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ANNEX

Research lines and plans

Research line: CLINICAL NEUROPSYCHOLOGY
Recommended profile for applicants: Qualification: - Bachelor's Degree: Psychology, Biochemistry, Biotechnology or related fields - Master's Degree in General Health Psychology, Cognitive and Behavioral Neuroscience or related fields Languages: High level of English Others: Research experience, preferably in subjects related to the proposed plans. Specific training in intimate partner violence.
List of Proposed Research Plans
CIMCYC supervisor: Natalia Hidalgo Ruzzante +Info International co-supervisor: Julia C. Daugherty, University of Clermont Auvergne, Francia +Info Title: Executive functioning and complex posttraumatic stress disorder in women survivors of intimate partner violence. Abstract: We are witnessing a shift in the study of psychological disorders suffered by women survivors of intimate partner violence (WSIPV), with Complex Posttraumatic Stress Disorder (C-PTSD) being the most prevalent. This disorder, coined in the ICD-11, is the one that best explains the negative impact experienced by victims of interpersonal trauma, including problems of affective regulation, self-concept and difficulties in maintaining relationships with others. On the other hand, the few studies focused on neuropsychological deficits after gender violence find poorer performance in attentional and executive functions. These neuropsychological alterations seem to play a mediating role in the severity of specific C-PTSD symptoms, showing an important role in psychological rehabilitation. However, the relationship between executive functioning and C-PTSD diagnosis has not been studied in any population, including female survivors. Thus, the proposed aim is to study the mediating role of neuropsychological alterations in classic PTSD and C-PTSD in WSIPV and to implement a neuropsychological rehabilitation program. For this purpose, a psychopathological, neuropsychological, social variables and violence assessment will be performed on 300 women (IPV and controls), to establish the prevalence and severity of alterations in neuropsychological functioning, as well as to analyze differences in neuropsychological alterations in C-PTSD. In addition, 40 randomly selected female IPV with C-PTSD will receive neuropsychological rehabilitation, while 40 will receive standard WSIPV care training. The reduction of classic and complex posttraumatic symptoms after receiving both treatments will be compared. To our knowledge, this is the first time that a neuropsychological rehabilitation program will be applied in female SIPVs with C-PTSD, evaluating its impact on post-traumatic symptomatology. If the treatment is effective, it could be applied in female survivors who present neuropsychological alterations and complex post-traumatic symptomatology, thus improving their adaptation after the trauma.
CIMCYC supervisor: Miguel Pérez García +Info International co-supervisor: Tiago de Oliveira Paiva, Universidade Lusofona de Oporto, Portugal +Info



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Title: Brain mechanisms of emotional regulation in women survivors of gender violence diagnosed with Complex Posttraumatic Stress Disorder (C-PTSD).

Abstract: Gender violence is a serious social and public health problem. Women who suffer from this scourge present numerous psychological alterations, including cerebral, neuropsychological and psychopathological alterations. The most frequent psychopathological alteration is Post-Traumatic Stress Disorder (PTSD) suffered by up to 65% of women survivors. However, the latest version of ICD-11 has included a new post-traumatic stress disorder called Complex Post-Traumatic Stress Disorder (C-PTSD). This new post-traumatic stress disorder is suffered by people 1) who have been exposed to the traumatic event repeatedly and 2) who have been exposed to an interpersonal type of traumatic event. In addition to PTSD symptoms, people with C-PTSD also suffer from 1) emotional regulation problems, 2) low self-esteem, and 3) difficulties in social relationships. Given the characteristics of gender-based violence, one would expect C-PTSD to be more prevalent than PTSD. The few studies have shown that the prevalence of C-PTSD is twice that of PTSD (40% versus approximately 20%). Given its high prevalence and the scarce number of published works in women survivors, the aim of the present project will be to investigate the brain mechanisms of one of the main symptoms of C-PTSD such as emotional regulation in women survivors. For this purpose, a group of women survivors diagnosed with C-PTSD will be compared with women diagnosed with PTSD, women survivors without PTSD and women who have not suffered gender violence. These participants will perform an emotional regulation task in the magnetic resonance imaging (MRI) machine in front of images of neutral content, violence and gender violence while images of their brain functioning are obtained.

CIMCYC supervisor: Inmaculada Teva Álvarez [+Info](#)

International co-supervisor: Raquel Alexandra Gonçalves Costa, Universidad Lusófona de Oporto, Portugal [+Info](#)

Title: Neuropsychological and psychopathological consequences of exposure to Intimate Partner Violence against women in children.

Abstract: Intimate Partner Violence against women is a worldwide public health problem. It is estimated that in Spain there are some 800,000 minors exposed to Intimate Partner Violence against women, considered a type of child abuse. This exposure has a series of consequences for the children who suffer it, such as emotional disorders and school problems, among others. Repeated exposure to violent situations has been related to neuropsychological damage (attention, memory, etc.), both in female victims and in their children. Knowing the neuropsychological damage in these children is important, since cognitive functioning is fundamental for emotional adjustment, as well as for the development and maintenance of health and social relationships, academic performance and professional future. When cognition is affected by stress and/or trauma, typical of exposure to Intimate Partner Violence against women, this will greatly impact the daily lives of these children as the aforementioned aspects are compromised. The main objective of this project will be to investigate both the type and severity of neuropsychological alterations in children of women victims of Intimate Partner Violence. A total of 144 minor victims and 144 non-victimized minors between 7 and 16 years of age will be selected. The participants will be evaluated with a comprehensive neuropsychological evaluation protocol. The development of this project will provide data on the



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neuropsychological sequelae in children exposed to Intimate Partner Violence against women in terms of type and severity. This knowledge of the sequelae of abuse will result in improvements in the care of child victims and will represent another possible area of future intervention to help recover the daily social, emotional and academic life of children.

CIMCYC supervisor: Juan Verdejo Román [+Info](#)

International co-supervisor: Sofia Amaoui, University of Innsbruck, Austria [+Info](#)

Title: Neuropsychological and/or cerebral sequelae associated with repeated blows to the head in female survivors of intimate partner violence.

Abstract: Intimate Partner Violence against Women (IPVAW), understood as the violence perpetrated against women by their male partners or ex-partners and based on the sex/gender system, is a social and public health priority worldwide. Anxiety, depression, post-traumatic stress disorder, neuropsychological and brain alterations are some of the consequences of this type of violence in women who suffer it. However, there is insufficient evidence on the sequelae specifically related to blows to the head, which in many cases cause brain injuries and, above all, on the effect that their repetition has on these women. The main objective of this thesis will be to evaluate the neuropsychological and/or cerebral sequelae associated with blows to the head in women survivors of intimate partner violence. For this purpose, data collected from a personal interview where sociodemographic data and data on the violence suffered, a complete neuropsychological evaluation and a brain MRI session will be used. The methodology of the project to which this thesis is linked is published at <https://osf.io/zan8x/>. This thesis will have a great relevance in the research line of Clinical Neuropsychology, since it will allow to continue providing evidence on the psychological and cerebral sequelae, as well as their possible underlying mechanisms, in a population as unfortunately numerous as are the women survivors of intimate partner violence. For this purpose, clinical neuropsychology methodologies will be used, such as neuropsychological tasks and neuroimaging.

Research line: DEVELOPMENT

Recommended profile for applicants:

Qualification:

- Bachelor's Degree: Psychology, Occupational Therapy, Speech and Language Therapy, Cognitive Science, Neuroscience, Medicine (Psychiatry), or related fields
- Master's Degree: Cognitive and Behavioural Neuroscience, Cognitive Psychology, Developmental Psychology, or related fields

Languages: High level of English

Others: Research experience, preferably in subjects related to the proposed plans.

List of Proposed Research Plans

CIMCYC supervisor: María Jesús Maraver Romero [+Info](#)

International co-supervisor: Eleonora Rossi, University of Florida, USA [+Info](#)

Title: "It's still not too late" Neurocognitive mechanisms of language learning in aging



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Abstract: Learning a second language in later life is key to face the social and cultural challenges of a globalized world, as well as a source of cognitive improvement and quality of life enhancement during aging. The benefits of language learning in the elderly have been of interest for research for decades, both after a brief exposure to a new language or after a lifetime of speaking more than one language. However, the cognitive mechanisms underlying learning in older ages and their differences across different stages of development have been less investigated, especially in relation to the errors made during the learning process. This project aims to investigate the cognitive and neural mechanisms of language learning in aging, through the processes of errorful learning and memory updating. Experimental studies will be carried out focusing on the analysis of behavioral and brain activity data acquired through electroencephalography (EEG). Large samples of participants (from young adulthood to late old age) will be recruited with broad measures of sociodemographic data, social networks, and well-being to control for the large variability that characterises aging research. Participants will perform cognitive assessment tasks as well as longitudinal language learning interventions, that will provide feedback on errors made. Task performance, information retention, and brain activity will be measured before, during, and after the language learning interventions. The results of this project will expand knowledge on the neurocognitive mechanisms of language learning in older adults. On a practical level, the implementation of learning strategies based on error correction could optimize the process of acquiring new languages at different stages of development, promoting active and healthy aging. Being part of this project will offer numerous training opportunities in research, combining advanced cognitive neuroscience methods with an applied approach to learning and aging.

CIMCYC supervisor: Rosario Rueda Cuerva [+Info](#)

International co-supervisor: Jed Elison, Institute of Child Development, University of Minnesota, USA [+Info](#)

Title: Changes in brain functional connectivity in relation to the early development of attention networks

Abstract: Behavioral and neural development undergoes profound changes during the first years of life. Attention is one of the foundational cognitive skills that infants must develop to navigate their environment effectively. During this critical period, young children experience a significant shift in the balance between exogenous (automatic orientation to salient or relevant stimuli) and endogenous (goal-directed) attention control, becoming increasingly capable of directing their attention based on expectations, instructions, or internal goals. This research plan aims to uncover the brain processes underlying this transition. Specifically, we plan to investigate the development of functional connectivity patterns in a longitudinal sample spanning ages 6 months to 7 years. Functional connectivity will be assessed using high-density (128-channel) EEG (HD-EEG) recordings of resting brain activity collected at various ages (6, 9, 18, 36, and 48 months), along with new data from HD-EEG and fMRI at 7 years of age. Our analysis will focus on the developmental trajectories of functional connectivity across different frequency ranges, with an emphasis on theta and alpha oscillatory activity, in relation to the development of attention. To monitor the progression of endogenous attention, we will employ a range of experimental protocols, including anticipatory versus reactive looking tasks for infants aged 6–18 months, and Bee-Attentive and AX-CPT tasks for older children.



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Additionally, at 7 years of age, attention will be assessed using the NEPSY battery, providing a comprehensive set of behavioral indices such as sustained attention, executive attention, and proactive versus reactive attention control. The results of this research are expected to significantly enhance our understanding of the neural foundations of early attention development. Moreover, these findings may identify early markers of attention development, a critical area of study given attention's foundational role in cognition and its influence on other domains, such as language, memory, and learning. Furthermore, establishing early brain markers of attention could contribute to understanding neurodevelopmental disorders involving attention deficits.

Research line: INDIVIDUAL DIFFERENCES

Recommended profile for applicants:

Qualification:

- Bachelor's Degree: Psychology, Linguistics
- Master's Degree: Cognitive and Behavioral Neuroscience, Psychology or related fields

Languages: High level of English

Others: Research experience, preferably in subjects related to the proposed plans.

List of Proposed Research Plans

CIMCYC supervisor: Isabel de Brugada Sauras [+Info](#)

International co-supervisor: Gonzalo Urcelay, School of Psychology University of Nottingham, UK [+Info](#)

Title: Individual differences in food cue reactivity and habit formation: The sign-tracker/goal tracker model.

Abstract: In an obesogenic environment, we are constantly exposed to cues — such as images and smells — that constantly remind us of the great availability of highly caloric and palatable foods. Through Pavlovian learning, these cues acquire the ability to predict the presence of rewarding food, driving eating behavior and promoting excessive consumption, even when people are sated. The goal of this research is to understand how individual differences in reactivity to food cues influence the formation of habits using the sign-tracker/goal-tracker model as a framework. Sign-Trackers are highly sensitive to sensory cues that predict a reward, endowing them with incentive (i.e., motivational) value. Conversely, Goal-Trackers primarily respond to the outcome or the reward itself. This translational study aims to investigate how these distinct patterns impact the development of automatic and maladaptive eating habits, which may contribute to issues such as overeating, obesity, and eating disorders. To achieve this, a series of experiments will be carried out in both rats and humans using Pavlovian conditioning procedures to discriminate between the two categories. Different types of behavioral responses such as latency, approach, reaction time and eye movements will be used. Subsequently, conditioned preference tasks will be used to assess food cues reactivity and transfer to automatic behaviors, measuring persistence of habitual behavior in response to changes in reward value and context. Studying these differences is fundamental to understanding the mechanisms underlying habit formation in eating behavior. Because sign trackers, are more responsive to food-related cues, they are likely at higher risk of developing automatic habits and uncontrolled eating behaviors, whereas goal-trackers might exhibit greater behavioral regulation. This research has significant implications for the design of personalized interventions in the treatment of



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obesity and eating disorders, providing a more effective approach based on an individual's behavioral profile.

CIMCYC supervisor: Alejandra Marful Quiroga [+Info](#)

International co-supervisor: Suparna Rajaram, Stony Brooks University, NY, USA [+Info](#)

Title: Neural Correlates Of Social Remembering: The Social Contagion Effect

Abstract: This project aims to study the neurocognitive mechanisms and modulating individual differences of social contagion in collaborative memory. Traditional paradigms studying the neural basis of memory retrieval have focused on individual performance, whereas in real life contexts we usually work with others to retrieve information. Extensive behavioral research has shown that recalling in groups are not always beneficial, but rather the opposite, so that remembering is impaired when participants recall in groups than when they recall individually. These impairments have been explained by, among others, the disruption of retrieval strategies (collaborative inhibition) and the subsequent integration of inaccurate information shared by others (social contagion). However, the underlying mechanisms and the individual differences that modulate these effects are not fully understood, and research on the neural mechanisms underlying collaborative memory is almost absent. This proposal fills in the gap by investigating the fine grained neurocognitive processes underlying in group retrieval. To this end, EEG will be simultaneously recorded from several people in the same face to face experimental settings. Participants will recall previously studied DRM (Deese, 1959; Roediger & McDermott, 1995) lists in triads (collaborative condition) or individually (nominal condition) that are expected to evoke associatively memory errors. First, EEG activity associated to interference and disruption of strategy will be analyzed to test if collaborating with other people disrupt the inner organization of information and introduce competition and interference. Second, we will study the EEG signatures related to errors encoding that elicit social contagion in the collaborative condition. Individual differences in variables related to social anxiety and theory of mind will be included in the analyses. The project takes advantage of the unique opportunity to conduct EEG recording in collaborative settings to address fundamental questions regarding in group memory retrieval that have not been previously addressed.

CIMCYC supervisor: Daniela Paolieri [+Info](#)

International co-supervisor: Francesca Pesciarelli, Dipartimento di Scienze Biomediche, Metaboliche e Neuroscienze, Università degli studi di Modena e Reggio Emilia, Italia [+Info](#)

Title: Pervasive behavioral and neural effects of grammatical gender in language processing

Abstract: The overall goal of the project is to investigate the role of grammatical gender information during linguistic comprehension by delving into its different levels of analysis: lexical, semantic and social, which have important implications in the way we understand, experience and interpret the world around us. Exploring the neural basis (ERPs) of the interaction between grammatical gender, biological information (sex and gender) and stereotypic information is also fundamental to understand complex social behaviors, such as discrimination and disparities, in a multicultural and multilingual world. Our project investigates this crucial aspect, focusing on the underlying correlates of these interactions, using the well-established technique of priming. In the studies we will focus on



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specific words with biological gender, stereotypical gender, abstract gender and generic masculine, to assess the impact of semantic variables on congruency effects. We expect that greater priming effects will be observed for stimuli with biological and stereotyped gender with respect to the arbitrary one (greater strength in the gender-semantic relationship), as well as an interaction with the biological sex and/or gender identity of the person participating in the study. In addition, we expect that the generic masculine form may determine different congruency effects if interpreted in a more or less specific way. In the present project, we are also interested in exploring factors such as the sex and gender role of the person participating in the studies, which could modulate the grammatical gender congruency effect. Moreover, considering the multicultural and multilingual nature of our society, bilingual individuals represent a key target population in which the process of gender activation and associated semantic information may vary very significantly.

CIMCYC supervisor: Ana Isabel Pérez Muñoz [+Info](#)

International co-supervisor: Davide Nardo, Università Roma Tre, Italia [+Info](#)

Title: Bilingual aging and cognitive reserve: Dealing with unexpected information during text comprehension

Abstract: The ability to revise an unexpected interpretation do not only requires the detection of information that is inconsistent with an initial erroneous prediction (comprehension monitoring), but also the replacement of that prediction with a new interpretation (revision). This ability can be very challenging for populations with presumed less cognitive resources such as older people (e.g., Veríssimo et al., 2022), or even younger adults during second language comprehension (e.g., Horiba & Fukaya, 2015). The present research plan is situated within the RunIn-Brain project (MINECO), which is the continuation of a previous research project: T-ComBrain (MSCA-COFUND Athenea3i-2018; full title: "Text Comprehension in the Brain: The role of Development and Bilingualism"), both led by the actual Principal Investigator. The main goal of the present doctoral thesis is to elucidate the cognitive and neural mechanisms underlying the ability to revise an unexpected interpretation by looking at the interplay between Ageing and Bilingualism. More concretely, this goal is based on two general aims: 1) to study age-related cognitive decline during L1 and L2 text comprehension in bilinguals, and 2) to test the bilingual advantage hypothesis in younger and older adults during L1 text comprehension. A comprehensive two-fold approach will be used to achieve the two general aims: A first series of behavioural- electrophysiological (EEG) studies, to examine how the revision of an unexpected interpretation is performed during online text comprehension; and a second series of magnetic resonance imaging (fMRI) studies, to identify brain areas recruited in (literal and inferential) monitoring and revision in monolingual and bilingual younger and older adults, by means of structural (Diffusion-Weighted Imaging or DWI) and functional (resting state-fMRI) connectivity.

Research line: SOCIAL INEQUALITIES

Recommended profile for applicants:

Qualification:

- Bachelor's Degree: Psychology
- Master's Degree: Psychology and Social Intervention or related fields



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Languages: High level of English

Others: Research experience, preferably in subjects related to the proposed plans.

List of Proposed Research Plans

CIMCYC supervisor: Soledad de Lemus Martín [+Info](#)

International co-supervisor: Maja Kutlaca, Durham University [+Info](#)

Title: Beyond Conflict: Effectiveness of Cooperation for Social Change

Abstract: The diversity of the current sources of social threats (economic, symbolic, political, environmental) leads to the emergence of cooperation strategies between groups aimed towards common goals. Such alliances might be formed between disadvantaged groups (e.g., LGBT movement to confront homophobia), or between advantaged and disadvantaged groups (e.g., host community's support for migrants). In this project, we aim to deepen our understanding of intergroup cooperation as a form of coping with large social threats from the perspective of advantaged and disadvantaged groups. We focus on the general hypothesis that in order to promote social change, intergroup cooperation needs to acknowledge and negotiate the existing intergroup conflicts. Instead of treating cooperation and conflict as processes antithetical to each other, this project uniquely proposes that groups need to engage in cooperation and conflict simultaneously to find adequate solutions. We propose that intergroup conflict is also necessary (and compatible with cooperation) in order to increase the possibility of success when groups must work together to create coordinated solutions to address global threats. This implies working internally on the lines of negotiations within movements and developing sustained long-term collaboration. Thus, we propose a bidimensional model of intergroup relations and will focus on how this offers a particularly valuable way of understanding how groups can work together to respond to global threats. We examine the predicting role of identities, privilege awareness, dehumanization and perceived intergroup conflict for social change. Using a mixed-method and cross-cultural approach, we focus on current sociopolitical intergroup issues such as gender, class, race relations in the context of ongoing environmental, migrants rights and pro-diversity movements.

CIMCYC supervisor: Rosa Rodríguez Bailón [+Info](#)

International co-supervisor: Matthias Gobel, University of Sussex, UK [+Info](#)

Title: Strategies for Reducing Economic Disparity: An Approach from the Perception of Close Inequality

Abstract: Economic inequality impacts society and generates significant negative psychological and social consequences. Successive economic, social and health crises in recent years have accentuated the gap between the rich and the poor. However, despite the serious negative consequences of inequality, motivating people to adopt attitudes and behaviors to reduce it is a major challenge today. Although there has been some progress in this regard, there are gaps in knowledge about which interventions may be most effective in meeting this challenge. Previous research in social psychology has shown that perceived economic inequality among close people (e.g. family, friends, co-workers) can be an effective way to motivate individuals to reduce inequality. Therefore, the main objective of this research plan is to systematically and comparatively analyze strategies to promote the change of attitudes and behaviors that favor the redistribution of resources and the reduction of inequality.



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Specifically, it is intended to analyze the effects of different interventions that have shown their effectiveness in other contexts and in small samples on the attitudes, motivations and behaviors of individuals to reduce inequality through the awareness that inequality close to them has a negative impact on the welfare of the people they encounter in their everyday life. This line of research includes conducting some pilot studies to test the interventions, but fundamentally it will develop experimental studies in which the effect of strategies aimed at activating the perception of economic inequality in close relationships on the main dependent variables, i.e. on support and attitudes towards redistribution measures and collective actions to reduce inequality, will be examined. The results will have a potential direct transfer to public actions and policies aimed at reducing economic inequality and its adverse effects.