigilance components

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The attentional networks system (alertness and vigilance, orienting, and executive control) modulates the neural and behavioral responses to the environment. Whereas phasic alertness and orienting functions triggered by predictive signals prepare for the anticipation of novel stimuli, the executive control network selects the relevant information from the environment to perform the ongoing task. Regarding vigilance, it has been recently proposed a novel dissociation of this function in two components: whereas the executive component is related to the ability to detect rare but critical signals, the arousal component is rather related with the capacity to maintain a fast reaction to the stimuli from the environment. The present study aimed at dissociating the brain's electrical responses (i.e., event-related potentials) associated with the diverse components of attentional networks system (i.e., phasic alertness, orienting, executive control, and executive and arousal vigilance). Thirty-seven adults (31 women, age: M = 25.86; SD = 4.99) performed the Attentional Networks Test for Interactions and Vigilance – executive and arousal components (ANTI-Vea) in two experimental sessions, while electroencephalography' signal was recorded with a highdensity (128 channels) BioSemi equipment. Behavioral results showed the typical main effects and interactions for phasic alertness, orienting, and executive control functions, along with appropriate measures for the executive and the arousal vigilance component. Regarding the analysis of event-related potentials, we observed the classic components of the attentional networks system, in particular: (a) N1, P2, and contingency negative variation (CNV) at FCz for phasic alertness; (b) P1 and N1 at occipital channels and P3 at Pz and CPz for attentional orienting; and (c) slow positivity at Pz and N2 at CPz for executive control. Importantly, specific event-related potentials were observed for executive vigilance (associated with the accuracy to detect infrequent but critical signals across time-on-task) and arousal vigilance (as a function of the speed of responses) components. Whereas the decrement on executive vigilance was observed as a change on late components (i.e., P3 at Pz and slow positivity at Cz), the slowness on arousal vigilance responses was found as a change on P2 at occipital channels. Altogether, this study presents a novel dissociation of the brain mechanisms associated with the components of the attentional networks system, providing further evidence on the specific neural mechanisms of executive and arousal vigilance.

Dissociated neuromodulatory effects and EEG activity for the executive and arousal vigilance components

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Our ability to maintain attention over extended periods for responding to critical stimuli– scientifically known as 'vigilance'– is fundamental for our interactions with an increasingly complex and stimuli-rich environment. However, vigilance tends to decrease as time-on-task progresses, thus impairing our ability to perform either mundane (i.e., reading a book) or highly intricate (i.e., air traffic control operations) daily tasks. Importantly, aiming at deepening the understanding of the nature of the vigilance decrement phenomenon, it has been proposed that vigilance may be conceptualized as two dissociated components: (i) arousal vigilance, as the ability of maintaining a basic state of activation that allows emitting fast and relatively automatic responses to any stimuli of the environment; and (ii) executive vigilance, as the ability of monitoring and executing a specific response to infrequent but relevant stimuli from the context. The present research – wherein conceptual dissociation between vigilance components is discussed – used transcranial direct current stimulation (tDCS) as a non-invasive brain stimulation technique along with electroencephalography (EEG) aiming at examining the neuromodulation effects on the behavioral patterns and neural functional mechanisms of vigilance components. Evidence gathered from two separated studies with a total of 150 participants demonstrated that applying High-Definition tDCS (HD-tDCS) over the right posterior parietal or pre-frontal cortex effectively reduced the vigilance decrement on the executive component, but not on the arousal one. Stimulation over the right parietal cortex has shown more promising results in a further analysis of EEG activity: the usual increase of alpha power across time-on-task –generally associated with the attentional disengagement from the task at hand– was smaller in the stimulated group, as compared to the sham one. The effectiveness of stimulating the right parietal cortex has been replicated across these two studies, thus serving as a precedent to further explore the possibilities of neuromodulation to improve vigilance performance. Finding useful protocols for improving both executive and arousal vigilance across time-on-task might help to mitigate attentional failures and lapses in clinical populations and workplace environments wherein the vigilance decrement has critical consequences.

Transcranial alternating current stimulation over the right dorsolateral prefrontal cortex modulates vigilance performance, but only when arousal levels are non-optimal

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Current theoretical accounts of the oscillatory nature of sustained attention predict that entrainment via transcranial Alternating Current Stimulation (tACS) at alpha and theta frequencies in the frontoparietal network could prevent the drops in vigilance across time-on-task. Nonetheless, some previous studies have neglected vigilance as a multicomponent domain that dissociates an arousal component and an executive component, and also the role of individual differences in arousal baseline when assessing the effects of tACS on vigilance performance. Here we examined the effects of alpha- and theta-tACS over the right DLPFC on both components of vigilance in participants that differed in arousal baseline according to their chronotype and time of testing. In Experiment 1, we selected intermediate-types participants who performed the vigilance tasks at a time of day when their arousal baseline is assumed to be at the optimal level. In Experiment 2, we selected evening-types participants that performed the vigilance tasks early in the morning, when their arousal baseline was at non-optimal levels. Our results showed that brain stimulation did not affect performance of intermediate-types participants in neither vigilance task. Importantly, tACS affected each component of vigilance differently in evening-types participants. The arousal component improved by brain stimulation irrespective of the oscillation's frequency. Regarding the executive component, only alpha-tACS improved vigilance performance compared with sham. In addition, the typical vigilance decrement with time-on-task was found with both theta-tDCS and sham, but it was attenuated with alpha-tACS. These results support the multicomponent view of vigilance, the relevance of taking into account individual differences in arousal baseline, and the role of alpha oscillations as a long-range cortical scale synchronization mechanism that compensates the decrements in performance that some researchers have attributed to resources depletion as a function of time-on-task.

Differences in attention and vigilance associated with musical training

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Recent evidence suggests that musical practice could be a promising cognitive training activity that could enhance attentional functioning. However, previous research shows some inconsistent results for certain attentional processes (e.g., selective attention and executive control), suggesting that musical training might have a specific impact only over some

processes. In addition, there is selection bias, in which individuals with higher cognitive functioning and socio-economic status select more this activity. The current study aimed to investigate the differences in attention between musicians and non-musicians with a finegrained measure (ANTI-Vea). This task allows measuring the three Posner and Petersen's networks (alerting, orienting, and executive control) as well as two different components of vigilance (executive and arousal vigilance). Adult musicians (18–35 years) with at least 10 years of musical experience (n = 49) were compared to a matched group of non-musicians (n= 49). For matching, we used a multivariate propensity-score procedure with an extensive set of confounding variables: age, sex, education level, lifelong tobacco consumption, physical exercise, bilingualism, second language use, involvement in cognitively stimulating activities, and video game playing. Adult musicians showed advantages in processing speed and in the two components of vigilance compared to non-musicians. Therefore, our results support the possibility of specific effects of musical training on attention, even when both samples had similar characteristics in confounding variables. Results are consistent with recent meta-analytic evidence showing that musical training produces far-transfer effects on cognition to some extent.

Symposiums April 22nd

Symposium 5
Attentional Orienting and Distraction

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Attentional capture from inside vs. ouside the attention focus

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Attentional capture seems to be modulated by task demands and distractor display in relation to the attentional focus. Forster and Lavie (2008; 2016) use a modified flanker task with a fully irrelevant distractor presented outside the attentional focus, observing reduced interference from them under high perceptual load. However, in the Gaspelin's dwelling hypothesis framework (Gaspelin et al., 2016), by using a similar paradigm but with a distractor inside the attentional focus, the opposite pattern is observed, with distractor interference increasing with higher perceptual load. In several experiments we compared both theories within the same paradigm by manipulating the perceptual load and the type of distractor, which could be presented inside vs. outside the attentional focus. Results show that, in accordance with our hypothesis, the influence of task demands on attentional capture varies depending on the type of distractor. Different to distraction from entirely irrelevant distractors from outside the attentional focus, when the distractor is inside the attentional focus we observed a pattern opposite to that predicted by the perceptual load theory, with perceptual load increasing rather than decreasing interference. Furthermore, although this increment in high perceptual load was larger for the benefits (i.e., when the salient distractor appears to be the target), it was also significant for the costs of presenting this type of distractor. Our results provide specific insight into new aspects of the attentional dwelling hypothesis and rather more general about attentional capture from inside vs. outside the attentional focus.

Is goal-driven distraction immune to perceptual load?

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In daily life, we may find our attention being involuntary distracted by task irrelevant information, sometimes with disruptive or even dangerous consequences. Over the past quarter century, research supporting the load theory has highlighted that vulnerability to distraction is powerfully determined by the extent to which our perceptual capacity is occupied by our task: 'High load' tasks are argued to efficiently and automatically filter irrelevant information, and typically reduce or even eliminate distraction. However, research in support of the contingent capture hypothesis has highlighted that one of the most powerful forms of distraction can, ironically, occur as an involuntary consequence of our top-down goals. Here we explore the hypothesis that such goal-driven distraction, originating from the top-down task-set itself, would not be modulated by the perceptual load of the task-set. To this end we fused a classic letter search perceptual load response competition task with a colour contingent capture task. Goal-driven distraction was indexed by reaction time interference from distractor letters matching (versus mismatching) the target defining colour. Across three experiments, perceptual load modulation of goal-driven distraction was found only in relation to distractor letters that were also associated with potential task response - interpretation of these effects was complicated by a strong interaction between goal-driven distraction and response competition. On the other hand, goal-driven distraction from response neutral letters appeared to be immune to perceptual load, with Bayesian analysis confirming the sensitivity of the null result. Our findings suggest that goal-driven distraction may have enhanced ability to break through and distract attention even in situations of high perceptual load.

Contextual cuing of visual search does not guide attention automatically in the presence of top-down goals

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Visual search is faster when it occurs within repeated displays, a phenomenon known as contextual cuing (CC). CC has been explained as the result of an automatic orientation of attention towards a target item driven by learned distractor-target associations. In three experiments we tested the specific hypothesis that CC is an automatic process of attentional guidance. Participants first searched for a T target in a standard CC procedure. Then, they experienced the same repeated configurations (with the T still present), but now searched for a Y target that was positioned either in a location on the same, or on a different side, from the old T target. Results suggested that there was no interference caused by the old T-target: target search was not affected by the relative positions of the T and Y. Instead, we found a general facilitation in search times for repeated configurations (Experiments 1 and 2). This main effect

disappeared when the need for visual search was eliminated in Experiment 3 using a "feature search task". These results suggest that repeated sets of distractors did not trigger an uncontrollable response towards the position of the T; instead, CC was produced by perceptual learning processes.

Crossmodal distraction across the lifespan

Valerio Santangelo
University of Perugia, Italy

The ability to resist distracting stimuli while voluntarily focusing on a task is fundamental to our everyday cognitive functioning. In this symposium, I will present two recent studies in which we investigated the trajectory of resistance to crossmodal distraction from childhood to old age. In both studies, the participants were presented with complex visual scenes. Endogenous (voluntary) attention was engaged by having the participants search for a visual target presented on either the left or right side of the display. The onset of the visual scenes was preceded by a task-irrelevant sound (an exogenous crossmodal spatial distractor) delivered either on the same or opposite side as the visual target, or simultaneously on both sides (i.e., cued, uncued, or neutral trials, respectively). In the first study (Cavallina et al., 2018), we compared the task performance of young children (5-7 years), older children (10-11 years), and young adults (18-23 years). We found in all age groups comparable orienting effects ("cued minus neutral" trials), indicating a similar capture of spatial attention by the exogenous cue, which was independent of age. However, only young adults demonstrated a suppression of the reorienting effect ("uncued minus neutral" trials), indicating late development in the reallocation of spatial attention toward a target following auditory distraction. In the second study (Pedale et al., 2021), we compared the task performance of young children (5-7 years), older children (10-11 years), young adults (20-27 years), and older adults (62-86 years). In this study, we further investigated the time-course of crossmodal distraction by presenting the task-irrelevant sound at different stimulus onset asynchronies (SOAs) of 50, 200, or 500 ms before the visual scene. Age-related differences were revealed, especially in the extreme age groups, which showed a greater impact of crossmodal spatial distractors. Young children were highly susceptible to exogenous spatial distraction at the shortest SOA (50 ms), whereas older adults were distracted at all SOAs, showing significant exogenous capture effects during the visual search task. By contrast, older children and young adults' search performance was not significantly affected by crossmodal spatial distraction. Overall, these findings present a detailed picture of the developmental trajectory of endogenous resistance to crossmodal spatial distraction from childhood to old age and demonstrate a different efficiency in coping with distraction across the age groups studied.

Attentional networks, vigilance, and distraction as a function ADHD symptoms

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Attentional difficulties are a core axis in attention-deficit/hyperactivity disorder (ADHD). However, establishing a consistent and detailed pattern of these neurocognitive alterations has not been an easy endeavor. Based on a dimensional approach to ADHD, the present study aims at comprehensively characterizing three key attentional domains: the three attentional networks (alerting, orienting, and executive attention), two components of vigilance (executive and arousal vigilance), and distraction. To do so, we modified a single, fine-grained task (the ANTI-Vea) by adding irrelevant distractors. One hundred and twenty undergraduates completed three self-reports of ADHD symptoms in childhood and adulthood and performed the ANTI-Vea. Despite the low reliability of some ANTI-Vea indexes, the task worked successfully. While ADHD symptoms in childhood were related to alerting network and arousal vigilance, symptoms in adulthood were linked to executive vigilance. No association between ADHD symptom severity and executive attention and distraction was found. In general, our hypotheses about the relationships between ADHD symptoms and attentional processes were partially supported. We discuss our findings according to ADHD theories and attention measurement.

General Discussion

Fabiano Botta, Juan Lupiáñez, Greta Manini, Sophie Forster, David Luque, Valerio Santangelo and Tao Coll

Symposium 6
Social attention

Chair: Andrea Marotta
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Does eyes direction encourage a more specific attentional orienting as compared to arrows?

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Several studies have demonstrated that eye-gaze and arrows reflexively shift visuospatial attention. However, it is unclear whether the attentional shifts induced by these two types of cues differ in some essential aspects. It has been speculated that possible differences between these stimuli may reside in the dissimilar way people select objects in response to them, eye-gaze triggering a more specific attentional orienting than arrows. To test this hypothesis, two experiments were run in this study. Following eye-gaze and arrow central cues, participants had to respond to a target that appeared in one of six possible locations, either inside one of the previewed position grouped objects or in an empty visual field. Results in the two experiments demonstrated that eye-gaze elicited a specific attentional orienting benefit only when targets were presented within the looked at object, whereas arrows induced the attention to spread across all groups of objects located within the cued hemifield. No differences between the two types of cues were observed when no objects were presented on the scene. These findings suggest that, at least when objects are presented on the scene, eye-gaze selectively directs attention toward a specific (looked at) object location, whereas arrows elicit a more general benefit by orienting attention toward parts of the environment.

Attending to eye-gaze, but not to eye color, leads to different social attention effects for gaze and arrows

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Department of Experimental Psychology. Mind, Brain and Behaviour Research Center, University of Granada, Spain

Eye-gaze is one of the most important social-communicative signals. Previous studies have shown that arrows and gaze stimuli lead to opposite spatial congruency effects in the context of a spatial interference task. Arrows produce faster responses when their direction is congruent with their position (e.g. a left-pointing arrow presented to the left; standard spatial congruency effect). Instead, eye-gaze stimuli produce faster responses when eye-gaze stimuli are presented on the opposite side of the gazed-at location (incongruent trials), leading to a reversed spatial congruency effect. This reverse congruency effect has been explained by the eye contact hypothesis that might occur on incongruent trials: When the gaze is presented to the left, looking to the right (incongruent trial), it is looking towards the participant, putatively making eye contact In recent studies, we explored implicit processing of eye-gaze and arrow direction by using an implicit version of the original task. Participants responded to the colour of eye-gaze/arrow stimuli instead of their direction (Explicit task). Results showed no congruency effects in the Implicit Task, suggesting that the direction of both arrows and eye-gaze stimuli do not affect behaviour when it is implicitly processed in the spatial interference paradigm. These findings disconfirm the eye contact hypothesis since the eye contact effect can occur implicitly and automatically, even when we do not intend to process gaze direction. However, the absence of congruency effect in the Implicit Task may be related to the additional response conflict that is introduced in this type of task (responses being sometimes ipsilateral and sometimes contralateral to the target). In contrast, laterality is perfectly matched with congruency in the Explicit Task.

In the present study, we explored whether the laterality of manual responses is responsible for the differences between the Explicit and Implicit Task in the congruency effect observed for arrows and gaze. Instead of manual, we used verbal responses, participants having to name the direction (Explicit Task) or the colour (Implicit Task) of left or right looking/pointing gaze or arrows, presented to the left or right of the fixation point. Results from the Explicit Task showed standard congruency effects for arrows and reversed congruency effects for gaze-stimuli. In the Implicit Task, no congruency effect was again observed neither for arrows nor for gaze-stimuli. Therefore, results replicate the manual task's findings, suggesting that manual motor components are not responsible for the opposite congruency effects observed for arrows and gaze.

Attentional effects triggered by gaze and arrows: qualitatively different effects emerge from childhood to adolescence

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The identification of gaze direction is an essential milestone in socio-cognitive development. As a directional stimulus, gaze shares attentional orienting mechanisms with non-social stimuli, such as arrows, but also produces unique effects. Thus, while arrows and gaze show similar effect in standard gaze cueing effects, a clear dissociation is observed with a spatial interference task in which the direction indicated by the stimulus and its location are in conflict. While arrows produce a standard congruency effect, with faster direction identification responses on congruent (e.g., a left pointing arrow presented on the left side) than on incongruent trials, gaze shows a reversed congruency effect (RCE) with faster identification on incongruent (e.g., a left looking gaze presented on the right side) than on congruent trials. To investigate the emergence of this gaze-specific attentional effect, 214 Spanish children, divided into six age groups from 4 to 17 years, performed the spatial interference task. Results from three experiments revealed a different developmental course of the attentional effects produced by gaze and arrows. All children demonstrated a standard congruency effect when responding to arrows. In contrast, the effect of gaze differed across age groups. When responding to gaze, 4-year-olds showed an arrow-like effect. However, it changed progressively in the subsequent age groups, with the RCE finally emerging in the 12-year-old group. Findings suggest that attentional orienting mechanisms shared by arrows and gaze are present in preschoolers. As children grow in age and social experience, gaze may acquire special features that modify its processing. Besides orienting attention to a direction, as arrows would do, gaze might orient attention towards a particular object that would be attentionally selected. The RCE could be reflecting this additional component of gaze which may be mature in early adolescence. Our results seem important for unravelling gaze-specific attentional mechanisms which is essential to understand social-cognitive performance, especially in children with atypical development.

Perceiving dual-agent gaze direction: Effects of joint attention and inversion

Andrew P. Bayliss
University of East Anglia

Recent research has discovered perceptual advantages for processing of two human agents that are engaged in mutual attention (looking at each other) compared with agents facing away from each other. In three experiments, we aimed to establish if the enhanced processing for mutual gaze extends to observed joint attention. That is, are gaze judgements about two agents facilitated if their gaze is not at each other, but towards a common object or space?

Participants made speeded judgements about whether two on-screen faces were looking in the same direction or not, with both faces either being upright or inverted. In Experiment 1, we found a very large face inversion effect, but this inversion effect was significantly weaker when the two faces were looking at the same object as one another (joint attention) as compared with looking at different objects (non-joint attention). Experiment 2 replicated this pattern with objects absent (i.e. the faces were looking in the same/different directions). Participants in Experiment 2 also responded to similar arrangements of desk lamps (directional, non-social stimuli) and this pattern of data was not replicated, indicating a level of specificity to stimuli capable of social attention. Moreover, in Experiment 3 we found that this protection against face inversion through joint attention was abolished in asymmetric displays wherein the faces were offset spatially from one another. Together, these data appear to show that observed joint gaze episodes are associated with facilitated face and gaze processing consistent with a pair of faces being processed as a single perceptual unit. When binding the faces as a single gestalt group is challenged through inversion or through spatial displacement, the perceptual facilitation of a joint attention episode is reduced. These data therefore are consistent with the notion that the perceptual system prioritises processing of faces engaging in joint attention.

Symposium 7
From Experimental Psychology to Public Health

Chair: Helena Matute
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Enhancing adherence to medical prescriptions in the elderly through the Differential Outcomes Procedure

Luis J. Fuentes[1], Victoria Plaza[2], Michael Molina[3], & Ángeles F. Estévez[4]
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Work on animals has pointed out the relevance of several factors in enhancing the establishment of new associations and their long-term retention in memory. One critical factor is the way correct responses are reinforced. In the differential outcomes procedure (DOP), each specific stimulus-stimulus association is reinforced with a particular and unique outcome (reinforcer). This reinforcement scheme has proved beneficial for both discriminative learning and memory, in comparison to when reinforcers are randomly delivered (the non-differential outcomes procedure; NOP). Recently, we have shown that the DOP can be used in clinical contexts by simulating conditions in which elderly people, frequently afflicted by memory deficits, may fail to adhere to medical prescriptions. It usually happens when patients suffer from multiple morbidities and need to hold several pill/disease/time-of-day associations in long-term memory. In Study 1 we showed that the DOP, in comparison with the NOP, improved the learning and long-term retention of pill/disease associations in healthy adults, just when the number of to-be-learned associations exceeded the limits of working memory capacity (Fuentes et al., 2020; Molina et al., 2015). In follow-up studies, we went further to show that the DOP benefits can be extended to the learning and long-term retention of pill/time-of-day associations in both healthy older adults (Study 2; Plaza et al., 2018) and patients diagnosed with Alzheimer's disease (Study 3, Molina et al., 2020). All these results suggest that the DOP is an easy-to-use tool that may be adapted by clinicians and caretakers to deal with the low adherence to medical prescriptions observed when elderly people need to manage a complex medication regime.

Enhancing risk comprehension through non-numerical estimates

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Health-related decision-making often requires understanding statistical data concerning risks and benefits of medical tests or treatments. This is particularly difficult when different pieces of statistical information have to be integrated to infer, for example, the predictive value of the result of a diagnostic test. Several studies have shown that this integrative process, commonly studied in Bayesian reasoning tasks, is more accurate when the data are presented as arrays of icons than in verbal formats (e.g., ratios of frequencies). Here we present the results of a research aimed at studying to what extent the way of estimating the probability (numerically or non-numerically) has also an impact on comprehension. Specifically, we wondered if the type of requested estimate, together with the presentation format, would modulate the effects that previous beliefs have on the comprehension of data. To this end, we compared Bayesian reasoning from believable and unbelievable scenarios in iconic or verbal format, and participants had to perform non-numerical and numerical estimates. The results showed that the estimates were more accurate for believable data, especially in the iconic format. Also, for believable scenarios, non-numerical estimates were more accurate than corresponding numerical ones. These findings could have implications for the design of interventions aimed to facilitate the understanding of risks and improve decision-making.

Can scientific risk reporting in medical journals bias the judgement of health professionals?

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Work The numerical format in which risks are communicated can affect the risk comprehension and perceptions of medical professionals. For instance, when two groups are compared on binary outcomes such as mortality, relative risks (e.g., 100% increase) can strongly bias perceptions. This is why it is recommended to communicate the underlying absolute risks (e.g., 1 in 7000 increasing to 2 in 7000). However, there are no evidence-based guidelines regarding how these should be communicated. To fill this gap, we investigated what formats are frequently used to communicate absolute risks in medical journals and how they influence the judgments of health professionals.

Study 1 was a systematic review of empirical articles published in seven orthopedic surgery journals. We selected articles (n=507) that reported group comparisons on a binary outcome and recorded the numerical format used to communicate the risks. The quality of figures was assessed according to published guidelines for transparent visual aids design. Study 2 was an experiment with 300 surgeons who received ecologically valid information about the risk of suffering an important surgical side effect in a clinical trial involving two groups of patients (new treatment and control). Surgeons were randomly assigned to one of 12 format conditions, based on the formats identified in the systematic review, plus a format using transparent visual aids. Surgeons were then asked to judge the risk reduction achieved with the new treatment and the clarity of the information received.

Study 1 showed that authors use a variety of formats to report absolute risks in scientific articles. The majority of articles compared groups of different sizes (90%) and reported both raw numbers and percentages (64%). Importantly, 15% of articles used formats with biasing features and the quality of figures was low. Study 2 showed that highly trained surgeons were often misled and strongly biased by the most commonly used formats identified in the systematic review. In contrast, less common formats following best practice standards (e.g., transparent visual aids) typically reduced or eliminated judgment biases and subjective confusion.

The use of misleading formats in scientific medical literature is frequent, even in recent years, and it is independent of many other factors (e.g., journal impact, study quality). Biases can be reduced if journals adopt guidelines for transparent risk communication. A broad three-category system for characterizing the probable impact of specific risk reporting formats is discussed.

How the symptom base-rate affects the perceived effectiveness of medical treatments

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One of the ways in which patients can learn about the effectiveness of their medical treatments is by examining their experience of the covariation between treatment use and symptom frequency. Since this evidence is not usually collected in the form of a controlled experiment, but as an informal process, it is not always easy to infer the causal effect of the treatment. In Experiments 1 and 2, we use a contingency learning task to let people learn about the effectiveness of a treatment by looking at the symptom base-rate before and after the treatment is introduced. Thus, we find that the initial base-rate of the symptoms can bias the judgments of perceived effectiveness for treatments that are in fact equally effective. In Experiment 3, we test the possibility that people use ratios, rather than absolute differences (i.e., contingency), to compare the base-rates of the symptoms before and after using the medicine. The results indicate that this is the case. These findings contribute both to improving our understanding of how people judge treatment effectiveness in real life, and to advancing in the theoretical debate of how causality can be estimated from contingency information.

Poster Session

Wednesday, 21st of April

P01. Affect intensity and gender differences in the functioning of attentional networks in university students. Merchán, A., Ruiz-Castañeda, P., Daza-González, M.T.

P02. Brain response to violation of physical laws in babies. Conejero, Ángela, Rico-Picó, Josué, Moyano, Sebastián, Hoyo, Ángela, Ballesteros-Duperón, M. Ángeles, Rueda, M. Rosario

P03. Changes in speech due to aging and cognitive state. Israel Martínez-Nicolás, Juan José G. Meilán, Thide E. Llorente, Francisco Martínez-Sánchez

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Poster Abstracts

Affect intensity and gender differences in the functioning of attentional networks in university students

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Affect intensity (AI) refers to individual differences in the intensity with which people subjectively experience emotions. High AI is an aspect of emotion dysregulation that is present in a variety of mood and anxiety disorders. The present study evaluates the functioning of attentional networks (alerting, orienting, and executive control) for non [1] emotional stimuli in healthy subjects classified as having High (H-AI) and Low (L-AI) AI levels through clustering methods. A sample of 200 university students (100 women), aged between 18 and 25 years old, completed the Affect Intensity Measure and the Attentional Network Test (ANT). Women obtained higher AI scores than men and were more highly represented in the H-AI cluster. In ANT, mean response time was significantly shorter in men than in women, but men showed a worse functioning of the alerting network than women (which was not observed for the executive control and orienting networks). In addition, H-AI men exhibited a more efficient executive control network than L-AI men. Executive control was negatively correlated with AI in men, but not in women. These results will be discussed in terms of individual differences in emotion regulation and attentional networks. This work was supported by a grant from University of Almería (Plan Propio de Investigación y Transferencia 2018), Spain.

Brain response to violation of physical laws in babies

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Recent research on infant's learning has demonstrated that as early as at 11 months of age babies have a general implicit knowledge about the physical laws that rule the world (Stahl & Feigenson, 2015): they tend to look longer to objects that seem to violate gravity or solidity principles, interacting with these objects in a specific way for testing their properties once they are allowed to manipulate them. Besides, there is a growing body of literature on infants' neural mechanisms related to the detection of errors and unexpected events. EEG studies with infants have found a negative deflection over fronto-central sites of the scalp associated to the

processing of observed arithmetic errors (Berger et al., 2006), unexpected ending of actions in a sequence (Reid et al., 2009) or mistakes in animal puzzles formation (Conejero et al., 2016). This negativity is considered as a precursor of the ERN component and a neural marker of executive attention. In the present study, we investigated functional brain activity in relation to the processing of the violation of physical rules longitudinally from 9 to 16 months of age. Infants were tested at 9 (final valid n=18) and 16 months of age (final valid n=33). We expected to find a greater negativity for the condition of physical rules violation compared to the noviolation condition. EEG was registered while infants were presented an ERP-adapted protocol of Stahl and Feigenson (2015) original paradigm. As predicted, babies showed a frontal negativity in response to objects violating physical principles of gravity and solidity at 9 (t17=2.13, p=0.049) and 16 months of age (t32= 3.05, p=0.005). Therefore, we replicated prior results on error detection/expectation violation with a new paradigm. Consistent with previous results (Conejero et al., 2016), the topographical distribution of the ERN was lateralized to left frontal sites. Additionally, the effect was distributed in more anterior channels (AF3) in 9 months-olds than in 16 months-olds (F3) babies, a finding that is also consistent with prior ERN-like data in infants (Reid et al., 2009). These results are of interest to understanding both the early development of the brain network for executive attention and its relevance for learning about object properties and physical events in the first years of life.

Changes in speech due to aging and cognitive state

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Through the aging process, alterations in speech may arise as a consequence of biological deterioration due to age, or as the result of an impairment in the cognitive processes involved in speech. Some voice parameters show specific alterations under the presence of dementia. The general objective of our study is to identify which of them change because of age, mental state, or an interaction between both. The sample consisted of 400 people over 55, who were divided into four groups according to their age. The mental state of the elderly was assessed through the MMSE and four ranks were established. Gender was also considered in the analysis. Some temporal, fluency, rhythm, amplitude and voice quality parameters were found to be related to the mental state, while disturbance parameters changed due to age. Frequency parameters were exclusively influenced by gender. Understanding how those parameters are affected by such variables is determinant to advance in the use of speech as clinical markers for the detection of cognitive impairments.

Cognitive control components related to unawareness of deficits in patients with acquired brain injury

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Anosognosia (unawareness of cognitive deficits) after acquired brain injury (ABI) is a common and complex condition that has been typically associated to impairments in cognitive control processes. In the present study we aimed at specifying whether deficits in cognitive control in anosognosia are general or specific. To test that we used a task where three different conflicting situations were orthogonally manipulated, which allowed us to independently measure distractor filtering, Stroop and Simon interference effects, as well as monitoring abilities (i.e. post error slowing effect). Results showed that patients with anosognosia (N=11) revealed specific conflict resolution deficit compared to ABI patients without anosognosia (N=7) and a healthy control group (N=18). No differences across groups were found in selfregulation abilities. This pattern of results favours the view that anoasognosia is not related to a general cognitive control deficit but to specific subcomponents of it, and will be discussed in relation to recent models of anosognosia.

The present study has been previously submitted and accepted for its presentation in the APPE-SEPEX meeting 2020.

Diferencias en el Volumen de Materia Gris Cerebral entre conductores arriesgados y no arriesgados

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La vida cotidiana implica una constante toma de decisiones respecto a las acciones a realizar y algunas de estas decisiones pueden llevarnos a asumir ciertos riesgos. La conducción es un ejemplo de un escenario típico de asunción de riesgos en la vida diaria, donde las consecuencias más extremas son los accidentes mortales, que se estiman en 1,35 millones de muertes cada año (World Health Organization, 2018). Los sistemas cerebrales que están implicados en el proceso de toma de decisiones, muestran una interacción disfuncional ante la toma de decisiones de riesgo (Ferenczi et al., 2016). Sin embargo, aún falta mucho por conocer sobre las bases neuroanatómicas de la conducción arriesgada. Por ello, uno de nuestros objetivos es conocer si existen diferencias a nivel de estructura cerebral entre los conductores arriesgados y no arriesgados. En el estudio que se presenta, 91 participantes fueron divididos en función del nivel de riesgo ante situaciones de tráfico: No Arriesgados

(n=28) y Arriesgados (n=63). La clasificación de los conductores se realizó atendiendo a los patrones de conducción reales de los participantes (puntos perdidos del carnet de conducir, asistencia a cursos de recuperación de puntos, multas por infracción de las normas de tráfico y velocidad de conducción por encima del límite permitido). Todos los participantes completaron una sesión de Resonancia Magnética Estructural (MRI). Los resultados mostraron un menor volumen de materia gris en los conductores Arriesgados que en los No Arriesgados en la corteza Orbitofrontal (p= 0.006) y en la corteza prefrontal superior (p= 0.002) y medial (p=0.001). Estudios previos indican que estas áreas forman parte de las redes de control cognitivo y de procesamiento de incentivos (Aydogan 2021; Peters & Büchel, 2011; Xie et al., 2017). Estas redes actúan como un sistema neurobiológico dual que trabaja de manera interactiva para modular el proceso de toma de decisiones (Li et al., 2020). Por lo tanto, concluimos que los conductores Arriesgados presentan un patrón estructural cerebral diferente al de los conductores No Arriesgados en las redes de control cognitivo y recompensa cerebral. Atendiendo a la literatura previa (Baltruschat et al., 2020; Barkley-Levenson et al., 2018) nuestros resultados sugieren que las diferencias a nivel de estructura cerebral entre los conductores Arriesgados y No Arriesgados podrían estar relacionadas con una distribución de los recursos cognitivos también distinta, lo que se podría reflejar en un procesamiento de la información disfuncional y en una toma de decisiones desadaptativa en los conductores arriesgados.

Efficacy and safety of magnetic and direct current transcranial stimulation for the treatment of dysexecutive syndrome in patients with stroke. A systematic review

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Introduction: Dysexecutive syndrome, affecting working memory, inhibitory control and flexibility, is one of the most prevalent cognitive problems following a frontal lobe or basal ganglia stroke. In the recent years, new noninvasive neuromodulation strategies, including repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS), have been developed aiming to strengthen the conventional neurorehabilitation protocols for stroke patients.

Objectives: To review the efficacy and safety of rTMS and tDCS for improving executive functions in adults suffering from stroke.

Methods: Systematic review based on the PRISMA statement. A bibliographic search was carried out independently in different databases: PubMed, Scopus, CENTRAL and Web of Science, combining the terms "stroke", "prefrontal", " transcranial magnetic stimulation",“ TMS

","‟ direct current stimulation ","‟ tDCS ","‟ executive functions "and all the functions that compose them. A reviewer screened the studies, extracted the data, and evaluated the quality of the included studies using the PEDro scale.

Results: Sixteen studies were identified, of which 10 were randomized controlled clinical trials. Anodal 2mA stimulation with tDCS and high frequency rTMS stimulation over the left dorsolateral prefrontal cortex proved to be the most effective parameters for improving attention and working memory. Two studies evaluated the long-term outcomes, one of them finding a persistent positive rTMS effect on the executive functions four weeks after treatment. Only mild side effects, like itching or transient headache were reported. However, there was a great diversity in the topography of the included brain lesions, as well as different stimulation parameters and outcomes among the analyzed studies. Hence, more studies including a greater number of patients with a homogeneous clinical and radiological profile and longer follow up periods are needed within future research studies.

Conclusion: Despite the heterogeneity of the studied population and the results, both rTMS and tDCS are safe techniques that seem to improve executive functions in stroke patients.

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Esfuerzo cognitivo y comprensión lectora durante la lectura de textos en papel y en pantalla: Un estudio de EEG y movimientos oculares

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Introducción: Un reciente meta-análisis reveló resultados de comprensión significativamente más bajos para la lectura en pantalla en comparación con la lectura en papel, parece que especialmente cuando la tarea de lectura exige un mayor esfuerzo cognitivo. Se han sugerido dificultades de atención y concentración al leer en pantalla como una de las causas, pero faltan estudios que hayan abordado de forma objetiva estos factores. Por ello, la presente investigación compara la actividad atencional de los lectores, medida mediante un sistema de EEG y otro de seguimiento de movimientos oculares, entre la lectura en pantalla y en papel. Además, examina la interacción entre el efecto del medio y las demandas cognitivas de la tarea de lectura manipulando la dificultad de los textos.

Método: Una muestra de 41 estudiantes universitarios participó en un estudio experimental 2x2 en el que cada participante leyó cuatro textos expositivos con distinta dificultad (coherencia baja vs alta) y en distinto medio (papel vs pantalla de ordenador). Medimos la densidad de voltaje de las bandas EEG Alfa y Beta, el tiempo de fijación y número de fijaciones de los participantes mientras leían y su nivel de comprensión de los textos mediante 10 preguntas abiertas literales e inferenciales sobre su contenido. Además, se evaluó la habilidad de

comprensión de lectura, la capacidad de atención sostenida, la memoria verbal a corto plazo y los conocimientos previos de los participantes para controlar su posible influencia.

Resultados: Tras el análisis preliminar de una sub-muestra de 27 participantes, los resultados de los datos de EEG mostraron que la densidad de voltaje de las bandas Betaalta y Beta-baja fue significativamente menor durante la lectura en pantalla, indicando un mayor esfuerzo cognitivo y atencional en este medio que en papel, independientemente de la dificultad de los textos. Por otro lado, no existieron diferencias significativas en diversos indicadores de los movimientos oculares de los participantes entre las distintas condiciones experimentales. Por último, contrario a nuestras expectativas, tampoco aparecieron diferencias significativas entre dichas condiciones en los resultados de los participantes en las preguntas de comprensión.

Conclusiones: El incremento del componente atencional al leer en pantalla en comparación con el papel, en conjunción con la ausencia de diferencias significativas entre medios de lectura en la comprensión de los textos, podría indicar que los participantes compensaron las dificultades de leer en pantalla con un mayor esfuerzo cognitivo.

Evaluating the effect of an autogenic meditation training on attention and level of anxiety amongst children in school

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Objectives: Autogenic mediation training is a psychophysiological self-control procedure that can have many benefits on cognition, emotion regulation and mental health. The purpose of this study was to analyse the effect of autogenic meditation training on attention and anxiety in children.

Methods: Seventy children (mean age= 9.8 years; standard deviation= 1.1) were assigned randomly to three different groups: autogenic meditation training group, reading naturally group (active control) and passive control group. After twelve weeks, we examined the change in cognition and emotion. For assessing selective and sustained attention we used the d2 test, and for evaluating anxiety we used the state-trait anxiety inventory.

Results: We found significant differences in the standardised gains between the autogenic meditation group in comparison with the active and passive control groups in all four variables studied (selective attention, sustained attention, state anxiety and trait anxiety). Repeated measures ANOVAs revealed high effect sizes in all variables. For selective attention, state anxiety and trait anxiety, only the autogenic meditation group showed a significant difference between pre and post measures.

Conclusions: Overall, our data suggest that autogenic meditation training improves attention and reduces anxiety in children. These findings may open a new and exciting field of research on self-regulation; however, further studies should address the impact of autogenic meditation training on cognition and emotion regulation both in children and adults.

Expectations of reinforcement vs. instructions: how do they influence learning?

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Experimental studies on the Differential Outcomes Procedure (DOP) have shown how the expectation generated using specific reinforcement for each association to be learned produces a significant increase in learning compared to when other types of reinforcement procedures are used. Traditionally, human studies on DOP are accompanied by prior instructions, which are necessary for the correct development of the task. But are these instructions essential? The main objective of this study was to test whether the effect of differential outcomes would remain stable in the absence of instructions, using eye tracking as a recording measure in a matching task. The results showed significant differences in the number of regressions between the differential and non-differential conditions, regardless of whether instructions were used or not. This finding may be related to the implicit processes that are involved in DOP and strongly suggests that such procedure could be used as a therapeutic tool in populations that present difficulties in understanding complex instructions, such as patients with neurocognitive disorders.

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Keywords: Differential outcomes procedure; eye-tracking; learning

ForenPsy: un banco estandarizado de testimonios de testigos aplicable en Psicología Experimental y Forense

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A fin de poder disponer de estímulos controlados para poder llevar a cabo experimentos en un contexto que simula un juicio con jurado, hemos creado ForenPsy. Consiste en una batería de 45 testimonios de testigos acerca de tres supuestos criminales (homicidio, amenazas y allanamiento) para que puedan usarse en investigaciones experimentales relacionadas con

el ámbito forense. Cada uno de los 45 testimonios fueron presentados a un total de 60 participantes hispanohablantes para que lo juzgaran como exculpatorio o inculpatorio. Además, se les pidió que valoraran el grado de relevancia de cada testimonio como determinante del juicio emitido usando una escala de 1 a 5. Para cada testimonio, recopilamos los porcentajes de los participantes que emitieron el juicio que concordaba con la clasificación pretendida por los experimentadores (exculpatorio o inculpatorio) y la puntuación media de la escala sobre la relevancia de ese testimonio. El 83% de los participantes (*DT* = 13,04) juzgaron los testimonios según la clasificación pretendida por los experimentadores, y el grado de relevancia fue valorado con una puntuación media de 2.86 (*DT* = 0,42). Adicionalmente observamos que ni el tipo de supuesto criminal (homicidio, amenazas y allanamiento) ni el tipo de juicio (exculpatorio o inculpatorio) influyeron significativamente sobre el porcentaje de participantes que emitieron el juicio concordante con lo pretendido, ni sobre la puntuación de relevancia de los testimonios. Los investigadores podrían usar este banco de testimonios para llevar a cabo experimentos simulando un contexto judicial.

Gender differences in STEM disciplines: performance analysis, strategies and visuospatial experience in Biomedical Engineering students

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Some research carried out in recent decades has shown that spatial reasoning predicts success in areas related to STEM disciplines (Science, Technology, Engineering and Mathematics). It is common to find a low proportion of women in university degrees related to these disciplines, and this has been linked to a lower performance of spatial abilities of this gender, compared to men. The aim of this study is to evaluate possible gender differences and correlations among spatial skills of mental rotation (MR) and perspective-taking, and previous experience, strategies and self-confidence in some spatial activities, in university students of a STEM degree, Biomedical Engineering. The results showed that males outperformance females in some spatial tasks that evaluate performance, previous experience and self-confidence, as well as significant correlations among these variables. Together, this study shows new findings on spatial performance, spatial strategies and factors based on experience and spatial meta-cognition to better understand the preference of university students towards the choice of a STEM university degree.

Keywords: STEM and spatial skills, Gender differences, Spatial experience, Self-confidence, Strategies.

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General involvement of motor simulation during task preparation

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Humans display a remarkable skill to translate novel instructions into adaptive behavior. In order to do so, instructed content needs to be transformed from a declarative into an action-based –or procedural– format, enabling efficient performance in novel scenarios [1]. While previous behavioral and neuroimaging research has focused on the procedural instructions representations, the cognitive mechanisms mediating the transformation itself are unknown to date. Here we addressed a candidate mechanism: the simulation of upcoming instructed tasks. Covertly pre-activating the task-relevant actions representations [2] could mediate the procedural assembly of novel task-sets. To assess this possibility, we carried out four online experiments in which we blocked motor simulation, and assessed its impact on novel task performance.

We developed a dual-task paradigm in which novel S-R mappings where encoded and prepared while participants performed a finger-tapping task. The mappings were later implemented upon a target stimulus. Critically, we manipulated the overlap between the response sets required by novel mappings and the finger-tapping. In the overlapping condition, the action representations required for task simulation would be already loaded by the motor task, and thus, less available. We hypothesized a disruption of mapping implementation in this overlapping condition, in comparison with non-overlapping trials. Congruent with our prediction, we found a robust overlapping effect on response speed and accuracy across three experiments. To further qualify this finding, we manipulated the preparation demands (Exp.2) and mapping novelty (Exp.3) Contrary with our expectations, we found that the overlapping effect was equivalent across task contexts: under high and low preparation demands, and for novel and practiced S-R mappings. Finally, we ruled out that the effect was generated by negative priming or motor adaptation (Exp.4).

Overall, our results emphasize that task setting requires from the availability of the relevant response representations, suggesting that preparation may rely on motor simulation. This involvement, however, seems to be rather general – and not linked to task novelty. While future studies are needed to identify the processes scaffolding novel task proceduralization, our findings are relevant for broader models of proactive control, stressing the participation of the motor system during the preparation for variable, demanding task contexts.

1. Brass, M., Liefooghe, B., Braem, S., & De Houwer, J. (2017). Following new task instructions: Evidence for a dissociation between knowing and doing. Neuroscience & Biobehavioral Reviews, 81, 16–28.

2. Jeannerod, M. (2001). Neural simulation of action: A unifying mechanism for motor cognition. NeuroImage, 14(1), S103–S109

Grasping objects using a vibrotactile sensory substitution glove

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Grasping is an essential action for our daily activities. This function required visual-manual coordination as suggested by the Visuomotor Channels model (Jeannerod, 1984). This model claims that prehension is composed of two different phases: 1) reaching phase: moving the hand towards the object; 2) grasping phase: open the hand to grab the object. The model establishes that the maximum hand aperture is scaled to the size of the object but it is independent of its initial distance. However, people with visual impairment do not have information on the size and spatial position of an object that is not in direct contact with the body surface.

In this study, we present a new vibrotactile sensory substitution glove that informs about the objects in the peripersonal space using vibrotactile stimulation. When the user points to an object with the index or thumb finger, its motor vibrates as a function of the distance of the object. The lower the distance, the higher the vibration. Moreover, the size of the object can be detected by scanning its edges, using the on-off information.

We carried out a classic grasping experiment in which 48 blindfolded participants were asked to grasp cylindrical objects using only our device. We manipulated the following within-group conditions: 1) size of the object: 2.5 or 3.5 cm of radius; 2) distance: 20 or 30 cm of distance; 3) location: four polar positions from 90º to 150º in steps of 20º (counter clockwise). During the experiments we observed that blindfolded grasping, demands for an initial exploration phase to detect the relative location of the target besides the reaching and grasping phases

Results showed that accuracy was a function of the size of the object, being the smaller object more difficult to grasp. As happened with visual control, the maximum aperture of the hand was scaled to the size of the object but, it was larger for the leftmost deviated condition (150º). Participants performed a small number but larger oscillations during the exploration phase. Whereas it was the opposite for the reaching phase. Finally, once participants detected that they were close enough to the object, they started the grasping behaviour. Our results showed that our device allows the detection and the grasping, showing communalities, such as the

maximum aperture, and differences, like the exploration phase and the reaching oscillations, to visual controlled grasping.

Health-Related Information Sampling and Causal Estimations

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Previous research has shown that information selection itself may promote the development of erroneous beliefs even if the information collected along the process does not support them. We conducted a laboratory-based experiment to assess the potential effects of information searching strategies on causal inferences about health while controlling for the effect of additional features of this information. Participants were required to gather information to find out whether a fictitious drug caused an allergic reaction. Although participants could select which type of information they wanted to check, they all received similar evidence that eventually pointed toward the absence of a causal link between the drug and the reaction. Results showed that participants used different strategies for collecting information, and that some of these strategies may produce an overrepresentation of certain pieces of evidence modulating the accuracy of causal inferences. These results show that people's autonomy for gathering health information may contribute to the development of false beliefs from actually accurate pieces of information.

Influencia del Sexo y del Ciclo Menstrual sobre el procesamiento Global-Local

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El efecto de las hormonas sexuales sobre el procesamiento global-local (paradigma Navon) ha sido poco investigado y los resultados obtenidos poco consistentes. En el estudio presente se examina el efecto de ventaja global (VG), computado como "precisión durante los ensayos globales *menos* precisión durante los ensayos locales", en mujeres con un ciclo menstrual natural que realizan la tarea durante la fase folicular temprana con niveles reducidos de hormonas sexuales; ovulatoria con niveles elevados de estradiol y lútea media, con niveles elevados de estradiol y progesterona así como en hombres, con niveles elevados de testosterona. Se manipula el nivel de procesamiento (global-local); la congruencia entre los estímulos jerárquicos (congruente, incongruente) y el paradigma atencional (selectivo, dividido). Los resultados muestran que los niveles de estradiol y progesterona correlacionan negativamente con la VG y que el grupo lúteo tiene una menor VG que el grupo de hombres durante la condición más demandante cognitivamente (divididaincongruente). Estos

resultados son compatibles con los estudios que sugieren que los hombres procesan la información de un modo más global y las mujeres de forma más local, así como con aquellos que sugieren que la flexibilidad cognitiva de la mujer, especialmente durante la fase lútea del ciclo menstrual, es superior a la de los hombres. Asimismo, permiten explicar resultados aparentemente contradictorios observados por otros autores, sugiriendo que el sexo y el ciclo menstrual pueden ser fuentes de variabilidad en los estudios con la tarea global-local.

Insights into the Memory Benefit of Experiencing Errors

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People usually avoid making errors, especially when being tested. However, errors are inevitable and furthermore, they can be a source of learning. In this regard, scientific evidence has shown that experiencing errors during learning, if corrective feedback is given, enhances later correct recall. This is referred as the *Learning from Errors* effect. However, little is known about specific conditions and underlying mechanisms that sustain this memory benefit of experiencing errors. In this sense, several theories have been proposed to explain this effect. The present study aimed to investigate these theories considering two questions: if the pre-existing semantic relationship of the study-material is needed, and if the recovery of the previous error at the final test is mandatory in order to produce the memory benefit. In Experiment 1, we manipulated semantic relationship by presenting a mixture of strongly and weakly semantically related word-pairs based on forward association strength. The experimental procedure included a study session of word-pairs (e.g., "*taste – mouth*"), an initial cued-recall test (e.g., "*taste – ?*") followed by corrective feedback (e.g., "*taste – mouth*"), an intermediate distracting task, a final cued-recall test (e.g., "*taste – ?*"), and final questions about implicit error recovery (e.g., "*Did another word came to mind? Which word?*"). Then, final test performance was compared based on the learning experience (errors versus correct answer). Experiment 2 followed the same procedure, but with two groups of participants: one group studied semantically-related word-pairs, and the other group unrelated word-pairs. Our results showed that the experience of generating errors, compared with giving a correct answer, enhanced correct recall on the final test, which reflects the *Learning from Errors* effect. This effect was especially evident with weak semantically-related (Experiment 1) and unrelated word-pairs (Experiment 2). Furthermore, correct answers with a previous error-experience were not accompanied by the error recovery at final test and they required longer reaction times. Thus, neither semantic nor the error recovery assumptions are satisfied in our experiments. This suggests the *Error Prediction* theory as the best candidate for explaining the *Learning from Errors* effect. Then, as this theory predicts, it is likely that the mismatch between the erroneous response and the actual correct answer enhances attention, which would improve the encoding of the corrective feedback, and thus, the later correct recall. This research brings us closer to a deeper understanding of the underlying mechanisms involved in the memory benefit of experiencing errors, which are probably relying on increased attentional resources.

Learning to suppress a distractor is not implicit

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The additional singleton task has become a popular experimental paradigm to explore how statistical learning shapes biases in selective attention. In this task, participants are instructed to find as fast as possible a figure with a distinctive shape among a series of distractors (e.g., a diamond between circles or vice-versa). In some trials, a non-target stimulus with a different colour is also presented in the search display, making search significantly harder. This singleton distractor appears more often in one location (the high probability location) than in all the remaining locations (the low probability locations). Recent literature suggests that participants learn to suppress the area of the screen that is more likely to contain the singleton distractor, making their response more efficient. This learning has been understood as the outcome of implícit learning, as tests of awareness conducted after the visual search task reveal little evidence of explicit knowledge. However, recent meta-analytical evidence suggests that the typical measures of awareness are not sensitive enough to detect explicit knowledge. In the present study we test three alternative measures of awareness in three large-scale experiments. Our results show clear evidence of explicit knowledge about which area of the display was more likely to contain the singleton distractor, suggesting that this type of statistical learning may not be an automatic, implicit process.

Mathematical abilities in children: an sMRI analysis with radiomics

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Brain areas related to mathematical abilities in children have been mainly assessed through their activation in fMRI, while volume-based analysis have been employed in sMRI to discover structural differences. However, a recent technique in precision medicine allows to enhance the sMRI analysis by extracting a large number of features, also called radiomics, related to shape, intensity and texture from specific areas. In the present study, a structural neuroimaging analysis based on radiomics and machine learning models is presented with the aim of identifying brain areas related to different mathematical tests. A total of 77 school-aged children from third to sixth grade were administered four mathematical tests: Math Fluency, Calculation, Applied Problems and Concepts as well as a structural brain imaging scan. The

results confirmed and extended the involvement of brain areas found in sMRI and fMRI literature such as the frontal, parietal and temporal cortex, as well as basal ganglia and limbic system areas. For these areas, texture features were the most informative while volume represented less than 15\% of the shape information. These findings emphasize the potential of radiomics for a more in-depth analysis of medical images for the identification of brain areas related to mathematical performance.

Myths in Psychology: Misconceptions among psychology students in Spain

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Given the pervasiveness of psychology in people's lives -people, whether psychologists or not, behave – it is to be expected that there will be inaccurate beliefs about how human behaviour works in people before they begin formal training in Psychology, as is the case at university. Myths in Psychology are beliefs that are inconsistent with the empirical evidence available in this field of knowledge. Previous literature shows that myths are relatively stable, resistant to change and prevalent in the non-academic population, as well as in students and professionals in this discipline. This work aims to examine the prevalence of certain myths in psychology students from two Spanish universities (UAM and UNED) and the influence of two variables: the academic course and the familiarity with scientific dissemination.

We developed a questionnaire composed of a 74-item Likert scale based on Gardner & Brown (2013) to measure the confidence that students have in several psychological misconceptions. Also, we collected demographic data, such as academic course and the consult of scientific dissemination. Results showed, overall, a low ratio of belief in misconceptions, a decline of them in the last courses and when scientific material is consumed, although all of these benefits are limited. Besides, an interaction between university and academic year was found. In general, psychology students at UAM belief less in myths than those at UNED, but the latter benefits more from formal education.

These results are an interesting tool for teachers to discriminate which myths are most widespread and focus on them in class until they disappear and be replaced by ideas more adjusted to empirical evidence. Furthermore, tentative explanations of this phenomenon are explored.

PicPsy: A picture bank with norms for research and assessment with Spanish-speaking children and adults

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Picture naming is a common task in psychoeducational assessment, intervention, and research. An important line of research in picture naming is normative studies. They have provided well-controlled stimuli by and offer information on the variables that influence naming performance. Traditionally, normative studies used line drawings, but recently the use of photographs has progressively increased. However, to the best of our knowledge, no standardized set of photographs and pictures with norms for Spanish-speaking children has yet been published. For this reason, we present PicPsy, a new bank with 106 concepts represented both as photographs and as matched line drawings with norms for children and adults. A total of 118 children (aged 7 to 10) and 89 adults participated in the study. All of them were native Spanish-speakers. They were asked to give a name for each picture of the PicPsy bank in one of the two formats, line drawing or photograph. In addition, they completed a familiarity-rating task and a visual complexity task. We provide norms for each age group (children and adults) and each type of stimulus (photographs and line drawings). Name agreement measures were high (81% and 87% modal naming for children and adults, respectively) and the performance of both groups were highly correlated. However, significant differences were also found between children and adults on the variables examined in both formats. Practitioners and researchers in psychology and education could take advantage of using PicPsy, which is published under public domain license, for assessment and research purposes. Materials and norms are available at https://osf.io/nyf3t/.

Previous fixations do not facilitate search when a distractor becomes a target

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Our day-to-day experience suggests that, with repeated exposure, we can easily acquire information about our environment. However, it is not clear what type of exposure is needed for information to be useful for task performance. In simple visual search tasks, repetition of spatial context reduces RTs when the context is predictive of target location (Contextual Cueing: Chun & Jiang, 1998). However, facilitation of visual search does not occur in all paradigms in which the context is repeated. In a previous study, we found that searching for different targets in the same set of 72 items did not facilitate search for other items within the same set. In this study, we analyzed whether this was still the case when all targets shared one feature (color). In each trial, a target letter was presented at fixation, followed by the search display. The search display was made of 72 colored letters (12 letters x 6 colors) and was the same for all searches (repeated visual search). Twelve different orange letters were used as targets. Location was constant for each target, but targets differed in eccentricity. Each target

was searched for 6 times. We compared the results of two groups of participants. For the first group all 12 letters were targets in each block of trials. For the second group one of the letters, 'W', became a target only in the last two blocks of trials. Our goal was to determine if previous fixations on this letter while searching for other letters of the same color facilitated search. Results showed that RT and number of fixations decreased significantly with target repetition for all letters. Critically, when we compared RTs and number of fixations for the first search of the letter 'W' we found that they were similar in both groups. This was the case even though the second group of participants had performed 55 trials before searching for the 'W' and had made, on average, 8 fixations on that letter during those trials. This suggests that just fixating an element when it is not a target is not enough to produce a memory trace. Facilitation requires repeatedly searching for that specific item.

Semantic priming and interference in analogical reasoning

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Previous studies have demonstrated that analogical reasoning can be facilitated by priming based on semantic relations. However, there is more controversy on whether the implicit presentation of a relation is sufficient to cause facilitation in a later analogical relation is sufficient to cause facilitation in a later analogical reasoning task. In the present research, we explore possible constraints on the processes involved in accessing relevant information during analogical reasoning. We used a priming paradigm to produce facilitation or interference during the mapping phase of subsequent analogical reasoning problems. In Experiment 1, we tested whether merely having participants read prime pairs of words that exhibited an implicit semantic relation (e.g. squirrel-nuts, for the relation "eats") would impact performance on subsequent analogies involving the same of different type of relation or non-related word pairs (e.g. *same-relation*, squirrel:acorns.:bird:?; *different-relation*, squirrel:tre::birg:?;). Participants showed no relational priming on analogical reasoning. Nevertheless, different-relation pairs generated interference relative to baseline but only in participants who were not aware of the relationship between the two tasks. Because in Experiment 1 we failed to obtain implicit analogical priming effects, in Experiment 2 we called participants' attention to the primes by asking them to study the prime pairs and then administrating a cued-recall test with feedback prior to solving the analogies. We found neither analogical facilitation nor interference effects regardless of whether participants noticed 8or not9 that both tasks were related. Overall, we failed to observe analogical priming in both experiments, presumably because participants were not explicitly instructed to take note of the relation between the words in each pair. However, we did find analogical interference even when participants were not aware that a previously encountered relation could have guided their resolution to a subsequent analogical reasoning task.

Sign-tracking in humans correlates with US devaluation and outcomespecific Pavlovian-to-instrumental transfer (PIT)

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The phenomenon of sign-tracking in rodents, in which the conditioned response is primarily directed to the CS itself, has been attributed to the CS acquiring excessive motivational significance or "incentive salience". It has also been linked to elevated cFOS levels in the OFC, a region implicated in expectancy-mediated behaviors such as US-devaluation and Pavlovian-to-instrumental transfer (PIT) (Delamater & Oakeshott, 2007; see also Derman et al., 2018). In the present study with human participants we made use of a differential Pavlovian conditioning task (CS+, CS-) and measured eye-tracking activity both in the location of the CSs and in that of the outcome. We classified participants as signor goal-trackers according to the following index for dwell time: [(Sign – Goal)/(Sign + Goal)]. When using the sign-tracking index for the CS+ compared to the CS control [(CS+ index) – (CS- index)], we found significant positive correlations with both US-devaluation and outcome-specific PIT effects in a subsequent instrumental task. These results suggest that sign-tracking in this procedure, as for rodents, may be a flexible, expectancy-mediated, behavior.

Sounds changing in pitch interact with proprioception when paired with body movement, affecting motor behaviour and bodily feelings

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Mental body-representations are highly malleable and can be altered by sensory inputs, with consequences to body feelings and behaviour. Little is known about auditory contributions to body-representations. Recently we reported that sounds changing in pitch can induce illusions of finger elongation if arbitrarily paired with bodily contact. At the basis of this "Auditory Pinocchio" illusion is the capacity of dynamic changes in pitch to elicit impressions of motion along the vertical plane. In this study we investigated whether sounds changing in pitch interact with proprioception when paired with body movement, as well as the related effects in movement and bodily feelings. In Experiment 1 participants (N=25) with closed eyes were asked to lift their arm laterally 70 or 120 degrees, while presented with brief sounds with ascending (700-1200Hz), descending (700-200Hz), or constant (700Hz) frequency. In Experiment 2 (N=25) two different sounds (pure tone, note) in their ascending and descending versions

were compared. We quantified changes on lateral movements using sensor data and collected self-reports on bodily feelings and confidence in reaching the target positions. Results showed that changing pitch sounds made participants feel more uncertain about their hand position than constant sounds, and also led to changes in feelings of bodily weight, capability, movement control, speed, and difficulty. Both pure tone and note made people feel lighter, faster, and ease the movement in the ascending vs descending version, leading to higher acceleration. However, the note showed differences between its ascending and descending versions in feelings of tiredness, comfort, motivation, and capability to do the exercise, but the tone showed higher velocity movement. These results provide the first evidence that changing pitch sounds interact with proprioception when paired with body movement. The observed effects in movement and body feelings open opportunities for sports and physical rehabilitation.

Regulación emocional y funciones ejecutivas en el Trastorno por Déficit de Atención e Hiperactividad (TDAH)

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Introducción. La afectación de las Funciones Ejecutivas (FE) en el trastorno por déficit de atención e hiperactividad ha sido ampliamente investigada. Sin embargo, solo más recientemente, la relación entre las FE y la Regulación Emocional (RE) en el TDAH se ha convertido en un foco de especial interés.

Objetivo. El objetivo principal de este trabajo es intentar identificar la relación entre los déficits en funciones ejecutivas y los problemas de regulación emocional en personas diagnosticadas con TDHA.

Método. Se lanzó una búsqueda de la literatura científica en las bases de datos MEDLINE, Academic Search Ultimate, APA PsycArticles, APA PsycInfo, PSICODOC, ERIC, Scopus y WOS, siguiendo los principios del modelo PRISMA. Los criterios de inclusión fueron: (a) diagnóstico de TDAH según los criterios DSM-IV, DSM-V o CIE-10, (b) aplicación de alguna escala conductual de FE en la vida diaria y/o de tareas neuropsicológicas de FE, (c) registro de medidas de regulación emocional, (d) ser un trabajo empírico y (e) estar redactado en inglés o español. Resultados. Los datos preliminares parecen reflejar la existencia de diferencias significativas entre los grupos TDAH y control.

Respecto a la RE, en el análisis de medidas que puntúan en la misma dirección (a mayor puntuación, peor funcionamiento emocional) se observa una d de Cohen de 1.62 (IC 95%: 1.30, 1.93). La ausencia del valor 0 en los intervalos de confianza confirman la significación estadística. En cuanto a las medidas de FE, se observa un tamaño del efecto d = 0.59 (IC 95%:

0.07, 1.10). De nuevo, el IC no incluye el valor 0. Asimismo, se analizó la correlación existente entre las puntuaciones de RE y de FE y se procedió al establecimiento de un modelo predictivo mediante regresión lineal.

Conclusiones. La identificación del tipo de relación existente entre FE y RE permitirá realizar una evaluación comprehensiva del caso, apoyando la toma de decisiones diagnósticas y la puesta en marcha de intervenciones adaptadas a la persona afectada en función de su perfil cognitivo.

Successful Grammar learning in an incidental context: The modulatory effect of Individual differences

Marta Rivera, Daniela Paolieri, Ana Pérez & Teresa Bajo

The acquisition of grammatical regularities in a new language is guided by the procedural memory system, especially during complex learning situations (Declarative/procedural model; Ullman, 2004). However, differences in executive functioning (EF) have also been proposed as sources of variability in successful acquisition of grammatical rules. The purpose of this study was to establish the implication of individual differences in EFs during intentional and incidental grammatical rules learning. A total of 247 Spanish monolingual speakers participated in this experiment using an online platform for behavioural experiments. Using a within-subjects procedure, participants learnt two different grammatical rules (complex context) in English by reading grammatically correct sentences and answering comprehension questions (incidental context) or by explicitly learning the rule, reading grammatically correct sentences and answering metalinguistics questions about them (intentional context). After learning each rule, participants performed a Grammatical Judgment Test (GJT) where studied, new-grammatical and new-ungrammatical sentences were presented and judged as correct/incorrect. The test was run immediately, 24-hours and 1-week after learning. Discrimination scores (d') in the GJT were calculated between studied and new-ungrammatical sentences (*recognition d'*) and between new-grammatical and newungrammatical sentences (*generalization d'*). Additionally, participants performed the AX-CPT and Global-Local tasks to capture individual differences in EFs. A Linear Mixed-Effect model analysis indicated that participants in the intentional context showed better discrimination between studied and new-ungrammatical sentences (*recognition d')* and between newgrammatical and new-ungrammatical sentences (*generalization d'*) than when they did so in the Incidental context condition. More importantly, a more balanced profile between proactivity and reactivity predicted the *generalization d'* score in the Incidental learning context. Thus, in a complex grammatical context of learning, individual differences seem to drive learning success in L2 incidental learning.

Keywords: Second Language Learning, Individual Differences, Learning Context.

Task difficulty and differential outcomes effect: an eye movement analysis

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Previous studies have shown that when differential outcomes follow correct responses to each association to be learned, performance is significantly better (differential outcomes effect; DOE) than when stimuli are matched randomly. These studies have reported a modulation of the DOE by task difficulty. In particular, when the task is very simple the effect is not observed, and it is only found with accuracy data when a more difficult task is used. In this study we aimed to explore whether this modulation corresponded to a specific pattern of eye movements. For this purpose, we designed a matching-to-sample task with two levels of difficulty (easy vs. difficult) under conditions in which outcomes were randomized (non-differential) compared with conditions in which each sample stimulus was always paired with a specific outcome (differential). The results showed significant differences in the number of regressions between the differential and non-differential conditions, but only in the difficult version of the task. This finding adds new information about the physiological processes involved in the DOE and suggests the existence of eye movement measures that are sensitive to the way in which outcomes are administered. In addition, our results along with those obtained in behavioral experiments, also suggest that task difficulty is an important variable to consider when this procedure is used in humans.

The cognate effect in word writing: evidence from late bilinguals and heritage speakers

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Cognates are words that share the same meaning and overlap phonologically/ orthographically between languages. Words such as hospital and oxygen are examples of English-Spanish cognates. Crucially, bilinguals process cognates faster than no cognates during word production. In this study, we investigated the cognate effect during written production by English-Spanish Late Bilinguals (LB) and Heritage Speakers (HS). We used a dictation-to-writing task in either L1 or L2 where the first-key presses and the rest of the word writing were considered as indices of lexical and sublexical processing. Overall, the results showed that for the first key latency, the difference between L1 and L2 was greater in the LB than in the HS group. In addition, we observed slower first key presses for cognates with respect to non-cognates words, but only in L1. On the contrary, in the rest of the word writing, the difference between L1 and L2 was greater and the cognate effect was stronger for the HS than the LB group. Interestingly, the writing of cognate words was significantly faster than the writing

of non-cognate words, but only in L2. The results evidenced non-selective coactivation of the bilinguals' two languages during word writing, suggesting that both lexical and sublexical processing are sensible to the degree of formal similarity. Moreover, group differences are explained in association with different degrees of reading/writing and production/ comprehension competences of the two groups.

The role of episodic retrieval in the item-specific proportion congruent effect

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The item-specific proportion congruent effect (ISPCE) refers to the finding that the Stroop effect is larger for words which are most often paired with their congruent color than for those which are most frequently paired with an incongruent color. This effect challenged Botvinick et al.'s (2001) conflict monitoring theory, and it has been tentatively explained in terms of contingency learning rather than in terms of cognitive control adaptation (Schmidt & Besner, 2008). Moreover, Giesen et al. (2020) have recently reported that contingency learning could be driven by episodic retrieval, as it would involve retrieving the same response emitted the last time the participant was faced with the same distracter word.

We analyzed whether contingency learning and episodic retrieval of the last episode involving the same distracter contributed independently to the ISPCE in the context of a four-choice Stroop task. ISPCE was manipulated by pairing two of the words most frequently with their congruent response, and the remaining words with one incongruent response. The distribution of trials was carefully crafted to include all possible combinations between high and low contingency trials and the presence vs. absence of the episodic benefit derived from requiring the same response than the last prior appearance of the distracter.

Experiment 1 showed the typical ISPC effect, but it also showed that the effect of contingency learning was completely accounted for by the effect of episodic retrieval. Moreover, a specific analysis of the distance with respect to the previous relevant episode indicated that this episodic effect was effective exclusively when the same episode was repeated on two successive trials. Experiment 2 explored whether contingency learning effects could be better expressed when the distracter appeared slightly before the target, but we obtained a similar pattern: We replicated the ISPCE, and showed that contingency learning effects could be explained in terms of episodic retrieval but, interestingly, in this case the episodic effect survived at longer distances, producing more efficient responses whenever the last occurrence of the distracter required the same response. The results support an episodic account of the contingency learning effects observed in this context and suggest that such memory effects may be largely responsible of the ISPCE.

The role of selection history in predictiveness-driven attentional biases

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Prior research has shown that stimuli that are good predictors of their consequences in an associative learning training phase receive more attention than poor predictors in a subsequent test phase—where all stimuli are equally predictive. This attentional bias has been called predictiveness-driven attentional bias, because is usually attributed to the differences in the predictive value of the stimulus. Alternatively, this effect might be just the consequence of different *selection histories* for each stimulus; that is, differences in the number of times that the stimuli have received attention during training. Note that a stimulus that is a good predictor in a learning task must be attended in order to solve the task; this attentional deployment could carry over to any posterior test phase. This experiment assessed and compared these two possible explanations for the (until now called) predictiveness-driven attentional bias. Along the experiment, participants were presented with pairs of colored circles. In one of the training tasks, only one color in each pair predicted which was the correct response; the other color was irrelevant in this respect. In another task, participants were required to simply select the stimulus of the pair that had a certain color. Thus, both predictive and selected colors were relevant during training, but only the formers were so because of their predictive value. Attention towards stimuli was then measured with a dot-probe task. Results showed that participants were faster at responding to the probe when it was presented over a previously predictive/selected stimulus than over a nonpredictive/non-selected one. Remarkably, the impact of these two sources of attentional bias on reaction times (RTs) did not differ; RTs were reduced to the same extent when the probe was presented over a relevant stimulus vs. an irrelevant one, regardless of whether such relevance came from its predictive value or its greater history of selection. These results suggest that the predictive value of the stimuli and their prior history of selection affect attention in a similar manner, raising the possibility that the predictiveness-driven attentional bias is simply a consequence of a higher number of previous selections for predictive stimuli.

Associative priming in second language learners: Does word knowledge have an effect?

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In the current work we report two experiments investigating associative priming in the first language (L1) and the second language (L2) as a function of associative strength. Experiment 1 examined whether our materials produced the standard priming effect in the L1. For that purpose, one hundred native Spanish speakers who were undergraduate students participated in a lexical decision task. In this task, prime-target associative strength (i.e., strong,

weak, and non-associated pairs) was manipulated. In particular, participants were presented with 160 prime-target pairs (80 word-word pairs and 80 word-nonword pairs) in Spanish (i.e., L1). Regarding the 80 word-word pairs, participants responded to 20 targets preceded by a strong associate (e.g., cielo-AZUL), 20 by a weak associate (e.g., abrazo-BESO), and 40 by a non-associated word (e.g., gafas-CAMA). As expected, priming effects in L1 were obtained in both the strong and weak pairs. In Experiment 2, we aimed to, first, examine associative priming in the L2 as a function of associative strength and, second, to investigate whether L2-word knowledge influenced the priming effect. To achieve these goals, one hundred participants from the same population as in Experiment 1 were tested. All participants have learned English as an L2 and self-rated their proficiency as moderate (*M* =6.12) on a scale from 1 (elementary knowledge) to 10 (native speaker proficiency). Participants performed a lexical decision task like the one in Experiment 1, but with English (i.e., L2) words selected from English free association norms. Moreover, L2 to L1 translation was assessed to determine participants L2-word knowledge. Results showed that, first, priming effect in L2 was only significant for the strong pairs; and, second, although L2-word knowledge was far from perfect, leaving open the possibility that some of the priming effect differences between strong and weak pairs could be explain by word knowledge instead of associative strength, we found no significant differences in word knowledge between the strong and weak pairs. Furthermore, participants knew a greater proportion of unrelated than related (both strong and weak) pairs, but this difference did not modify our conclusions regarding the priming effect. Overall, these data suggest that spreading activation occurred not only in the first language, but also in the second language, even in L2 learners. Interestingly, in the latter case, spreading activation only occurred when there was a strong association between concepts and this effect does not seem to be due to L2-word knowledge.

Causal illusion in the core of pseudoscientific beliefs: the role of information interpretation (but not information search) strategies

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There is a high prevalence of pseudoscientific beliefs in our social context, negatively influencing areas of great relevance such as health or education. Causal illusions have been proposed as a possible cognitive basis for the development of such beliefs. A previous study found that people who are more prone to profess pseudoscientific beliefs also tend to develop more intense causal illusions in the laboratory tasks. The first aim of our study was to further investigate the specific nature of the bias mediating the association between causal illusion and pseudoscientific beliefs through an active contingency detection task. In this task, volunteers are given the opportunity to manipulate the presence or absence of a potential cause in order to explore its possible influence over the outcome. Responses provided in active contingency detection tasks are assumed to reflect both the participants' information

interpretation strategies as well as their information search strategies. A previous study showed that the correlation between paranormal beliefs and causal illusion was mediated by the proportion of trials in which the participants decided to administer the potential cause, concluding that the way in which people search for information could mediate the development of paranormal beliefs. Thus, we expected that the information search strategy would mediate the association between causal illusion and pseudoscientific beliefs. Our results revealed that volunteers with higher pseudoscientific beliefs also developed stronger causal illusions in an active contingency detection task. Also, the participants tended to use a confirmatory search strategy, a spontaneous tendency to test the relationship between two events mainly observing cases in which the potential cause is present. Nevertheless, the volunteers' search strategy seemed not to influence their tendency to endorse unwarranted beliefs.

Keywords: causal illusion, pseudoscience, paranormal beliefs, contingency task, information search strategy.

Diseases that resolve spontaneously can make you think that an ineffective treatment works

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Certain diseases, such as common cold, are known to resolve without treatment or intervention. From the patient's viewpoint, this amounts to experiencing an improvement in the symptoms over time (i.e., a progressive increase in the probability of feeling well). Contingency learning experiments have shown that, when the probability of an event is high, there is a chance of overestimating the causal effects, even leading to illusions of causality (i.e., believing that a causal relationship exists when there is none). Thus, we investigate whether diseases that resolve spontaneously and show the mentioned pattern of gradual improvement could be particularly prone to produce illusions of causality. Experiments 1 and 2 show that a completely ineffective treatment is judged as more effective when the disease improves over time than when improvements are scrambled through the session. Experiment 3 extends the finding to a situation in which the gradual improvement in health is observed before the treatment starts (and hence it cannot be causally attributed to the medicine), and still people overestimate its effectiveness. We conclude that diseases that resolve spontaneously can produce strong overestimations of effectiveness, at least for treatments that are completely ineffective. This has practical implications for preventative and primary health services.

Does repetitive motor action affect moral decision-making?

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Would you push someone to his death in order to save the life of several others? Do you think you would be affected in your decision by having been moving your hands? Previous studies suggest that moral decisions are mediated by the level of abstraction at which the content of a dilemma is represented. In this study, we evaluated if interfering with motor system activation can affect our morals by changing the abstraction level at which a dilemma is processed. Participants (*N*=70) repeatedly tapped with either their hands or their feet and then decided whether killing a person to save several others (utilitarian decision) or refusing to act (deontological decision). Actions were described by using hand (e.g., "push") or foot (e.g., "kick") verbs. Results showed that when the motor rhythm and the harmful action involved the same effector, the participants refrained from acting more often than when they involved different body parts. We suggest that the motor rhythms activate motor brain areas in a somatotopic manner, facilitating a more detailed simulation of the harmful act and thus, making less likely to carry it out. Irrelevant factors, like moving a body part, can affect our moral decisions. Moreover, this finding suggest that the motor system plays a causal role in moral cognition.

Dreams, are dreams... although we do not always remember them. Frequency and clarity of dream recall in a sample of Young adults

Mar Mediano, Mª José Contreras, Julia Mayas Arellano, Pedro R. Montoro

The study of dreams has been a topic of interest for centuries. Likewise, the function of dreaming has been a topic of debate and controversy from philosophy and psychoanalysis, to psychology and, more recently, the neurosciences. Apart from the advances made in the understanding of the processes that occur during sleep and its disorders, the generation of dreams while we sleep and how we remember them during wakefulness are still a mystery.

The main objective of this study was to evaluate whether the number of nocturnal awakenings influences the frequency of dream recall in a sample of 45 healthy young adults. In addition, the influence of other factors (i.e., anxiety trait, vividness of mental images, spatial visualization) over the level of clarity of dream memories was examined.

Self-report measures, questionnaires, and self-records were collected. Objective measures were also used through a biometric sleep smart bracelet, used for 14 consecutive nights. Each morning the researchers received a daily report provided by the smart bracelet as well as a self-report describing the dreams recalled and the responses to several predefined questions.

With this procedure, the following data were analyzed: 1) the correlation between the number of nocturnal awakenings, smart bracelet scores and daily number of dreams recalled; 2) if individual factors such as gender, visuospatial ability, the level of vividness of mental images or the level of anxiety (trait), are related to the average frequency of remembered dreams and 3) if certain selfreported variables such as the level of satisfaction of dreams, the involvement of family members in the dream stories or the emotions felt during them, are associated with the level of clarity of the memory of the dreams.

The results will be discussed with respect to previous studies on this topic.

Effects of the Medial Olivocochlear Reflex on the Psychoacoustical Tuning Curves

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A psychoacoustical tuning curve (PTC) is a plot of the threshold masker level required to just mask a fixed-level pure-tone signal (the probe) as a function of masker frequency. PTCs are thought to partly reflect the tuning of the cochlear site stimulated by the probe frequency. Cochlear tuning, however, can change with activation of the medial olivocochlear reflex (MOCR) and, therefore, PTCs can also change whenever the MOCR is active. In the present experiments, cochlear tuning at a basal site (at 4 kHz) and apical site (0.5 kHz) is studied without and with activation of the MOCR by ipsilateral, contralateral and bilateral sounds. To this end, PTCs for 0.5 and 4-kHz pure tone probes were measured in forward masking in the presence of a precursor white noise presented in the three aforementioned lateralities. The precursor was intended to activate the MOCR. An additional control condition with no precursor was included. Masker frequencies ranged from 0.5 to 1.2 times the probe frequency. Three methodological precautions were considered to select the stimuli: 1) the precursor was identical for all three activation conditions of the MOCR; 2) the sound pressure level of the precursor was set at 60 dB SPL because this level is capable of activating the MOCR with minimal activation of the middle ear muscle reflex; and 3) the masker duration was set at 30 ms to prevent the activation of the ipsilateral reflex by the masker itself. Four listeners with normal hearing participated in the experiments. Masker levels at threshold were estimated using a two-interval, two alternative forced-choice adaptive procedure. A rounded exponential function was fitted to the PTCs data to estimate the bandwidth of the underlying auditory filter. The results show no change at 0.5 kHz and a broadening at 4kHz of the PTC bandwidth in the presence of bilateral and ipsilateral precursors. PTCs were minimally affected by the contralateral precursor noise. The pattern of results seems to be consistent with an attenuation of the cochlear gain caused by MOCR. (Work supported by the Spanish Ministry Science and Innovation (grant PID2019-108985GB-I00 to EALP).

El cronotipo de las mujeres modula el efecto de la progesterona en tareas que requieren vigilancia y atención sostenida

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El cronotipo hace referencia a la preferencia que desarrollan los individuos para realizar sus actividades diarias y sus horas de descanso. Este rasgo, que permite clasificar a las personas en matutinas, vespertinas, o intermedias, junto con el momento del día, ha demostrado producir efectos sobre el rendimiento cognitivo. Concretamente, los individuos rinden de forma óptima cuando son evaluados en el momento del día que coincide con su preferencia. Este efecto es conocido como de sincronía, y ha sido vinculado previamente a tareas de vigilancia, atención sostenida e inhibición. Sin embargo, el efecto de sincronía también ha demostrado ser modulado por variables como el grado de automaticidad-control con el que se desarrolla la tarea, o la presencia de un tono. Esta modulación, que habitualmente se traduce en una mejora del rendimiento, parece detectarse en mayor medida en individuos de cronotipo matutino.

En este estudio, nuestro objetivo principal es también estudiar la modulación del efecto de sincronía, pero, en este caso, por variables biológicas como el ciclo menstrual. Este propósito surge de la interacción que ha sido previamente establecida entre ritmos circadianos y hormonas sexuales. Además, el ciclo menstrual también ha sido vinculado con procesos de atención sostenida y, aunque actualmente no existe consenso en el efecto general que producen las hormonas en la cognición, la mayor parte de resultados indican que la progesterona puede ampliar la capacidad atencional. Por estos motivos, resulta interesante profundizar en la relación entre ritmos circadianos (cronotipo)-ciclo menstrual (progesterona) y atención sostenida/vigilancia.

Para llevar a cabo el estudio, citamos a las mujeres en dos momentos concretos de su cicló menstrual: en su fase folicular (bajo nivel de progesterona) y en su fase lútea media (pico de progesterona), y acuden al laboratorio en horario de mañana y de tarde para completar dos tareas: el *Psychomotor Vigilance Task* (PVT) y el *Sustained Attention to Response Task* (SART).

Resultados preliminares muestran una modulación del efecto de sincronía cuya dirección coincide en ambas tareas: la progesterona produce una mejora del rendimiento de las participantes matutinas en su momento óptimo, es decir, por la mañana. Contrariamente, el rendimiento se deteriora en participantes vespertinas también en su momento óptimo. Este efecto podría atribuirse a la interacción entre cortisol (presente en horas de la mañana) y progesterona que de nuevo señala a las participantes matutinas como ejemplo de mejor adaptación y rendimiento.

Enhanced inhibitory control in high mindfulness trait

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A recent meta-analysis showed a reliable relationship between trait mindfulness and some executive functions, such as inhibition (Verhaeghen, 2020). Importantly, the studies that have addressed this issue have mainly chosen "inhibitory" tasks that measure interference control, such as the Stroop task. To date, only one study has explored the link between trait mindfulness and response inhibition in young adults. Noone, Bunting and Hogan (2016) found that the observing facet of mindfulness (as measured with the five facets mindfulness questionnaire; FFMQ) was related to better critical thinking with this association being mediated by enhanced inhibitory function (as measured with the go/no-go task). In our work, we aimed to further explore the relationship between trait mindfulness and inhibitory control by using the stop signal task (Verbruggen, Logan & Stevens, 2008), which provides a good estimate of the ability to cancel an already initiated motor response. In a standard stop signal task, participants are instructed to respond as fast as possible to a stimulus unless a stop signal is presented after a variable delay, with the manipulation of this delay allowing researchers to estimate the time that is necessary to stop an initiated response. We administered the FFMQ and the stop-signal task to hundred fourteen participants and found a negative association between the scores in the "acting with awareness" facet of mindfulness and the stop signal reaction time (r = -0.2), so that the higher the mindfulness score the better the ability to suppress motor responses. This finding conceptually replicates previous ones and confirms the link between dispositional mindfulness and inhibition in its different forms.

ERMENTAL: a simple web environment to design cognitive training experiments

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Abstract We are going to present the project for the implementation of an online platform (ERMENTAL), with Internet access, for the self-application of visuospatial (mental rotation and visuospatial memory) cognitive processes tasks, which will allow to demonstrate the effectiveness of training, analyzing individual (according to initial levels of ability) and group (gender differences, differences by academic branch) differences. In the present project, different configurations of the task will be discussed for the data collection with an experimental design that will detect the most effective configuration from the possibilities of the online platform (for example, number of trials with or without feedback, number of effective

sessions depending on the participant's initial level, etc.). This approach derives from the previous research of the authors about training of visuospatial skills, use of strategies, individual and gender differences. In addition, special attention has been devoted to relating the possibilities of training with the reduction of gender differences in the access to STEM (Science, Technology, Engineering, Mathematics) disciplines in Higher Education, where there is a lower number of women as reported by international studies.

Keywords: Visuospatial training, mental rotation, visuospatial working memory, online tasks, gender differences, access to STEM degrees, experimental analysis

Grammatical gender retrieval during bare noun recognition: Evidence on the activation of transparency routes

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The study of grammatical gender representation and processing during noun lexical access has raised great debates in regards of the mandatory character of agreement contexts for gender to be retrieved, and the role of morpho-phonology and gender values in gender encoding. Although results with Germanic languages suggest that agreement contexts are mandatory for the retrieval of gender, studies with Romance languages say otherwise. The latter have shown that gender competitive effects (masculine vs. feminine) are obtained with bare nouns during language production. The question remains as to whether the same competitive effects would be observed during bare noun recognition. Answering this question was the aim of the present study. To do this, a masked primed lexical decision task in which native speakers of European Portuguese (EP) had to classify chains of letters as nonwords or words was conducted. Each target noun could be either masculine or feminine and was primed by either a masculine or a feminine prime noun as well. The target transparency of both targets and primes was also manipulated, and they were either transparent or opaque. Although results failed to show a main gender facilitation effect between targets and primes, feminine nouns were faster named than masculine nouns, and transparent nouns were faster named than opaque nouns. Interestingly, effects of target transparency were observed in interaction with the gender values of the target nouns: masculine nouns benefited from being transparent, but feminine benefited from being opaque. Results are discussed on the light of the Dual Route model and the marked gender hypothesis.

Keywords: gender processing, dual route model, gender transparency, gender congruency effect

How instructions affect on face recognition: Accuracy and visual behavior

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Thanks to *Innocence Project*, we know that the memory of witnesses facing a lineup is fragile and inconsistent. However, this evidence is the one that causes the most wrong convictions today (Wells, 2018). For this reason, the aim of the present research is to examine whether the instructions used when participants have to face a lineup (*absolute judgement* vs *relative judgement*) improve the performance in photo simultaneous lineups (*present perpetrator* or *absent perpetrator*). In order to examine whether the participants really followed the instructions, their eye movements were recorded when they were faced the photo lineup. In addition, they were also asked to estimate their pre and post lineup confidence. A total of 140 participants (113 women and 27 men) participated in the experiment. They were students of the Degree in Psychology at the Universidad Autónoma de Madrid. Participants were randomly assigned to one of the four experimental conditions. Half of the participants in each instruction condition (*absolute judgment* vs *relative judgment*) faced the *present perpetrator* lineup, and the other half faced the *absent perpetrator* lineup. Results showed that the relationship between the type of instruction provided (*absolute* vs *relative*) and identification accuracy did not reach statistical significance in any of the lineups (*present* and *absent perpetrator*). With regard to the visual behavior, in the *present perpetrator* lineup, participants made significantly less inter-photograph comparisons and spent less time examining all the photographs of the lineup with the *absolute judgment* instructions than with *relative judgment* instructions. With respect to the *absent perpetrator* lineup, in the same way, participants made significantly fewer visits to the set of photographs composing the lineup with *absolute judgment* instructions than with *relative judgment* instructions; however, in this lineup, no differences were found between the two instruction conditions (*absolute* and relative *judgment*) regarding the time required to examine all the photographs. Moreover, regression analyses were conducted to examine if the total inter-photographs comparisons made by the participants and the total time those participants spent analysing all the photographs could predict the identification accuracy. Results pointed out that inasmuch as the total time needed to examine all the photographs increased, decreased the probability of hitting in both lineups (*present* and *absent perpetrator*) Finally, as was expected, no relationship was found between "pre" and "post" confidence and accuracy in any of the lineups (*present* and *absent perpetrator*).

Keywords: eye movements, present perpetrator lineup, absent perpetrator lineup, relative judgment instructions, absolute judgment instructions.

Impulsivity in a delay-discounting task does not account for the rapid development of activity-based anorexia in female rats

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Anorexia nervosa is a puzzling disorder characterized by tight control of weight and diet, reflecting a tendency to reject food as an immediate reinforcer in favor of the long-term goal of maintaining thinness whatever the cost. Nevertheless, it has been highlighted the presence of impulsive behaviors with adaptative value as a consequence of dietary restriction in these patients that, paradoxically, could suggest a greater susceptibility to delay of gratification. The animal model of activity-based anorexia (ABA) mirrors the main symptoms of AN and currently is the best instrument intended to ascertain the factors contributing to its onset and maintenance. This model shows the importance of developing excessive physical activity when food is restricted. A theory considers excessive activity as food-induced behavior and it establishes the contingencies of reinforcement that would determine the strengthening of behavior when it is consumed intermittently. Activity level and impulsivity tend to be associated, however, research with the most paradigmatic induced behavior, polydipsia, suggests interactions between the level of impulsivity and induced drinking when the degree of behavioral excess is identical. Also, it has been found that food restriction level affects impulse[1]choice behavior in rats. As far as we know this is the first study focused on revealing the interplay between impulsivity and the development of excessive activity in ABA, and its relation to weight loss. Twenty-four female Wistar rats were trained in a within-sessions delay-discounting (DD) task and assigned to ABA, food control and weight control groups, the two last without access to the activity wheel. The DD procedure has been traditionally used to study impulsivity both in humans and animals, providing an indicator of the preference of a small reward delivered immediately versus a delayed one of larger magnitude. Discount functions showed an increase in the percentage of large delayed reward choices regarding the baseline while starvation progressed in all rats and wheel-running increased in ABA rats. Animals in the three conditions were more self-controlled and the rate of discounting revealed no relation between impulsivity level, as a cause or a consequence, and the development of hyperactivity or the rapid loss in weight

Individual differences and task familiarity in illusion of control

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The purpose of this study was to examine the effect of task content familiarity in the illusion of control effect (i.e. the tendency to overestimate our chances of success beyond the objective probabilities). A total of 88 participants participated in this experiment: 36 aerospace engineers (average age 37.78 with an average experience in the aerospace industry of 12.9 years) and 52 undergraduate psychology students (average age 31.83 years). Participants performing a standard drug-related contingency judgment task and a novel analogue task with aerospace content. In the drug related task, the participants were shown 50 different patients suffering a fictious disease which could be treated with a fictitious drug. The drug was not effective, there was a null contingency between treatment and recovery, but there was a 70% chance of spontaneous recovery. This is considered a high baseline rate which tend to produce strong illusion of control effects in null contingency setups. The participants were tasked to identify the drug effectivity (the normative answer was no effectivity at all). We expected to find an illusion of control in both tasks. Indeed, the aggregate data showed a strong illusion of control with no significant difference between groups and task. A non-negligible number of participants displayed inefficient strategies during their task performance (21 out of 88 participants in the aerospace task and 27 participants in the drug-related task). Our results suggest that inter-individual effects need to be considered in future research and measures of central tendency must be used with caution.

Influencia de la recomendación algorítmica en decisions de voto político

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Utilizamos recomendaciones algorítmicas casi a diario: para realizar compras online, reservar vacaciones, descubrir nuevos cantantes, ver películas y series, buscar trabajo, encontrar pareja, informarnos o interactuar con nuestros conocidos. En estos contextos, asumimos que las recomendaciones son objetivas, eficientes y fiables; un fenómeno que se conoce como heurístico de la máquina. Al mismo tiempo, sin embargo, algunos trabajos sugieren que en realidad las personas reaccionamos con cierta aversión hacia los algoritmos, prefiriendo el consejo de un experto humano al proporcionado por un algoritmo. En esta investigación evaluamos si un algoritmo es realmente capaz de influir en las preferencias de voto de las personas mediante sus recomendaciones. Para ello, realizamos un experimento en el que los participantes indicaron su disposición a votar a ocho candidatos políticos desconocidos.

Cuatro de estos candidatos mostraban un distintivo que les acreditaba como los más compatibles con el perfil de los participantes. Por consideraciones éticas, el contexto político, los candidatos, y el algoritmo utilizado fueron ficticios. Antes de ello, para generar confiabilidad hacia el algoritmo, los participantes habían completado un test de personalidad ficticio y recibido un informe aparentemente personalizado que en realidad era idéntico para todos ellos. Para lograrlo, utilizamos una versión del efecto Forer, redactando el informe de forma imprecisa para hacer creer a los participantes que el algoritmo había adivinado su personalidad. Encontramos que las personas se muestran dispuestas a aceptar las recomendaciones de los algoritmos en terrenos de decisión tan comprometidos como el voto político.

Intentionality is a key element in the processing of causal events in Spanish

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Previous studies on Spanish caused-motion events have shown that this language offers linguistic strategies to encode causality on the basis of intentionality, i.e., the degree of participation of the agent (Ibarretxe-Antuñano 2012; Ibarretxe-Antuñano et al. 2016). However, little has been said about the possible correlation between these linguistic resources and the way these speakers categorise causality (Fausey & Boroditsky 2010; Filipović 2013). This paper investigates the relation between the way speakers talk about causality and the way they think about it (Tierry 2016; Yoshinari et al. 2010).

Data were collected using the Causality Across Languages Clips, a set of 58 videos of causal interactions among humans, natural forces and inanimate objects (CAL;NSF BCS-1535846 & BCS-1644657). Thirty-two native Spanish speakers (from Aragón) participated in two tasks: a non-verbal categorisation task where participants have to attribute different degrees of responsibility to the event actors, and a verbal description task, where participants responded to the question "what happened?".

Results show that intentionality is a key concept in the categorisation and multimodal expression of (any type of) causal events in Spanish. The non-verbal categorisation task revealed that speakers arranged causal events on the basis of the agent's intentionality resultin in a clear distinctive categorisation of intentional vs. accidental events. The verbal description task confirmed this sharp distinction between Intentionality (lo tiró [CL.ACC THROW.3SG.P]) vs. Accidentality (se le cayó [CL.3SG.ACC CL.3SG.DAT fall.3SG.P]. Statistical positive correlations were found between results in both tasks ($r = 0.96$, 95% CI = 0.991-0.998, p-value < 0.001). This demonstrates that intentionality is a key element in the processing of causal events in Spanish. In short, the intentional component is crucial not only in the non-verbal categorisation of causal events (intentional vs. non-intentional, guilty vs. non-guilty), but also in the oral and gestural encoding of these events in Spanish.

Keywords: causality, intentionality, categorisation, encoding, Spanish

Is probabilistic cuing an inflexible attentional habit? A meta-analytic review

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One of the most popular paradigms to explore learned biases in selective attention is the probabilistic cuing task. In this task, participants search for a visual target among several distractors and report some feature of the target. In a *training* stage the target is more frequently located in one specific area of the search display than elsewhere. Eventually, participants become faster at finding the target in the rich region compared to the sparse region. This stage is followed by a *testing* stage, where the target is evenly located across the different regions of the display. Despite this change in the spatial distribution of targets, search speed usually remains faster when the target is located in the previously rich region. Based on this evidence, it has been suggested that probabilistic cuing can be characterized as an inflexible attentional habit. However, based on previous evidence and the small average sample sizes of studies within this literature, we hypothesize that, although it is possible to detect a bias during the testing stage, this effect is probably much smaller than the comparable effect observed during the training stage. The aim of this meta-analysis was to test whether the mean size of probabilistic cueing decreases from the training stage to the testing stage. A total of 41 studies were included in the meta-analysis. Since all these contrasts entailed within-subject comparisons, we computed Cohen's *dz* for each study and stage. To compare the effect size for the training and the testing stage we fitted a multi-level random-effects model at the study level. Our analysis showed that the effect size in the testing stage was roughly half that in the training stage. In addition, we detected clear evidence of publication bias in effect sizes from both stages, suggesting that the average effects reported in the literature are probably inflated by the selective publication of statistically significant results. However, and most importantly, the effect size for the training stage is systematically larger than that of the testing stage even after correcting for publication bias. We conclude that probabilistic cuing decreases during the testing stage and thus, fails to show the characteristics of an attentional habit. On the contrary, it meets the criteria of a goal-driven attentional phenomenon.

Judgments of learning in bilingual participants

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Judgements of Learning (JOLs) are considered the results of metacognitive strategies involved in the monitoring of learning. JOLs have been reported to vary with the difficulty of the material. For example, the font type effect is a phenomenon where hard-to-read font types make people believe they will recall the material worse than standard font types. However, these low JOLs do not tend to imply low learning outcomes, which means that participants adjust their learning resources to compensate for the difficulty of the material. Although these strategies are essential for learning, little is still known about whether bilingual contexts affect them. The aim of our study was to investigate the consequences of studying in a second language (L2) on the interplay between monitoring and control to produce successful learning. For this, participants studied words in two blocks separated by language: Spanish as a first language (L1) and English as L2. Words appeared in two different font types (easy vs. difficult to read) and participants provided JOLs after studying each one. Then, they did a recognition test in which studied words appeared along with new items. We assessed relative accuracy by computing Goodman-Kruskal gamma correlation as a nonparametric measure of the association between JOLs and the accuracy in the recognition test. Results indicated that relative accuracy was moderate and significant in Spanish-L1 in both in easyto-read and difficult-to-read font, but non-significant in English-L2. Overall, additional research should further explore these findings with different materials in order to understand the relation between monitoring and control in L2 memory processing.

On the (null) effects of second language processing on self-bias and altruistic/empathic behaviors

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Recent evidence has suggested that functioning in a foreign (vs. the native) language reduces self-bias effects in the self-paradigm (Ivaz et al., 2016, 2019). Interestingly, a clear, coherent and stable self-concept, together with an adequate self/other distinction, are fundamental for the emergence of altruistic and empathic behaviors (Krol & Bartz, 2021). In this study, we explored whether responses to tasks measuring self-bias, and altruistic (i.e., the dictator game and altruistic/egoistic dilemmas) and empathic behaviors, were modulated depending on whether participants processed the information in their native or foreign language. 147 students (139 female; M age = 18.99) participated in this study in exchange for course credits. Participants were randomly allocated to the native or foreign language group and had to complete the selfparadigm and dictator game tasks, and respond to the altruistic/egoistic dilemmas and to a state empathy questionnaire. Proficiency was measured in the L2 group. Results showed no effect of language (native vs. foreign) for any of the tasks. Furthermore, selfbias was not a

reliable predictor of altruistic behavior, regardless of language. However, cognitive empathy was a good predictor of altruistic behavior in the dictator game, but only for the foreign language group. Together, the results of this study suggest that the foreign language effect may have certain limitations: whilst it seems reliable that processing moral dilemmas in a foreign language can change the decisions we make, these effects do not seem to carry over to altruistic and empathic behavior.

On the flexibility of the sound-to-meaning mapping when listening to native and foreign-accented speech

Carlos Romero-Rivas, Albert Costa

Extracting linguistic information from the speech signal is critical to successfully communicate with others. We usually carry out this sound-to-meaning mapping easily, but this process may be hampered under adverse listening conditions. Thus, exploring whether foreign accents might affect the sound-to-meaning mapping is particularly relevant, as interactions with these speakers are increasingly common in the globalized world. In this study, we conducted a cross-modal priming task, in which participants (N=24) were presented with auditory primes uttered by a native or by a French foreign-accented speaker of Spanish, and with visual targets that had different degrees of relatedness to the prime: repeated, semantically related, or unrelated words. Behavioral and EEG measures were analyzed, and in both cases we found a significant relatedness effect (i.e., reaction times/N400 amplitudes were smaller for repeated than for related words, and for the latter compared to unrelated words). However, speakers' accents had no effect on the results. To further explore the potential effect of speakers' accent on the sound-to-meaning mapping, we conducted a second study, in which participants (N=22) were presented with the same task, although in this case primes were uttered by the same native speaker as in the previous experiment, and by a German foreign-accented speaker with a stronger accent. We replicated the results observed in the first study. Taken together, these results suggest that the sound-to-meaning mapping is a robust and flexible process that is not compromised by auditory variables related to speakers' characteristics.

Parieto-occipital contributions to phenomenal consciousness

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Although a seemingly ordinary process, perception can be complex and requires a computational effort, since we need to identify the different features of a given object (e.g., colour, form, size) and integrate all of them to construct a single percept (Treisman, 1998). Sometimes this integration can fail and produce what we call 'illusory conjunctions', perceptual errors which imply assigning the feature of one object to a different one. Although

we have the impression of perceiving much more information than we can report, which is known as phenomenological consciousness, this perception is riddle with errors that nevertheless create a unified experience of the world. In this study, we used fMRI to explore the neural underpinnings associated with correct and illusory perception using a dual-task paradigm in which a percentage of perceptual illusions (erroneous conjunctions of features) are produced. Participants reported if a central digit was larger or smaller than 5, and then reported the color of a peripherally presented letter surrounded by distractors. Behaviorally, all participants reported ~30% illusions (reporting the color of the distractor), and these responses were comparable for the more or less demanding attentional conditions of the central task. Applying region of interest and functional connectivity analyses, we found that responses of a set of parieto-occipital areas are involved in feature integration. Initially, visual sensory areas presented increased BOLD responses for illusions as compared to hits, but this effect reversed at a latter time point, together with larger functional connectivity between parietooccipital regions for hits as compared to illusions. These results are in line with previous evidence, highlighting the important role of parietal areas on the feature integration process and the production of illusory conjunctions.

Physiological reactions and attitudes towards meat in vegetarians

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The number of people adopting a vegetarian diet is growing in the last decades. Due to its social significance (health, climate change, animal welfare), psychological studies are emerging to understand the motivations to adopt this diet and the attitudes towards meat. However, little is known about the psychophysiological responses of vegetarians towards meat. In this study we measured emotions, attitudes and involuntary psychophysiological reactions towards meat and vegetables in vegetarians and omnivores. For the first time in the vegetarian population, we used salivation as a measure of appetite. Participants had to smell and look at real meat while saliva was collected, we also used images of vegetables and meat where participants had to imagine the smell and taste of the food. We found that vegetarians had more negative attitudes and emotions towards meat than omnivores. Meanwhile, vegetarians' salivation at real meat stayed at the baseline and omnivores' salivation increased. Our results suggest that vegetarians' negative perception of meat did not completely suppress salivation. Perhaps meat was leading to different effects on voluntary and involuntary behaviours.

Preserved cognitive control in aging: The role of literacy experience

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Healthy aging is commonly accompanied by cognitive deficits affecting several domains such as executive control, whereas certain verbal skills remain relatively preserved. Interestingly, recent scientific research has shown that different intellectual activities may work as cognitive reserve mechanisms, delaying or even alleviating cognitive decline in the elderly. Thirty young (age: M = 23) and thirty old (age: M = 66) adults were assessed in cognitive control (i.e., switching) and literacy experience accumulated across the life-span (i.e., print exposure). First, we tried to confirm whether healthy aging was generally associated with deficits in switching by looking at mixing cost, to then investigate if individual differences in print exposure explained variation in age effects on mixing cost. Both accuracy and reaction times measures demonstrated larger cost in old (but not in young) adults when switching from local to global information. More importantly, this interference effect was diminished in old adults with higher print exposure (reaction times). Our findings suggest literacy experience may act as a good cognitive reserve mechanism to prevent executive control decline.

Stimulus-response learning and expected-reward value enhance stimulus cognitive processing: an ERP study

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Reward affects our attention to stimuli, prioritizing those that lead to high-value outcomes. Recently, it has been suggested that such reward-related cognitive prioritization might be associated with the process of learning new stimulus-response (S-R) associations, because both are acquired through extended reward training, and once established, they are hard to overcome. We used event-related potentials (ERP) to analyze the contribution of S-R links to the formation of reward-related cognitive prioritization during reinforcement learning. Reward-related cognitive prioritization was measured by comparing the ERP signals for stimuli predicting high-value and low-value outcomes. In addition, we compared a strong S-R link (same stimulus, same response), with a weak S-R link condition (same stimulus, two different responses). The participants' performance was more accurate and faster when the procedure allowed for establishing strong S-R links and for high-value outcomes. Furthermore, those stimuli associated with strong S-R links showed a larger P3 amplitude at parietal sites. Value effects (larger ERP

activity for those stimuli predicting a high-value outcome) were obtained at parietal and occipital sites in the P3 time window. However, value effects did not benefit from strong S-R links in either the P1 or the P3 components. These results suggest that strong S-R learning is not necessary to develop reward-related modulations of ERP activity.

Keywords: attention, ERPs, P1, P3, S-R learning

Relationship among spatial distance, temporal distance and temporal valuation related

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How do people represent time? According to the "moving forward view of time", people conceptualize time in a metaphorical way as a spatial journey from a back/past location to a front/future location. If people think about time as a forward movement, people should: 1) estimate the distance to future times and in front locations as shorter than the same distances to past times and back locations, and make better evaluations of future events than past events (an asymmetry between past/back and future/front); 2) think about time, space, and evaluation in a similar way, thereby producing positive correlations between time, space, and evaluation; 3) think about past vs. future and back vs. front in an antagonistic way, thereby producing negative correlations between responses to past vs. future and to back vs. front. To test these predictions, participants first judged the temporal distance to an event from 14 to 359 days in the past or the future. Next, they carried out a standardized time discounting task with both a past and a future version. Finally, participants estimated the spatial distance to points placed from 14 km to 359 km in front and behind them. The results showed that 1) participants did not estimate distances to future times and in front locations as shorter than the same distances to past times and back locations, and did not value better future than past events. Therefore, there was no asymmetry between future/front and past/back in any task: 2) participants showed positive correlations between time and space, but there was no correlation between evaluation and either time or space; 3) the correlations between responses to the past vs. the future and back vs. front were positive, instead of negative, showing that thought about past/back and future/front is agonistic (vs. antagonistic). The results suggest that 1) space and time do share a cognitive substrate; 2) the “moving forward view of time" needs to be revised. We hereby propose an alternative "air balloon view of time".

Resting state functional connectivity and impulsiveness measures associated with Sahaja Yoga Meditation

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Neuroscience research has shown that meditation practices have effects on brain structure and function. However, few studies have combined information on the effects on structure and function in the same sample. Long-term daily meditation practice produces repeated activity of specific brain networks over years of practice, which may induce lasting estructural and functional connectivity (FC) changes within relevant circuits. The aim of our study was therefore to identify differences in FC during the resting state (RS) between 23 Sahaja Yoga Meditation (SYM) experts and 23 healthy participants without meditation experience. Seedbased FC analysis was performed departing from voxels that had shown structural differences between these same participants. The contrast of connectivity maps yielded that meditators showed increased FC between the left ventrolateral prefrontal cortex and the right dorsolateral prefrontal cortex, but reduced FC between the left insula and the bilateral midcingulate as well as between the right angular gyrus and the bilateral precuneus/cuneus cortices. Behavioral and neuropsychological measures of impulsiveness were also performed, applying the Barrat Impulsivity Scale (BIS-11) and two different tasks (Go/No-Go and Simon tasks) respectively. The meditators showed more Self-Control in the BIS-11 and a reduced interference reaction time in the Simon task. It thus appears that long-term meditation practice increases direct FC between ventral and dorsal frontal regions within brain networks related to attention and cognitive control and decreases FC between regions of these networks and areas of the default mode network. In addition, the reaction time interference during the Simon task was significantly correlated with the FC between the left insula and the mid-cingulate in the SYM group. In sum, FC differences in SYM show parallel reduction in impulsivity.

Revisiting self-advantage in the context of attentional blink: what occurs when removing familiarity effects with a self-shape associations paradigm?

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The self-prioritization effect (SPE) has been largely studied in the context of the attentional blink (AB). In rapid serial visual presentation (RSVP) paradigms, AB is defined as the cost of detecting a second target (T2) due to the interference of presenting a previous one (T1). This phenomenon occurs approximately between 200 and 500 ms after the first target is presented. Previous studies have used participant's own name as a self-relevant stimulus by entering it as T1. This manipulation has been effective to suppress the signature of AB, i.e. individuals usually show the SPE but do not experience an AB for their own name whereas they do for other's names. The rationale behind this effect is that one's own name is a highly salient stimulus that requires less attentional resources to be processed, and once it occurs, resources are rapidly available to process other stimuli (e.g., T2). However, using one's own name as stimuli could convey familiarity-based effects misleading the correct interpretation of the results. Here, we present a new approach that eliminates these potential biases to assess the SPE by introducing the procedure developed by Sui, He, and Humphreys (2012). In the first two experiments, participants were asked to associate three geometric shapes (a circle, a square, and a triangle) with three personal labels: "self", "friend", and "stranger". Then, the three shapes were introduced in the AB procedure as T1. Contrary to previous studies, in Experiment 1 we observed that self-relevant shapes enlarged the AB effect compared with other-related shapes. The larger AB effect was further replicated in Experiment 2, where participants previous to the AB task performed the shape-label matching task to strength the association between shapes and labels. Moreover, this self-advantage was dissociated from reward-related processes (Experiments 3 and 4) where AB effects did not differ among the different label-values associations. These findings suggest that, in contrast to associations involving other-related stimuli, associations involving self-related stimuli attract attention automatically, producing the standard SPE. However, once a shape-label association has been activated by the presence of one element of the pair (the shape) in the AB paradigm, participants are less efficient to disengage attention from the activated association when it involves the self than when it involves other or unfamiliar people. Thus, associations with self [1] relevant information might be easier to build up but harder to disengage from.

Temporal symmetry across cultures

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Do human representations of time extend symmetrically or asymmetrically into the past and the future? And do any potential asymmetries depend on cultural differences in temporal focus? The dominant view suggests that people in Western (future-focused) cultures perceive the future as being closer, more valued, and deeper than the past (a future asymmetry). Moreover, it suggests that the more we delve into the future, the less we delve into the past. Consistently, asymmetries toward the past were found in Eastern (past-focused) cultures. But available evidence is limited, mixed, and has used a number of different temporal tasks. We looked for asymmetry using several temporal tasks (self-continuity, time discounting, temporal depth, and temporal distance) consistently across cultures. The set of cultures varied widely in their temporal focus (American, Spanish, Serbian, Bosniak, Croatian, Moroccan, Turkish, and Chinese; total N=1075). The results supported a small-sized general future asymmetry, limited to the tasks with the longest temporal intervals, which did not vary with temporal focus, other than a small effect on time discounting. Moreover, we showed that past and future hold a fixed (versus antagonistic) relation in the mind. All in all, we found limited support for the dominant view.

The attentional spotlight shifts from rhythmic exploration to stable exploitation

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Visual – spatial attention operates like a spotlight, allowing us to attend to a single location in space at a time. Traditionally, this attentional deployment has been supposed to operate continuously across time. In other words, once the attentional spotlight is engaged to a cued location, it remains constant for as long as necessary. However, recent studies show that attention fluctuates rhythmically exploring the space after a non-informative cue. In this

context, we investigated whether multivariate pattern techniques can reveal these fluctuations in sensory regions of the visual system when valid cues are used.

To this aim, electroencephalographic activity was recorded while twenty-two participants performed a visuospatial cueing task, where exogenous cues served to covertly orient the attention. In order to decode the neural activity of attending to the right or left visual field, a linear discriminant analysis was trained and tested independently for each time point on twelve posterior electrodes. This resulted in one time generalization matrix (TGM) per participant. Then, a time-frequency analysis was applied to each row and column of these TGMs, to identify the rhythm of the attentional fluctuation. Finally, the statistical analysis consisted of two-level permutation tests, first on the classifier performance and later on the frequencies.

Results show a dynamic evolution of the occipital spotlight that makes it possible to distinguish two states. The first state occurs during the first 250 ms after cue, where attention is exploring the cued and uncued visual field rhythmically at about 7 Hz. The second state occurs between 425-650 ms, where attention focuses on the cued visual field for a more extended period.

Together, our results reveal a novel insight into the temporal dynamics of the spotlight of attention in showing that the information is first sampled rhythmically from cued and uncued locations, before it settles onto the cued location. To this end, the attentional spotlight seems to strike a balance between early exploration (i.e. sampling from uncued locations) and later exploitation (i.e. sampling from the cued location).

The leftmost digit effect during different-length multidigit comparison and the role of the stimuli set

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Within the field of numerical cognition, research on the comparison of multidigit numbers has allowed to study how number processing is performed. The comparison of multidigit numbers has traditionally focused on the processing of stimuli with equal number of digits (e.g., comparing 342 *vs* 578). In contrast, even when the importance of number length has been explicitly recognized by componential models of multidigit number processing, research on the comparison of numbers of different length (e.g., 998 vs 1000) – which demands a focus on the number of digits in each multidigit – is scarce (e.g., Huber et al., 2016). The aim of this work is to examine (1) whether length and the identity of the leftmost digits are processed simultaneously when comparing multidigit numbers of different length, and (2) how this is affected by the composition of the stimuli set. We performed three studies in which participants had to compare three- and four-digit numbers in blocks with different proportion of trials with multidigit numbers of the same length (i.e., fillers). Stimuli were grouped into pairs of multidigit numbers of two types: same length (three vs three, and four versus four-digit number pairs) and different length (pairs with a three and a four-digit number). Within the different-length numbers, two types of stimuli were created: length-digit congruent (the number with more digits started with

a larger digit: e.g., 2384 vs 107) or length-digit incongruent (the number with more digits started with a smaller number: e.g., 2675 vs 398); controlled in terms of overall distance. In Study 1, participants were presented three blocks in a single session with 25%, 50%, and 75% of fillers; in Study 2, participants performed each block in three different sessions; and in Study 3, two blocks where shown, one with 0% of fillers (i.e., exclusively congruent and incongruent different-length pairs) and other with 50% of fillers in a single session. The results showed shorter reaction times for congruent length-digit pairs than incongruent pairs. However, this incongruency effect was only slightly modulated by the proportion of fillers in the stimuli set. Our findings suggest that despite the perceptual saliency of number length, this is not the only information considered during different-length number comparison, the left-most digit of numbers is also considered to a greater or lesser degree in accordance with the characteristics of the given set of stimuli.

Variables Affecting Physical Inactivity: A Systematized Mapping Review from 2007 to 2017

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Introduction: Physical activity (PA) has significant health benefits. However, a third of the adult population across Europe is physically inactive and numbers are on the rise. To address this problem, a large body of the literature has tried to identify the variables influencing the adherence to PA (barriers or facilitators). Consequently, it is known that psychological variables and, to a lesser extent, environmental and physical ones, are important for explaining PA behaviour. However, research synthesizing and defining all the relevant variables is lacking. A clear picture of the literature is critical to improve the effectiveness of interventions for promoting PA. Objective: The purpose of the present study is twofold. First, to define and synthesize all the relevant non-demographic variables for PA, with a special emphasis on the psychological ones. Second, to obtain an overview of the literature by using visualization techniques.

Methods: To meet the first objective a systematized review on PA barriers/facilitators was conducted, using PsycINFO. It yielded 4069 articles of which 1014 articles were finally selected. The extracted variables were organized into three dimensions: psychological, contextual/personal, and physical. For the second objective, visualization techniques were performed using VOSviewer software.

Results: A total of 38 non-demographic variables were identified as PA barriers/facilitators consisting of 21 psychological variables, 12 contextual/personal variables, and 5 physical variables. The most often reported variable was "Motivation" followed by "Facilities and

access", "Influence of others", "Physical or medical status", "Time demands", and "Self-efficacy" (≥ 20%). Examination of the literature using visualization techniques reported three clusters comprising, respectively contextual/personal variables, psychological/physical variables, and emotional/self-cognition variables. Further, this visualization helped to detect a high priority gap in the literature: Despite the well-known theoretical relationship between contextual/personal and psychological variables, both clusters cover relatively independent bodies of literature.

Conclusions: A substantial body of research has been conducted aiming to identify variables for PA. However, to our knowledge, this is the first study that brings together and defines all the potential non-demographic variables, as well as carrying out a mapping review on this topic. The results of the present study have implications for policymakers and public health-service providers as it informs the development of tailored interventions program aiming to promote PA.

Keywords: barriers; physical activity; systematized review; visualization techniques

Would a steady or dynamic stimulus presentation modulate the effects of letter case on visual word recognition?

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Words are identified and read faster when printed in their typical case configuration (e.g., UPPER, lower or Mixed case), as shown in studies with different experimental paradigms and word types. A common feature in these studies is that participants are presented with good visual quality stimuli that remain steady until response. However, for a driver who wants to read text in a traffic sign while approaching it, the quality of the visual input is lower and less stable. The objective of the present work was to examine whether these particular stimulus presentation conditions alter the effects of letter case on visual recognition for words in traffic signs. This issue is of interest in applied settings, because different letter case configurations are used in traffic signs on a given road (VALENCIA / Valencia), and also in basic cognitive research, as the study of factors that modulate the effects of letter case can contribute to increase knowledge about visual word recognition. Participants were asked to complete a word search task. Images of traffic signs were designed according to Spanish official regulations, with eight toponyms on each. All participants were presented with stimuli printed in three letter case configurations, in different blocks of trials: upper case, mixed case (the first letter in upper case, the rest in lower case), and an enlarged mixed case condition, included because words were larger in the upper than in the mixed case. We also manipulated the stimulus presentation, which was steady until response for half of participants, whereas it mimicked the dynamic presentation for a driver approaching to the traffic sign for the other half. Results showed that the effects of letter case on correct response latency were different

in the two stimulus presentation conditions. In the steady condition, responses were slower for words in upper case than in the two mixed case configurations. In the dynamic condition, responses were slower for words in the default mixed case than in upper case, and the fastest responses were found for words in the enlarged mixed condition, suggesting that size interacts with letter case in the processing of words in traffic signs while driving. Therefore, stimulus presentation factors, such as a steady or dynamic presentation, are also relevant to determine the optimal word configuration in visual word recognition.

Implicit learning in children with dyslexia or poor reading performance associated to intellectual deficit

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The term dyslexia concerns a specific learning disability to acquire fluent reading in the absence of a general intelligent deficit. The average intelligent ability in this population has led to hypothesize that the difficulties to achieve an automatized reading performance might not lie so much in explicit learning strategies but rather in a kind of impairment in implicit learning mechanisms. Furthermore, implicit learning has been claimed to be independent of intellectual ability so that poor readers whose lack of reading fluency is attributable to intellectual functioning deficit would not be expected to exhibit implicit learning impairment. In the present study, we compare implicit learning in children (8-9 years old) with dyslexia, poor readers with borderline intellectual functioning, and typically developing children. To this aim we use a sequence learning task including second-order conditional relationships. The results revealed that dyslexic group was not able to exhibit sequence learning through the reaction time measure, but in the accuracy measure the three groups showed a similar learning score. This mismatch between the two learning measures observed in the dyslexic group will be discussed in relation to the non-conclusive results recollected so far in the research about a hypothetical implicit learning deficit in this population.

Information of Interest

Simposiums/Keynotes: We will send an email with the links required to access the virtual rooms by the 20th of April to all the attendees. Symposium chairs will receive this info asap in a different email with further instructions.

Posters: Each poster presenter will create a unique link to a virtual room in Google Meet (preferably) for presenting their poster in the designated time slot. You can check the time slot for each poster in this document (see above). The presenters will share this link as a part of the tweet with the poster document and the poster identification code at the beginning of the Twitter poster session (20th April). Poster presenters will receive further instructions by email.

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If you want to check out a poster(s) on Twitter, you can easily find it using the Twitter's search tool. Type there the hashtag #JornadasVirtualesSEPEX21 and the poster identification code (e.g., P14). Alternatively, you can search for the title of the poster. All the posters will be retweeted by @SEPEX13; thus, you can have a look to all posters just looking the tweets from @SEPEX13. Please, note that poster information will not be available on Twitter until 20th April.

Time and punctuality

Chairs and organizers will be very strict with the time boundaries for each talk. This is mandatory if we want the audience to be able to change from one symposium to another without missing any talk.