BASQUE CENTER
ON COGNITION, BRAIN
AND LANGUAGE

Activity REPORT 2021-2024

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AND LANGUAGE

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In honor of Iñigo Romero, whose warm smile and generosity, always shown with quiet discretion and elegance, left an unforgettable mark on our team; and to Anique Schüler, who inspired us daily with her strength and unwavering dedication, demonstrating how far one can go despite physical limitations and, above all, where perseverance can lead us. We remember them with deep gratitude and affection. Their legacy lives on within each of us and in the work we carry forward every day at the BCBL.

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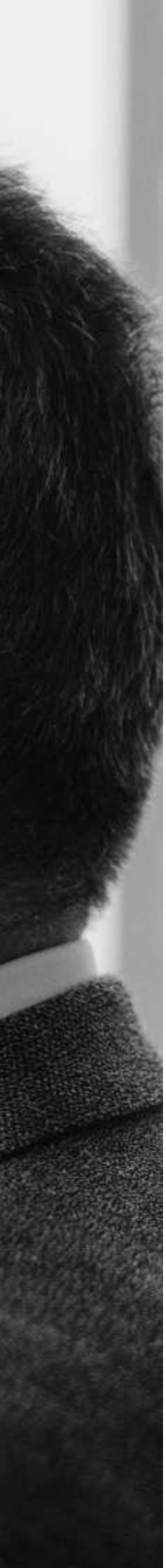

This document presents the activity report of the Basque Center on Cognition, Brain and Language (BCBL) during the 2021–2024 period.

Founded with the mission of performing world-class research on the cognitive and neural mechanisms underlying language, the BCBL has consolidated its position as a global reference in interdisciplinary research, with special emphasis on bilingualism, multilingualism, and language-related brain plasticity. The center continues to pursue excellence in scientific production, science dissemination, training, and knowledge transfer in the field of Cognitive Neuroscience of Language.

During this period, the BCBL has strengthened its scientific and organizational infrastructure. Now operating across three active sites—Miramón, Korta, and JuniorLab (Vitoria)—the center is equipped with state-of-the-art technologies, including the newly installed MEG Triux Neo® system, an advanced Siemens 3T Prismafit MRI scanner (upgraded in 2024 to version XA30),and an Optical Coherence Tomography (OCT) Spectralis system. Moreover, the center has incorporated a cutting-edge Gowerlabs LUMO fNIRS system, optimized for developmental research and hyperscanning. These resources allow for the investigation of the neural correlates of language with unprecedented precision, enhancing our ability to conduct high-resolution, multimodal, and developmentally sensitive neuroimaging studies.

Scientific activity at the BCBL remains vibrant. Between 2021 and 2024, researchers reported major discoveries in the field of neurobiology of language,publishing 365 scientific articles—78% were published in Q1 journals and 56% in D1 journals—accompanied by showcases at international conferences. These achievements place the BCBL among the top international research centers in the field. This Research has continued to expand infive major lines: language development, speech perception and disorders, reading and dyslexia, multilingualism, and brain damage and rehabilitation, all with growing interdisciplinary connections.

Fundraising has been strong, with 61 externally funded projects (including two ongoing ERCs and three awarded ERC grants), and a self-financing rate exceeding 80%. The center was also awarded with th Severo Ochoa Center of Excellence acreditation (2022–2026), confirming its strategic value to the national and European research landscape.

In terms of training, the center continues to foster academic excellence. Between 2021 and 2024, 61 students enrolled in the Master's Program in Cognitive Neuroscience of Language, while 35 doctoral theses were completed under a PhD program recently reaccredited by Unibasq for the 2024–2029 period. Many of our graduates have continued their careers at internationally renowned institutions.

The BCBL remains committed to technological and clinical collaboration. Through initiatives such as NeureClinic, over 100 children have been diagnosed since 2018. Moreover, the center has developed and openly shared tools such as NeureSoft, MultiMAP, and neuroimaging datasets, reinforcing its dedication to real-world impact and open science.

Outreach and dissemination continue to be strategic pillars. The center has organized 15 international conferences, hosted over 70 invited seminars, and appeared in more than 1,500 media outlets, engaging over 22,000 participants in experiments and school visits.

From a human resources perspective, the BCBL has renewed its HRS4R Seal of Excellence, implemented a Gender Equality Plan, and adopted inclusive measures such as Spanish Sign Language classes and accessible communication systems, reinforcing its values of equity and sustainability.

These have been years of maturity, renewal, and consolidation for the BCBL. The pages that follow outline our main achievements, which have only been possible thanks to the creativity, dedication, and collaborative spirit of the entire BCBL community.

I would like to express my deepest gratitude to the entire BCBL team for their dedication and talent, to our patrons for their unwavering support, and to the many citizens who generously participate in our studies. Their contributions are invaluable to advancing our understanding of cognition, brain function, and language, and in ensure that our research has a real and lasting impact on society.

We look ahead with confidence and responsibility, eager to continue contributing to scientific excellence, training the next generation of researchers, and developing solutions that improve people's lives.

Manuel Carreiras
Director of the BCBL
January, 2025

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1.A DEFINITION
1.B MISSION, VISION
1.C AIMS

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THE CENTER

The Basque Center on Cognition, Brain and Language (BCBL) remains an internationally recognized interdisciplinary research center focused on the study of the brain, cognition, and language. Established by Innobasque, Ikerbasque, UPV-EHU, and the Gipuzkoa Provincial Council, the BCBL is part of the Basque Network of Science, Technology and Innovation (RVCTI). It has earned an outstanding reputation within the framework of the Basque Excellence Research Centres (BERC) program for 2022-2025.

The BCBL's primary aim is to carry out cutting-edge research in the cognitive neuroscience of language, with a particular focus on bilingualism, multilingualism, language acquisition, and language-related disorders. By employing the latest neuroimaging technologies and advanced computational models, the center delves into areas such as the impact of aging, neurodegeneration, and brain injuries on language.

During the 2021-2024 period, the BCBL has strengthened its international collaborations, extended its research lines, and increased its funding sources. These efforts have allowed the center to sustain significant growth in human resources and research infrastructure, further solidifying its status as a global leader in its field.

The mission of the BCBL is to be a world-class center dedicated to excellence in research, training, and knowledge transfer in the field of cognitive neuroscience of language. The center provides a platform for researchers and professionals from various disciplines to advance the understanding of the neurocognitive mechanisms involved in language acquisition, comprehension, and production.

The BCBL aims to:

- Expand knowledge about the neural processes that underpin bilingualism, multilingualism, and language disorders.
- Contribute to the development of diagnostic tools and therapies for language impairments, such as dyslexia and aphasia.
- Foster international collaborations and act as a hub for innovation, translating scientific discoveries into educational, clinical, and societal applications.

The BCBL's commitment to society is evident through its collaboration with universities, healthcare systems, and educational institutions. The center strives to enhance social welfare by applying its research findings to education, healthcare, and the rehabilitation of language disorders, contributing to the well-being of individuals and communities.

THE AIMS OF THE BCBL

During the 2021-2024 period, the BCBL has continued to pursue its strategic objectives by focusing on several key areas, aligning with its mission of excellence in research. These objectives include:

1. Research Excellence and Innovation:
- To push the boundaries of cognitive neuroscience by understanding the neural underpinnings of language processes, such as speech perception, language production, and reading disorders.
- To further explore the plasticity of the brain concerning language acquisition in both children and adults, including second-language learning and multilingualism.

2. Transfer of Knowledge:
- To translate scientific discoveries into practical applications in education, clinical practices, and rehabilitation, particularly concerning language disorders.
- To develop and implement technological solutions, such as NeureSoft, for diagnosing and treating neurodevelopmental and language disorders.

3. Collaboration and Social Impact:
- Strengthen international cooperation through projects supported by entities such as the European Research Council (ERC) and the European Commission's Horizon Europe framework.
- To maintain close collaborations with hospitals, educational centers, and health institutions to develop strategies that improve both the quality of life for individuals with language disorders, as well as the diagnosis and treatment protocols used in clinical settings.

4. Human Resource Development:
- To enhance talent acquisition and retention, with an emphasis on recruiting world-class researchers and providing comprehensive training for early-stage researchers through robust mentorship programs.

5. Sustainable Growth:
- To secure sustainable funding from both public and private sources to support the center's long-term goals, ensuring that research activities are continuously funded at a high level.

2.A PARTNERS
2.B GOVERNANCE
2.C PEOPLE
2.D SCIENTIFIC TALENT

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ORGANIZATION AND GOVERNANCE

BCBL was established as a Non-profit Association on November 19th, 2008. The Association currently comprises the following founding partners:

Ikerbasque
Basque Foundation for Science
www.ikerbasque.net

Innobasque
Basque Innovation Agency
www.innobasque.eus

Provincial Government of Gipuzkoa
www.gipuzkoa.eus

University of the Basque Country
www.ehu.eus

Basque Government
www.euskadi.eus

The BCBL is a non-profit institution. The structure and composition of the Center is based on the BERC (Basque Excellence Research Center) model, developed by the Basque Government and Ikerbasque. The main Management Board is the **General Assembly**, in which all BCBL partners (the Basque Government via Ikerbasque, the University of the Basque Country UPV/EHU, Innobasque, the Basque Innovation Agency, and the Diputación Foral de Gipuzkoa) are represented. The General Assembly delegates a **Steering Committee**, which meets several times per year and ensures the proper management of the center. Both the General Assembly and the Steering Committee are headed by the President of the BCBL, who is the Basque Government Deputy Councilor for Universities and Research.

The **General Assembly** is the Association's supreme governing body; it includes all members.
The Steering Committee is the body responsible for administering the Association; it ensures that the Articles of the Association are complied with and that the agreements reached at the General Assembly are fulfilled.

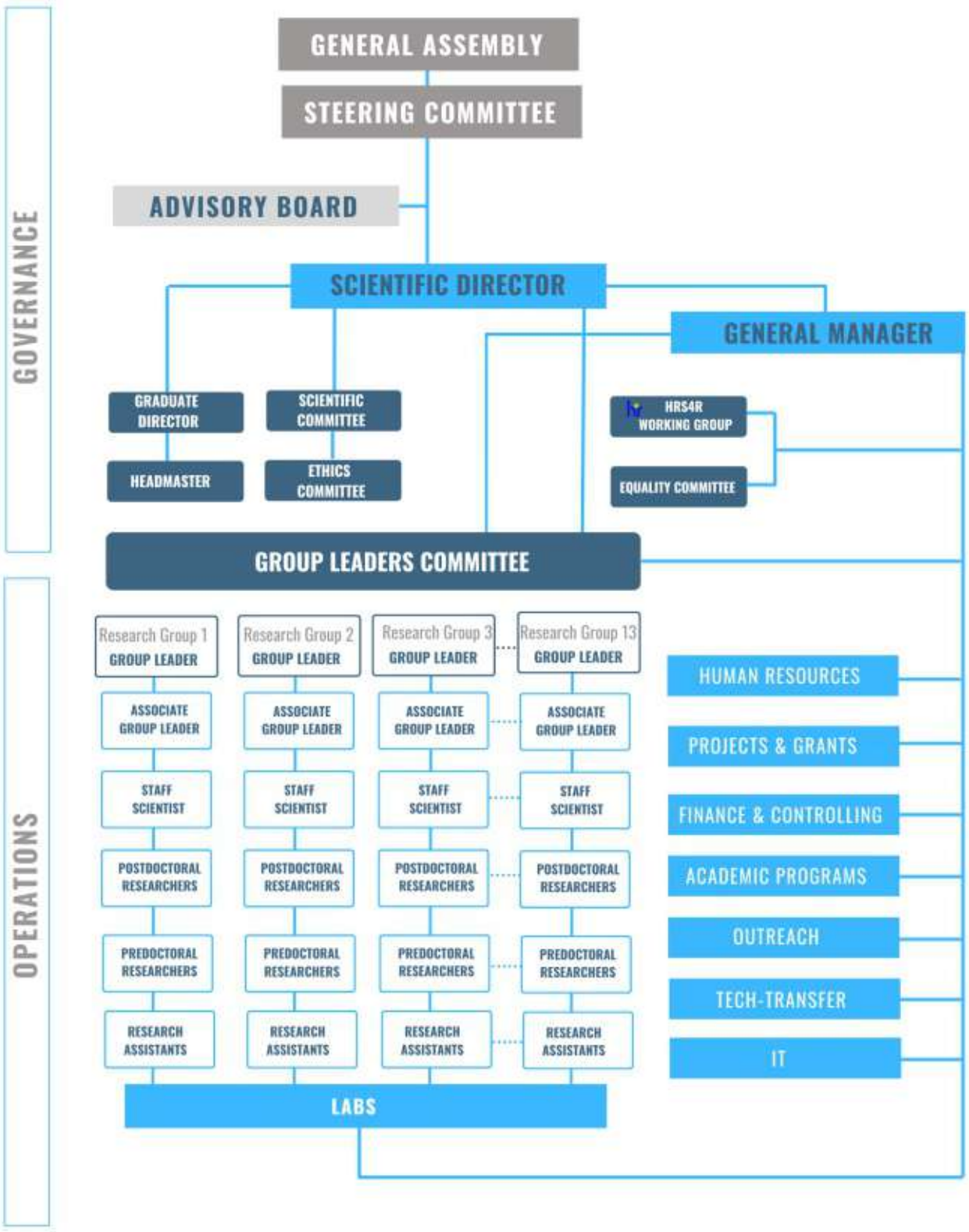
The Chairmen of the BCBL's General Assembly and Steering Committee for the 2021-2024 period were:

Fundación Ikerbasque
represented by:

[2021-2024
Aldofo Morais Ezquerro
Viceconsejero de Universidades e Investigación del Gobierno Vasco (Basque Government Deputy
Councilor for Universities and Research).

2.B GOVERNANCE

2.B.1 Organizational Chart



2.B.2 ISAB, International Scientific Advisory Board

The BCBL's International Scientific Advisory Committee is an observer and consultative external body, mainly constituted by internationally renowned researchers with different areas of expertise within the field of cognitive neuroscience. The members of the Scientific Advisory Committee are experts in their respective areas of knowledge, both in the national and international context.

For the 2021–2024 period, the members of the International Advisory Board were:

[George R. Mangun, Ph.D. (Chair)
Distinguished Professor of Psychology and Neurology
Director, Center for Mind and Brain
University of California, Davis, U.S.A.

[James L. McClelland, Ph.D.
Lucie Stern Professor in the Social Sciences
Department of Psychology
Director, Center for Mind, Brain and Computation. Stanford University, U.S.A.

[Cathy J. Price, Ph.D. (Appointed in 2020)
Professor of Cognitive Neuroscience
Director, Wellcome Centre for Human Neuroimaging
Queen Square Institute of Neurology
University College London, U.K.

[Aslı Özyürek, Ph.D. (Appointed in 2024)
Professor, Donders Institute for Brain, Cognition and Behaviour, Faculty of Social Sciences
Affiliated Researcher, Center for Language Studies, Radboud University and Max Planck Institute for Psycholinguistics
Director, Multimodal Language Department, Max Planck Institute for Psycholinguistics. Nijmegen, The Netherlands

[Anne Cutler, Ph.D. (Until December 2022, †)
Distinguished Professor, The MARCS Institute, Western Sydney University, Australia
Director Emeritus, Max Planck Institute for Psycholinguistics, The Netherlands
† Anne Cutler sadly passed away in December 2022, leaving a lasting legacy in the field of psycholinguistics.

[Timothy Shallice, Ph.D. (Until September 2024)
Professor and Director Emeritus, Institute for Cognitive Neuroscience. University College London, U.K.
Professor Emeritus, Scuola Internazionale Superiore di Studi Avanzati (SISSA), Italy

[William Marslen-Wilson, Ph.D. (Until December 2024)
Honorary Professor of Language and Cognition, Department of Experimental Psychology
Director Emeritus, MRC Cognition and Brain Sciences Unit, University of Cambridge, U.K.

2.B.3 Internal Organization: Committees and Working Groups

The **Scientific Director** provides scientific and management leadership of the BCBL by defining and coordinating the implementation of the overall strategy of the center. The Scientific Director promotes a comfortable atmosphere that stimulates high-quality research production, efficient collaborative management, and technical support. As the main center representative, the Director also designs and promotes alliances and relationships with partners and stakeholders to achieve BCBL's primary objectives.

While the director of the center provides leadership, responsibilities are highly distributed among researchers, fostering collegial strategic decisions. To maintain, implement, and deploy the BCBL procedures and policies, a solid monitoring mechanism was established. This monitoring mechanism relies on **Dedicated Teams and Committees** responsible for the proper daily functioning of BCBL's scientific and administrative activities, ensuring the smooth operation of the center.

Researchers are grouped into research groups that dynamically change/increase as research programs develop, new human resources are recruited, or new grants are obtained. Each group is led by a Group Leader (GL) (see full list at www.bcbl.eu) and multiple Associate Group Leaders (AGL). In 2024, we introduced a new role within our scientific team: Associate Group Leader (see the organizational chart). This position was created to increase the visibility and independence of BCBL researchers with solid experience who are not yet eligible for the Group Leader position due to the center's structure. The AGL supports the GL in ensuring effective development and performance of the research group. Both Group Leaders and Associate Group Leaders provide expert guidance to PhD students and postdoctoral researchers, and also are responsible for establishing the group's research goals and managing its budget.

The **Management Team** led by the General Manager supports all research activities, across all departments the organizational chart transversally. This includes support for departments such as Administration (finance control, projects and grants management, human resources, and outreach), Information Technologies, Laboratories, and Tech-Transfer. It is important to highlight that since many researchers are foreigners, the BCBL needs a group of trained research assistants in its different laboratories to be able to run experiments in the local languages, Basque and Spanish.

The research and support staff at the BCBL today are:

- Director: Dr. Manuel Carreiras
- Group Leaders: 13
- Associate Group Leaders: 6
- Staff scientists: 8
- Post-doctoral Researchers: 22
- Pre-doctoral Researchers: 44
- Affiliated Researchers: 9
- General Manager: Ana Fernández Arin (2023-current), Dr. Miguel Arocena (2009-2023)
- Laboratories Department: 34
- Information Technologies & Technical: 4
- Administration: 10
- Technical Transfer: 6

SCIENTIFIC COMMITTEES

The **Group Leader Committee**, which includes the Scientific Director, the General Manager, and the Group Leaders, meets once per month to coordinate activities, recruitment, lab organization, and funding to establish priorities, follow the progress of research projects, and support management and outreach structures at the center.

The **Scientific Committee** evaluates all the projects carried out in the BCBL and is composed by one Group Leader, David Soto, and two Associated Group Leaders, Effie Kapnoula and Manuela Ruzzoli.

The **Ethics Committee** ensures all projects comply with the ethical rules and is composed by three Group (Leaders Alejandro Tabas, Marina Kalashnikova and Simona Mancini), and two Associated Group Leaders, (Brendan Costello and Carmen Vidaurre). Additionally, the Euskadi Ethics Committee is contacted when external advice is needed.

The **External Speaker Series** team coordinates the external speaker series scheduled every other Thursday. Speakers are expected to deliver a talk and participate in a Journal Club organized by the PhD students, focusing on a paper selected by the external speaker. Moreover, speakers interact with members of the BCBL interested in their research.

The **Lab Meeting** team is responsible for organizing weekly lab meetings that the research community holds every week. This provides an opportunity for all research personnel to internally communicate and improve ongoing research. Each researcher is to present their findings at least once per year at the Lab Meeting.

TEACHING COMMITTEES

The **Master and PhD programme Coordination Team** is responsible for running the MSc and PhD programmes. The management of key functions has been organized such that one Group Leader (César Caballero) is responsible for the master's degree program (Headmaster), and another Group Leader (Nicola Molinaro) manages the Ph.D. program in Cognitive Neuroscience (Graduate Director). The role of the Graduate Coordinator (Larraitz Lazkano, Administration Team) has been created in order to reinforce this team.

HUMAN RESOURCES COMMITTEES

The **HRS4R Working Group**: The HRS4R award (Human Resources Strategy for Researchers), granted to the BCBL in 2016, aids research institutions and funding organizations in implementing the principles of the Charter & Code in their policies and practices. By embedding these principles, the BCBL has become a more attractive institution for researchers seeking a new employer or host for their research projects. This alignment enhances the appeal of both the national research system and the European Research Area (ERA) as a whole.

In July 2023, the BCBL successfully renewed its HRS4R award following a site visit conducted by three experts appointed by the European Commission. The

HRS4R framework focuses on four main themes of the Charter & Code: ethics, recruitment, working conditions, and training. It also serves as a tool for continuous improvement and development at the BCBL.

Every 2 years, we perform a comprehensive analysis of the BCBL's practices, comparing them to the 40 principles outlined by the European Commission. This process helps identify areas for improvement and results in the design of a concrete Action Plan. The HRS4R Working Group ensures proper tracking and monitoring of the implementation of these actions.

One of the significant milestones achieved under this framework has been the improvement of our OTM-R policy (Open, Transparent, and Merit-based Recruitment) and the development of an online recruitment tool.

These advancements reflect our commitment to fostering a supportive, transparent, and ethical research environment.

The **Equality Working Group** is in charge of promoting actions to guarantee equality. The BCBL is aware that research centers can be competitive only if they develop, attract and retain the best talent, both female and male. Consequently, since its foundation, the BCBL has promoted equal opportunity between men and women. In this sense, recruitment of scientific talent and promotion, as well as selection of the staff team, is based purely on merit, guaranteeing equal opportunities for all candidates. The objective is to create a workplace where the best talent can flourish in line with the Strategic Vision of the European Research Area, which aims to ensure that half of the scientific personnel in all disciplines and at all levels of the scientific system are women by 2030.

The BCBL Gender Action Plan has multiple components, including work-life balance strategies, and the implementation of procedures to ensure equity (e.g., in salary), access (e.g., to research infrastructure, student support), and in administrative structure of the center (i.e., the involvement of Group Leaders in planning and decision making). The majority (>65%) of the personnel of the BCBL (i.e., trainees, scientific and administrative staff) are women. This proportion of female/male employees comes as a result of a strategy that is based on 2 main pillars: (1) No gender distinction in terms of salary. The salary level depends on responsibility and/or research level, regardless of gender; (2) Promotion is always achieved based on performance, regardless of the gender of the employee.

The **Ombuds Team** is made up of members of the Administrative and Research staff, elected to the team based on proposals and consensus from the doctoral and postdoctoral researchers. It is an independent mechanism with several functions including conflict resolution, giving advice and support for BCBL staff, handling confidential and/or sensitive matters, monitoring work practice issues and making recommendations for improvement. The Ombuds team can be reached to talk in complete confidence.

OPERATIONAL COMMITTEES

Lab Techniques Committees: Each laboratory technique (MRI, EEG, MEG, Behavioral/Online, Eye Tracking/Optical Coherence Tomography, BabyLab) has a coordination team composed of research and laboratory staff that ensures the proper functioning and optimization of the equipment.

The **IT Committee** consists of researchers, laboratory staff, and IT personnel. They work to optimize the center's computing and IT resources by proposing improvements and implementing solutions for IT related issues.

THE RESEARCH AND SUPPORT STAFF AT THE BCBL TODAY IS:

DIRECTOR

Manuel Carreiras
2008-today
Ikerbasque Research Professor

GENERAL MANAGER

Miguel A. Arocena
2009-2023
General Manager since 2023: Ana Fernández
2009-today

GROUP LEADERS

César Caballero-Gaudes
2012-today
Ikerbasque Research Associate - Ramon y Cajal Fellow
Ram Frost
2019-today
Senior Scientist
Marina Kalashnikova
2018-today
Ikerbasque Research Fellow
Marie Lallier
2010-today
Ikerbasque Research Associate - Ramon y Cajal Fellow
James Magnuson
2021-today
Ikerbasque Research Professor
Simona Mancini
2010-today
Ikerbasque Research Associate - Ramon y Cajal Fellow
Clara Martin
2012-today
Ikerbasque Research Professor
Nicola Molinaro
2009-today
Ikerbasque Research Professor
P.M. (Kepa) Paz-Alonso
2011-today
Ikerbasque Research Professor
Arthur Samuel
2010-today
Ikerbasque Research Professor
David Soto
2016-today
Ikerbasque Research Professor
Alejandro Tabas
2024-today
Ikerbasque Research Associate - Ramon y Cajal Fellow

ASSOCIATE GROUP LEADERS

Lucia Amoruso
2017-today
Brendan Costello
2010-today
Efthymia Kapnoula
2016-today
Ikerbasque Research Fellow - Ramón y Cajal Fellow
Garikoitz Lerma-Usabiaga
2012-today
Ikerbasque Research Fellow - Ramón y Cajal Fellow
Manuela Ruzzoli
2021-today
Ikerbasque Research Fellow - Ramon y Cajal Fellow
Carmen Vidaurre
2023-today
Ikerbasque Research Associate

STAFF SCIENTIST

Sendy Caffarra
2013-2021
Amaia Carrión-Castillo
2020-today
IkerbasqueReaserch Fellow - Ramón y Cajal Fellow - Marie Skłodowska-Curie Fellow
Lia Maria Hocke
2024-today
Mikel Lizarazu
2011-today
Ikerbasque Research Fellow

Svetlana Pinet
2019-today
Ikerbasque Research Fellow - Marie Skłodowska-Curie Fellow
Ileana Quiñones
2015-2023
Craig Richter
2018-today
Ramón y Cajal Fellow
Olivera Savic
2023-today
Marie Skłodowska-Curie Fellow
Antje Stoehr
2018-today
Ikerbasque Research Fellow - Juan de la Cierva Fellow

POSTDOCTORAL RESEARCHERS

Najemeddine Abdennour
2023-today
IKUR Fellowship
Sandy Abu El Adas
2022-today
Marie Skłodowska-Curie Fellow
Alexia Antzaka
2013-2021
Loretxu Bergouignan
2014-2021
Nicoletta Biondo
2022-today
Marie Skłodowska-Curie Fellow
Tiphaine Caudrelier
2021-2022
Ivory Y. Chen
2024-Today
Severo Ochoa Fellow
Susanne Eisenhauer
2024-today
Marcel Giezen
2015-today
Ane Gurtubay-Antolin
2015-today
Juan de la Cierva Fellow - Marie Skłodowska-Curie Fellow
Kshipra Gurunandan
2022-2024
Jieying He
2023-today
David Hernández-Gutiérrez
2022-2024
Mohamed Issa
2023-today
Severo Ochoa Fellow
Mina Jevtovic
2019-2023
Ana Joya
2023-today
IKUR Fellowship
Anastasia Klimovich-Gray
2018-2022
Li-Chuan Ku
2023-today
IKUR Fellowship
Tomas Lenc
2024-today
Marie Skłodowska-Curie Fellow
Peng Li
2023-Today
Juan de la Cierva Fellow
Mengxing Liu
2019-2023
Suhail Matar
2022-today
Juan de la Cierva Fellow
Drew McLaughlin
2022-today
Marie Skłodowska-Curie Fellow
Ning Mei
2018-2023
YevgenyMelguy
2023-2024
Giulia Mornati
2022-today
Alexandra Navarrete
2024-today
Juan de la Cierva Fellow
Fernando Pérez-Bueno
2024-2024
José J. Pérez-Navarro
2017-today
Plan Nacional Fellow

Chiara Luna Rivolta
2018-today
La Caixa Health fellow and Severo Ochoa Fellow
Clara Solier
2023-Today
MaiteTermenon
2017-2021
Qihui Xu
2022-2023

PREDOCTORAL RESEARCHERS

Jose A. Aguasvivas
2017-2021
Kirill Aksenov
2024-today
Plan Nacional FPI Fellow
Irene Alonso
2023-today
Severo Ochoa Fellow
Xabier Ansorena
2018-2022
Giada Antonicelli
2022-today
Severo Ochoa FPI Fellow
Karen Arellano
2020-2024
Irene Arrieta
2020-2023
Deneb Avendaño Dominguez
2023-2024
Ana Bautista
2022-today
La Caixa Inphinit Fellow
James Barry
2022-today
La Caixa Fellow Retaining
Noemi Bonfiglio
2023-today
Juan de la Cierva Fellow
Francisca Campos Matias
2024-today
Horizon Europe Fellow
Francisco J. Carrera Arias
2020-today
Robert Cavaluzzi
2023-2024
Irtisha Sony Chakraborty
2024-today
Plan Nacional FPI Fellow
Inés Chavarría
2020-today
Severo Ochoa FPI Fellow
Catherine Clark
2019-2023
María de Almeida Ribero
2024-today
Severo Ochoa FPI Fellow
Laura de Frutos
2021-today
Plan Nacional FPI Fellow
Melissa Donati
2024-today
Plan Nacional FPI Fellow
Florent Duême
2018-2022
Patxi Elosegi
2021-today
Basque Government Predoc Fellow
Hadeel Ershaid
2022-today
Severo Ochoa FPI Fellow
Teresa Esteban
2017-2022
Laura Fernández-Merino
2020-2024
Vicente Ferrer
2020-2023
Marco A. Flores-Coronado
2022-today
La Caixa Fellow Incoming
Candice Frances
2017-2021
Alberto Furgoni
2018-2022
Meritxell García
2019-2021
Shuang Geng
2018-2023
Sandra Gisbert
2017-2021

Kirk Goddard
2019-2021
José Antonio Gonzalo
2024-today
Fundación Tatiana Pérez de Guzmán el Bueno Fellow
Nerea Gorostiola
2022-today
IKUR Fellow
Rachelle Hamelink
2023-today
IKUR HPC – IA Fellow
Pavlina Heinzová
2016-2022
Maddi Ibarbia
2017-2022
Soan Kim
2020-today
Plan Nacional FPI Fellow
Marta La Pietra
2022-today
Plan Nacional FPI Fellow
Leandro Lecca
2020-today
Plan Nacional FPI Fellow
Yongning (Tiger) Lei
2023-today
BFI Fellow
Clémentine Lévy-Fidel
2024-today
ERC Fellow
Hongyang Luo
2023-today
China Scholarship Council Fellow
Ihintza Malharin
2023-today
Severo Ochoa FPI Fellow
Lucia Manso
2020-today
Plan Nacional FPI Fellow
Jiaqi (Mo) Mao
2022-today
La Caixa Fellow Incoming
Jordi Martorell
2017-2023
Pedro Margolles
2018-2022
Stefano Moia
2018-2021
Piermatteo Morucci
2017-2021
Nirmitee Mulay
2021-today
Severo Ochoa FPI Fellow
Sanjeev Nara
2017-2021
Eugenia Navarra
2017-2021
Mikhail Ordin
2015-2021
Joaquin Ordoñez
2024-today
La Caixa Inphinit Fellow
Romain Pasteur
2019-today
Plan Nacional FPI Fellow
Carlos Pérez
2018-2021
Giorgio Piazza
2019-2022
Yue (Irene)Qiu
2023-today
Severo Ochoa FPI Fellow
Sandra Rodríguez
2021-today
Fundación Tatiana Pérez de Guzmán el Bueno Fellow
Abraham Sánchez
2020-2024
Ece Savran
2023-today
Severo Ochoa FPI Fellow
Anique Schüller
2022-2024
Daria Shavarina
2022-2024
Usman Sheikh
2016-2021
Chunya Song
2024-today
Severo Ochoa FPI Fellow
Christoforos Souganidis
2018-2022

Ioanna Taouki
2018-2021
Trisha Thomas
2019-2023
PolinaTimofeeva
2017-2022
Aikaterini Tsaroucha
2022-2024
Eneko Uruñuela
2020-2023
Monika UtrosaSkerjanec
2024-today
ERC Fellow
Vincenzo Verbeni
2023-today
IKUR Fellow
Antje Walter
2024-today
Plan Nacional FPI Fellow
Shiya Wang
2023-today
Severo Ochoa FPI fellow
Daphne Weiss
2022-today
Plan Nacional FPI Fellow
Wai Leung (Brian) Wong
2022-today
Severo Ochoa FPI Fellow
Yi-Ting (Silvia) Yang
2022-today
La Caixa Inphinit Fellow
Hana Zjakic
2021-today
Plan Nacional FPI fellow
Ruiqing Zhang
2024-today
Plan Nacional FPI Fellow

ADMINISTRATION STAFF

Jon Aldaz
2020-today
Leire Arietaleanizbeascoa
2009-today
Vanessa Gallardo
2009-today
Alex Garate
2024-today
Maialen García
2022-today
Maider Goñi
2011-today
Eider Juaristi
2009-today
Larraitz Lazcano
2018-today
Larraitz López
2010-today
Iñigo Romero
2015-2023
Janire Sarasua
2022-2024

INFORMATION TECHNOLOGIES & TECHNICAL STAFF

Borja Chantre
2011-today
Jose Corral
2009-today
Alejandro Exposito
2022-today
Javier Gutiérrez
2013-today

LAB MANAGERS

Manex Lete
2015-today
Oihana Vadillo
2010-today

LAB SECTION COORDINATOR

Elena Aguirrebengoa
2011-today
Itziar Basterra
2012-today
David Carcedo
2011-today
Ainhoa Eguiguren
2016-today

Amets Esnal
2015-today
Maite Kaltzakorta
2021-today
Mamen González
2011-today

LABORATORIES STAFF

Maria Isabel Abril
2022-2024
Olatz Andonegui
2024-today
Maialen Añibarro
2024-today
Javier Aula
2022-2023
Oihane Baskaran
2023-2024
Nils Beck
2021-2022
Jaione Bengoetxea
2022-2023
Daniel Berry
2024-2024
Diego Blanco
2024-2024
Emanuele Ciardo
2024-today
Maddi Carrera
2022-2024
Zuriñe Castresana
2023-2024
Cristina Comella
2022-today
Iñigo Diez
2022-2024
Joane Esnaola
2024-today
Leire Eizaguirre
2019-2022
Aiora Enparantza
20219-2022
Simone Flückiger
2023-today
Sophia FosbergTibblin
2024-today
Melisa Franco
2022-2024
Araitz Garnika
2021-2023
Gloria Gómez
2020-2021
Caroline J. Handley
2022-2024
Nahia Izagirre
2024-today
Jone Iraeta
2022-2023
Patricia Jiménez
2019-2023
Natalia Louleli
2022-2024
Elivan Luiz
2023-2024
Iñaki Montero
2023-today
Soraya Morán
2024-today
Ryland L. Miller
2024-today
Naroa Miralles
2023-2024
Daniel Nieto Carrero
2024-today
Macarena Nuñez
2021-today
Verónica Nuñez
2023-2024
Isabel Olmos
2024-today
Iker Oteiza
2019-2021
Edith Ramos
2019-2023
Katherine Robles
2023-today
Marian Simarro
2023-2024

Mikel Sevilla
2022-2022
Jake M. Vinnacombe
2024-today
Eñaut Zeberio
2023-today

TECH TRANSFER

Amaia Aierbe
2019-today
Jon Castander
2022-2024
Nekane Galparsoro
2012-today
Joana Izurieta
2010-today
Leire Lucas
2018-today
Maite Redondo
2018-today
Martin Tarragona
2017-today

VISITORS
more than 1month stays

BA STUDENTS

Garazi Acasuso (2022)
UPV/EHU, Spain
Miren Agirregomezkorta Iza (2021)
Universidad de Navarra, Spain
Maialen Añibarro (2024)
UPV-EHU, Spain
Ibai Azpeitia (2024)
UNIV. MONDRAGON, Spain
Oihane Bazkaran (2022)
UNED, Spain
Irene Bernardi (2022)
University of Padova, Italy
Ece Nazli Baloglu (2023)
Bilkent University, Turkey
Cristina Comella (2022)
Tecnum, Spain
Sebastián Cruz (2022)
Tecnum, Spain
Araitz Garnika (2021)
EHU/UPV, Spain
Ines Gasset (2021)
Universidad San Pablo CEU, Spain
Gamze Nur Gulgen (2024)
Istinye University (Istanbul), Turkey
Ege Gür (2022)
Bilkent University, Turkey
Ainhoa Ibarra Jauregi (2021)
EHU/UPV, Spain
Miriam Iñurrita (2022)
UPV/EHU, Spain
Nahia Izagirre (2024)
UPV-EHU, Spain
Paula Manso (2022)
Tecnum, Spain
Laia Martí (2024)
UPV-EHU, Spain
Vaibhav Mehra (2023)
Delhi University, India
Aiheko Miner (2024)
UPV-EHU, Spain
Justine Mure (2021)
Universidad de Lyon, France
Anuska Oak (2022)
University of Houston, USA

MASTER STUDENTS

Asena Akkaya (2022)
Bilkent University, Turkey
Irene Alonso Bustamante (2021)
EHU/UPV, Spain
Elene Azkoaga Vitoria (2021)
Universidad Internacional de Valencia,Spain
Giulia Barani (2024)
Università di Pavia, Italy
Noemi Bonfiglio (2023)
UniversityofPadova, Italy
Maddi Carrera Eizaguirre (2021)
Universidad de Sevilla, Spain
Rafael Castro (2021)
Universidad Jorge Tadeo Lozano y La Universidad Central, Colombia
Sandra Cid Guerrero (2021)
EHU/UPV, Spain

Ana Collados Mateos (2021)
EHU/UPV, Spain
Elena Didoni (2024)
University of Pavia, Italy
Alaia Epelde (2022)
UPV/EHU, Spain
Carmen María García Martin (2021)
EHU/UPV, Spain
Patricia Gil Paterna (2022)
Universidad de Valencia, Spain
Jimena Gonzalez (2024)
Ghent university, Belgium
Lucilla Guidotti (2023)
Universita di Milano, Italy
Genevieve Hayes (2022 & 2023)
Oxford University, UK
Pia Hembach (2024)
University of Aachen, Germany
Silvia Herrera Galián (2021)
EHU/UPV, Spain
Jorge Ricardo Hidalgo (2024)
University of Groningen, Netherlands
Hanna Vivianne Hirano (2024)
Purdue University, USA
Hazal Keskinbichki (2022)
UPV/EHU, Spain
KayaLücker (2022)
University of Amsterdam, Netherlands
Anne Mahlke (2023)
Aachen University, Germany
Adriana Maud (2022)
UPV/EHU, Spain
Joaquín Ordoñez (2023)
University of Groningen, Netherlands
Maialen Paniego (2024)
UPV/EHU & Univ. VIC, Spain
Minjung Park (2023)
UPV/EHU, Spain
Aurora Pia Placido (2024)
University of Siena, Italy
Elivan Luiz Rodrigues (2023)
UPV/EHU, Spain
Sandra Rodríguez (2021)
EHU/UPV, Spain
Anne Scott Vela (2023)
UPV/EHU, Spain
Anna Shapiro (2024)
Universität Konstanz, Germany
Katerina Skupovska (2024)
Univ. Groningne, Ghent and Eastern Finland
Maksim Slivka (2022)
Graz University, Lithuania
Diana Solchaga (2022)
UPV/EHU, Spain
Cristina Tobías Figuerola (2021)
Tecnum, Spain
Almendra Villalta (2024)
University of Groningen, Netherlands
Leire Zalakain (2024)
University of Konstanz & University of Bordeaux Montaigne

OTHERS

Francisca Maria Bourdieu (2023)
MIR student
Hospital italiano de Buenos Aires, Argentina
Lena Mehlem (2022)
Erasmus student
RWTH Aachen University, Germany


HAWAII SURF

[01 NEUROBIOLOGY OF LANGUAGE
[02 SPOKEN LANGUAGE
[03 CONSCIOUSNESS
[04 SPEECH AND BILINGUALISM
[05 BRAIN AND RHYTHMS AND COGNITION
[06 LANGUAGE AND MEMORY CONTROL
[07 NEUROLINGUISTICS AND APHASIA
[08 SIGNAL PROCESSING IN NEUROIMAGING
[09 INFANT LANGUAGE AND COGNITION
[10 STATISTICAL LEARNING AND LANGUAGE
[11 DEVELOPMENTAL LANGUAGE DISORDERS
[12 COMPUTATIONAL NEUROSCIENCE
[13 PERCEPTUAL INFERENCE

02.C.1

RESEARCH GROUPS

As of December 2024, the research groups are constituted as follows.

2.C.1 Research groups

[01 NEUROBIOLOGY OF LANGUAGE

The Neurobiology of Language group looks at how the brain represents and processes language in typical as well as atypical populations, for example, when people with deafness or dyslexia read texts.

Examining speech-brain synchronization allows us to identify children at risk for dyslexia and to develop interventions based on neurofeedback that enhance rhythmic sensitivity.

Additionally, we investigate how plasticity allows the brain to adjust to new or unusual circumstances, such as acquiring a new language or the appearance of a brain lesion.

Our studies with bilinguals of different types (including sign language users) provide insight into whether differences between languages and modalities are reflected in underlying neural networks.

We conduct longitudinal research with language learners of different types and brain tumor patients to map language function and to track macrostructural and functional plasticity.

GROUP LEADER

Manuel Carreiras
BCBL Director
Ikerbasque Research Professor

ASSOCIATE GROUP LEADER

Lucia Amoruso
Brendan Costello

STAFF SCIENTIST

Amaia Carrión-Castillo

POSTDOCTORAL RESEARCHERS

Marcel Giezen
Jieying He
Suhail Matar
Alexandra Navarrete
Chiara Luna Rivolta

PREDOCTORAL RESEARCHERS

Kirill Aksenov
Laura de Frutos
Lucía Manso
Joaquin Ordoñez
Antje Walter
Ruiqing Zhang

AFILIATED RESEARCHER

Jesús Cespón

RESEARCH ASSISTANTS

Iñaki Montero
Isabel Olmos

[02 SPOKEN LANGUAGE

Speech is a unique evolutionary achievement that has played an enormous role in human development. We investigate how this system works and what the underlying neural mechanisms are.

These investigations focus on a range of questions. For example, using behavioral and MEG techniques, we are looking at individual variation in the brain lateralization of speech processing.

Using fMRI, we are examining how cognates affect activation of brain regions in bilingual word recognition. We have a set of studies that explore the relationship between speech perception and production, including experiments that reflect the sometimes inhibitory effect one may have on the other.

Ongoing research is testing the role of sleep, exploring some language acquisition cases in which sleep consolidates information, and others in which sleep can help to clear out information that is no longer needed. Collectively, our research efforts are advancing the field's understanding of spoken language processing.

GROUP LEADER

Arthur Samuel
Ikerbasque Research Professor

ASSOCIATE GROUP LEADERS

Efthymia Kapnoula

POSTDOCTORAL RESEARCHERS

Drew Mc Laughlin

PREDOCTORAL RESEARCHERS

Daphne Weiss
Wai Leung (Brian) Wong

2.C.1 Research groups

[03 CONSCIOUSNESS

We are developing new protocols to understand the distinction between conscious and non-conscious information processing in the human brain, and its role in guiding cognition and behaviour. We combine advanced brain imaging procedures, psychophysical tasks and state-of-the-art computational methods.

Our research encompasses multiple cognitive domains, including perceptual selection, learning and memory, and language, as well as metacognition—our ability to reflect, monitor and control our own cognitive processes.

We study these topics in children, healthy adults and patients. We are committed to translating our findings for the benefit of the wider society, by developing educational and clinical applications through targeted neurocognitive interventions that can promote adaptive behavioral change.

GROUP LEADER

David Soto
Ikerbasque Research Professor

POSTDOCTORAL RESEARCHERS

Najemeddine Abdennour
Ivory Chen

PREDOCTORAL RESEARCHERS

Francisca Campos Matias
Patxi Elosegi
Soan Kim
Nirmitee Mulay

2.C.1 Research groups

[04 SPEACH AND BILINGUALIMS

Our main objective is to explore speech perception and production, their interplay and control, with a specific focus on language interactions in the bilingual mind.

We aim to explore factors impacting speech production and perception in L1 and L2, including contextual properties (e.g., foreign accentedness of the speaker/addressee). We also focus on factors influencing and optimizing L2 speech sound and word learning (e.g., orthography, consciousness, cross-modality interactions). Another line of research targets bilingual language control by exploring L1/L2 language interference in word and sentence perception and production in monolingual and bilingual (switching) modes.

We recently started a large-scale ERC* project investigating the impact of the orthographic system on speech sound and word perception and production across modalities (listening, reading, speaking, typing), languages (opaque and transparent orthographies), and populations (monolinguals and bilinguals with varying reading skills).

GROUP LEADER

Clara Martin
Ikerbasque Research Professor

STAFF SCIENTIST

Svetlana Pinet
Antje Stohr

POSTDOCTORAL RESEARCHERS

Peng Li
Clara Solier

PREDOCTORAL RESEARCHERS

Ana Bautista
Yi-Ting (Silvia) Yang
Yue (Irene) Qiu

RESEARCH ASSISTANTS

Daniel Nieto Carrero

2.C.1 **Research groups**

[05 BRAIN RHYTHMS AND COGNITION

The human brain processes and analyzes complex information within fractions of a second, overcoming both input ambiguity and noise. In our group, we use time-resolved neuroimaging techniques (MEG and EEG) to understand the computational dynamics and architecture of language processing.

The temporal structure of the surrounding environment provides cues that help the brain optimally sample external stimuli and orchestrate appropriate responses.

The Brain Rhythms and Cognition group explores how the brain encodes visual, auditory and linguistic rhythms by focusing on neural oscillatory activity. Based on this approach we investigate predictive processing in language comprehension, music processing and visual and attentional processes.

These research lines merge into the more general goal of detecting oscillatory neural components that lead to the development of language disorders across the lifespan.

GROUP LEADER

Nicola Molinaro
Ikerbasque Research Professor

ASSOCIATE GROUP LEADERS

Manuela Ruzzoli

STAFF SCIENTIST

Mikel Lizarazu

POSTDOCTORAL RESEARCHERS

Mohamen Issa
Li-Chuan Ku
Tomas Lenc
Jose J. Pérez-Navarro

PREDOCTORAL RESEARCHERS

Noemi Bonfiglio
Marta La Pietra
José Antonio Gonzalo
Jiaqi (Mo) Mao
Romain Pastureau
Maria de Almeida Ribeiro
Vincenzo Verdeni

RESEARCH ASSISTANTS

Emanuele Ciardo

2.C.1 Research groups

[06 LANGUAGE AND MEMORY CONTROL

Cognitive neuroscientists, engineers and mathematicians work together in the Language and Memory Control group to unravel the neural basis of high cognitive functions using an array of behavioral, functional (task-related, resting-state) and structural (volumetric, diffusion MRI, quantitative MRI) MRI techniques and a range of analytical approaches.

We investigate how high cognitive functions result from interactions between different cognitive components, focusing mostly on language (reading, speech comprehension and production) and memory (semantic, autobiographical, episodic) systems across the life span in both cognitively normal and clinical populations.

Our current research program includes studies on thalamocortical contributions to language systems, differential involvement of visual pathways in word processing, brain plasticity associated with language learning and cognitive training, executive attention, episodic memory retrieval, creativity, and advanced MRI methods.

GROUP LEADER

Pedro M. (Kepa) Paz-Alonso
Ikerbasque Research Associate

ASSOCIATE GROUP LEADER

Garikoitz Lerma-Usabiaga
Carmen Vidaurre

POSTDOCTORAL RESEARCHERS

Ane Gurtubay-Antolin

PREDOCTORAL RESEARCHERS

Ece Savran
Yogning (Tiger) Lei
Francisco J. Carrera Arias
Hongyang Luo
Leandro Lecca
Chunya Song
Rachelle Hamelink
Sandra Rodriguez
Shiya Wang
James Barry

RESEARCH ASSISTANTS

Katherine Robles

2.C.1 **Research groups**

[07 NEUROLINGUISTICS AND APHASIA

The Neurolinguistics and Aphasia group focuses on the study of language comprehension, production and learning across a wide spectrum of populations from adult monolingual and bilingual speakers to language-impaired brain-damaged patients.

By using a variety of experimental methods (electrophysiology, eye tracking and behavioral paradigms), we investigate how basic syntactic structures and relations are built online, track their time course and electrophysiological correlates, and determine how these change at different stages of L2 learning or in the presence of language impairment.

Moreover, we develop standardized aphasia assessment tools that enable us to study how the breakdown of these core mechanisms can be reliably detected and treated in patients with brain damage.

GROUP LEADER

Simona Mancini
Ikerbasque Research Associate

POSTDOCTORAL RESEARCHERS

Nicoleta Biondo
Susanne Eisenhauer
Ana Joya

PREDOCTORAL RESEARCHERS

Giada Antonicelli
Nerea Gorostiola

RESEARCH ASSISTANTS

Nahia Izagirre

2.C.1 Research groups

[08 SIGNAL PROCESSING IN NEUROIMAGING

SPIN-Group. Our group broadly focuses on investigating advanced methods for the acquisition and analysis of neuroimaging and biomedical data in order to advance our understanding of human brain function, structure and physiology.

With a focus on cognitive and clinical neuroscience, our current projects mainly concern the development of signal processing algorithms for functional magnetic resonance imaging and functional near-infrared spectroscopy, including signal denoising and deconvolution, physiological and neurovascular processes, functional connectivity analyses, decoding and encoding brain activity, and multimodal imaging. We aim to apply these methods to examine the functional organization of large-scale brain networks and how they shape cognition in single individuals and across subjects in healthy and diseased conditions across their lifespan.

GROUP LEADER

Cesar Caballero-Gaudes
Ikerbasque Research Associate

STAFF SCIENTIST

Lia Maria Hocke

PREDOCTORAL RESEARCHERS

Ines Chavarría
Cristina Comella
Marco A. Flores-Coronado
Ryland L. Miller

RESEARCH ASSISTANTS

Sophia Forsberg Tibblin

2.C.1 Research groups

[09 INFANT LANGUAGE AND COGNITION

Our group investigates the process of early language acquisition, specifically the emergence and consolidation of speech perception and word-learning over monolingual and bilingual infants' first two years of life, as well as interactions between these early language abilities and the development of general perceptual and cognitive capacities.

The primary aim of this research is to define the earliest determinants of later individual language ability, including but not limited to endogenous factors, such as family risk for developmental language disorders or hearing loss, and environmental factors, such as the quantity and quality of infants' early language input.

We address these questions through cross-sectional and longitudinal designs that combine neurophysiological (EEG, fNIRS), behavioral (visual preference, eye-tracking), and observational (parent-infant interactions) techniques in the BCBL BabyLab.

GROUP LEADER
Marina Kalashnikova
Staff Scientist

STAFF SCIENTIST
Olivera Savic

POSTDOCTORAL RESEARCHERS
Giulia Mornati

PREDOCTORAL RESEARCHERS
Irene Alonso
Melissa Donati
Hana Zjakic

RESEARCH ASSISTANTS
Soraya Morán

2.C.1 **Research groups**

[10 STATISTICAL LEARNING AND LANGUAGE

Individual differences in the ease or difficulty of mastering a second language are related to individual differences in learning regularities in the environment. This perspective has lead to the current interest in statistical learning as an individual-specific ability and how it impacts success in second language learning.

Our current research focuses on statistical learning from both the behavioral and neurobiological perspectives and examines its relation to literacy acquisition, taking into account the unique aspects of languages' orthographic and morphological systems.

Experimental work involves methods from computational linguistics and machine learning used to precisely characterize the statistics of contrasting writing systems, as well as state-of-the-art neuroimaging techniques including EEG, MEG, fMRI used to probe the neurobiological mechanisms for detecting regularities in both the visual and auditory modalities, targeting the what, where, and how of statistical learning and its neural links to L2 learning.

GROUP LEADER
Ram Frost
Senior Scientist

STAFF SCIENTIST
Craig Richter

AFILIATED RESEARCHER
Blair Armstrong

2.C.1 Research groups

[11 EDUCATIONAL NEUROSCIENCE AND DEVELOPMENTAL LANGUAGE DISORDERS

The research activity of the Educational Neuroscience and Developmental Language Disorders group revolves around research lines aiming at elucidating the neurocognitive mechanisms subtending typical and atypical language and reading development and at transferring this knowledge to clinical and educational practice.

Our research projects have been driven by the desire to eventually reach a better understanding as to why some individuals struggle to acquire language, in its oral or written forms, and of the neurocognitive and environmental factors that play a significant role in the manifestations of these developmental language disorders. To conduct this research efficiently, we use various techniques (behavioral testing, eye tracking, fMRI, EEG, MEG) and designs (cross-linguistic, cross-sectional, longitudinal, and training studies) in bilingual and monolingual populations including infants, children, and adults, with and without language and reading disorders.

The group is strongly committed to transferring its fundamental research into practice, and is actively collaborating with clinicians and educators to improve the early detection, diagnosis and remediation of children with developmental language and reading difficulties.

GROUP LEADER

Marie Lallier
Ikerbasque Research Associate

POSTDOCTORAL RESEARCHERS

Sandy Abu El Adas

PREDOCTORAL RESEARCHERS

Irtisha Chakraborty
Hadeel Ershaid

RESEARCH ASSISTANTS

Macarena Núñez

2.C.1 **Research groups**

[12 COMPUTATIONAL NEUROSCIENCE

Understanding the human brain is an incredible challenge. We use simulations with computational models to discover principles that reveal how the brain supports language, cognition, perception, and action.

For example, in the domain of language, we use artificial neural networks that simulate the timecourse of human spoken language processing. Our models develop internal representations that resemble those found in the human brain, and provide new hypotheses about the computations that support language understanding.

We use experiments with human participants to test hypotheses that emerge from simulations with computational models.

By gradually making our models more biologically realistic, we will discover principles that can guide theories of typical development and processing, as well as theories of developmental disorders and impairments due to disease or injury.

GROUP LEADER

James Magnuson
Ikerbasque Research Professor

PREDOCTORAL RESEARCHERS

Ihintza Malharin

RESEARCH ASSISTANTS

Simone Flückiger

2.C.1 Research groups

[13 PERCEPTUAL INFERENCE

Perceiving the world around us is extraordinarily complex. Consider hearing: from a degraded mixture of auditory signals, we manage to understand dialogues and to experience music. To do this, our brain needs to use the knowledge it acquired in the past to fill in the information that is missing in the auditory signals: to infer the auditory objects that produce what we are hearing.

The Perceptual Inference Group aims to understand the neural mechanisms responsible for this process. One of our most ambitious goals is to explain the perceptual inference of spoken language, a process that requires integrating information along multiple time-scales. For this reason we pay special attention to the role played by auditory subcortical structures and early-cortical stages, which present the fine temporal properties necessary to process dynamic speech sounds like phonemes.

Our topic is highly interdisciplinary and requires combining techniques from machine learning, dynamic system modelling, and ultra-high-resolution human neuroimaging. We also collaborate closely with animal electrophysiologists, whose data allows to inspect neural dynamics in greater detail, and with clinical researchers, who help us transferring our results to the study of schizophrenia and dyslexia.

The long term objective of the group is to understand how our subjective priors and expectations shape our experience of reality, giving rise to prejudices and perceptual biases, but also optimizing cognition.

GROUP LEADER

Alejandro Tabas
Ikerbasque Research Associate

PREDOCTORAL RESEARCHERS

Clémentine Lévy-Fidel
Monika Utrosa Škerjanec

2.C.2 Fellowships

European Comission 17

[Marie Skłodowska-Curie 17

Spanish Ministry of Science and Innovation 80

[Ramón y Cajal Fellowship 12
[Juan de la Cierva Formación Felloswship 6
[Juan de la Cierva Incorporación Fellowship 7
[Juan de la Cierva Fellowship 5
[FPI Predoctoral Fellowship 50

Basque Government 28

[IKUR Fellowship 9
[Postdoctoral Felloswship 1
[Predoctoral Fellowship 9
[Investigo Program 9

Gipuzkoa Government 3

[Postdoctoral Felloswship 3

Ikerbasque 21

[Research Proffessor Fellowship 4
[Research Associate Felloswship 8
[Research Fellowship 9

"La Caixa" Fundation 14

[Predoctoral INPhINIT La Caixa Fellowship 14

Tatiana Pérez de Guzmán el Bueno Foundation 2

[Predoctoral Fellowship 2

PI	Grant	Funding Agency	Amount	Period
Sara Guediche	Marie Skłodowska-Curie	European Comission	158.122 €	2019-2021
Efthymia Kapnoula	Marie Skłodowska-Curie	European Comission	171.122 €	2019-2021
Anastasia Klimovich	Marie Skłodowska-Curie	European Comission	170.122 €	2018-2021
Garikoitz Lerma-Usabiaga	Marie Skłodowska-Curie	European Comission	257.191 €	2018-2021
Leona Polyanskaya	Marie Skłodowska-Curie	European Comission	170.122 €	2018-2021
Sendy Caffarra	Marie Skłodowska-Curie	European Comission	245.732 €	2020-2022
Jesús Cespón	Marie Skłodowska-Curie	European Comission	172.932 €	2020-2022
Antje Stoehr	Marie Skłodowska-Curie	European Comission	172.932 €	2020-2022
Svetlana Pinet	Marie Skłodowska-Curie	European Comission	160.932 €	2021-2023
Amaia Carrión	Marie Skłodowska-Curie	European Comission	172.932 €	2022-2024
Lucia Amoruso	Marie Skłodowska-Curie	European Comission	224.497 €	2021-2024
Olivera Savic	Marie Skłodowska-Curie	European Comission	181.153 €	2023-2025
Nicoletta Biondo	Marie Skłodowska-Curie	European Comission	245.732 €	2022-2025
Sandy Abu el Adas	Marie Skłodowska-Curie	European Comission	165.313 €	2023-2025
Drew Jordan Mc Laughlin	Marie Skłodowska-Curie	European Comission	181.153 €	2023-2025
Ane Gurtubay	Marie Skłodowska-Curie	European Comission	181.153 €	2024-2026
Tomas Lenc	Marie Skłodowska-Curie	European Comission	165.313 €	2024-2026
Marie Lallier	Ramón y Cajal	Spanish Ministry	222.735 €	2017-2022
Simona Mancini	Ramón y Cajal	Spanish Ministry	208.600 €	2019-2024
Cesar Caballero-Gaudes	Ramón y Cajal	Spanish Ministry	208.600 €	2019-2024
Marina Kalashnikova	Ramón y Cajal	Spanish Ministry	208.600 €	2020-2025

2.C.2 Fellowships

PI	Grant	Funding Agency	Amount	Period
Manuela Ruzzoli	Ramón y Cajal	Spanish Ministry	208.600 €	2021-2026
Craig Geoffrey Richter	Ramón y Cajal	Spanish Ministry	208.600 €	2021-2027
Amaia Carrión	Ramón y Cajal	Spanish Ministry	244.350 €	2024-2029
Efthymia Kapnoula	Ramón y Cajal	Spanish Ministry	244.350 €	2024-2028
Garikoitz Lerma-Usabiaga	Ramón y Cajal	Spanish Ministry	244.350 €	2024-2029
Mikel Lizarazu	Ramón y Cajal	Spanish Ministry	244.350 €	2024-2028
Alejandro Tabas	Ramón y Cajal	Spanish Ministry	244.350 €	2024-2029
Lucia Amoruso	Ramón y Cajal	Spanish Ministry	244.350 €	2024-2029
Lucia Amoruso	Juan de la Cierva Incorporación	Spanish Ministry	64.000 €	2019-2021
Rocio Lopez Zunini	Juan de la Cierva Formación	Spanish Ministry	50.000 €	2019-2021
Maite Termenon	Juan de la Cierva Formación	Spanish Ministry	50.000 €	2019-2021
Svetlana Pinet	Juan de la Cierva Incorporación	Spanish Ministry	44.295,89 €	2020-2021
Amaia Carrión	Juan de la Cierva Incorporación	Spanish Ministry	93.000 €	2020-2022
Tiphaine Caudrelier	Juan de la Cierva Formación	Spanish Ministry	50.000 €	2021-2022
Brendan Costello	Juan de la Cierva Incorporación	Spanish Ministry	93.000 €	2021-2024
Ane Gurtubay	Juan de la Cierva Incorporación	Spanish Ministry	97.800 €	2022-2025
Garikoitz Lerma-Usabiaga	Juan de la Cierva Incorporación	Spanish Ministry	97.800 €	2022-2024
Antje Stoehr	Juan de la Cierva Formación	Spanish Ministry	52.600 €	2022-2024
David Hernández-Gutiérrez	Juan de la Cierva Formación	Spanish Ministry	52.600 €	2022-2024
Mikel Lizarazu	Juan de la Cierva Incorporación	Spanish Ministry	67.300 €	2022-2024
Brendan Costello	Juan de la Cierva Formación	Spanish Ministry	50.000 €	2019-2021

PI	Grant	Funding Agency	Amount	Period
Peng Li	Juan de la Cierva	Spanish Ministry	67.400€	2024-2025
Alexandra Navarrete	Juan de la Cierva	Spanish Ministry	67.400 €	2024-2025
Fernando Perez Bueno	Juan de la Cierva	Spanish Ministry	67.400 €	2024-2025
Suhail Matar	Juan de la Cierva	Spanish Ministry	67.400 €	2024-2025
Jieying He	Juan de la Cierva	Spanish Ministry	67.400 €	2024-2025
Candice Frances	FPI	Spanish Ministry	88.250 €	2017-2021
Eugenia Navarra	FPI	Spanish Ministry	88.250 €	2017-2021
Maddi Ibarbia	FPI	Spanish Ministry	88.250 €	2017-2021
Teresa Esteban	FPI	Spanish Ministry	88.250 €	2017-2021
Jose Javier Pérez Navarro	FPI	Spanish Ministry	88.250 €	2017-2021
Sanjeev Nara	FPI	Spanish Ministry	88.250 €	2017-2021
Sandra Gisbert	FPI	Spanish Ministry	88.250 €	2017-2021
Pedro Margolles	FPI	Spanish Ministry	96.843 €	2018-2023
Christoforos Souganidis	FPI	Spanish Ministry	96.843 €	2018-2022
Ning Mei	FPI	Spanish Ministry	96.843 €	2018-2022
Polina Timofeeva	FPI	Spanish Ministry	96.843 €	2018-2022
Xabier Ansorena	FPI	Spanish Ministry	96.843 €	2018-2022
Carlos Perez Serrano	FPI	Spanish Ministry	88.250 €	2019-2023
Catherine Alice Clark	FPI	Spanish Ministry	88.250 €	2019-2023
Mina Jevtovic	FPI	Spanish Ministry	88.250 €	2019-2023
Jordi Martorell	FPI	Spanish Ministry	88.250 €	2019-2023

2.C.2 Fellowships

PI	Grant	Funding Agency	Amount	Period
Shuang Geng	FPI	Spanish Ministry	88.250 €	2019-2023
Abraham Sanchez	FPI	Spanish Ministry	95.450 €	2020-2024
Pastureau, Romain	FPI	Spanish Ministry	95.450 €	2020-2024
Laura Fernández	FPI	Spanish Ministry	95.450 €	2020-2024
Leandro Lecca	FPI	Spanish Ministry	95.450 €	2020-2024
Lucía Manso	FPI	Spanish Ministry	95.450 €	2020-2024
Karen Arellano	FPI	Spanish Ministry	95.450 €	2020-2024
Inés Chavarría	FPI	Spanish Ministry	95.450 €	2020-2024
Soan Kim	FPI	Spanish Ministry	97.460 €	2021-2025
Hana Zjakic	FPI	Spanish Ministry	97.460 €	2021-2025
Ihintza Malharin	FPI	Spanish Ministry	99.260 €	2023-2026
Aikaterini Tsaroucha	FPI	Spanish Ministry	99.260 €	2022-2023
Marta La Pietra	FPI	Spanish Ministry	99.260 €	2022-2026
Anique Charlotte Schüller	FPI	Spanish Ministry	99.260 €	2022-2024
Daria (Dasha) Shavarina	FPI	Spanish Ministry	99.260 €	2022-2024
Hadeel Ershaid	FPI	Spanish Ministry	99.260 €	2022-2026
Wai Leung (Brian) Wong	FPI	Spanish Ministry	99.260 €	2022-2026
Daphne Rebecca Weiss	FPI	Spanish Ministry	99.260 €	2022-2026
Giada Antonicelli	FPI	Spanish Ministry	99.260 €	2022-2026
Laura de Frutos Sagastuy	FPI	Spanish Ministry	111.758 €	2023-2027
Irene Alonso	FPI	Spanish Ministry	111.758 €	2023-2027

PI	Grant	Funding Agency	Amount	Period
Shiya Wang	FPI	Spanish Ministry	111.758 €	2023-2027
Nirmitee Mitin mulay	FPI	Spanish Ministry	111.758 €	2023-2027
Ece Savran	FPI	Spanish Ministry	111.758 €	2023-2027
Ruiqing Zhang	FPI	Spanish Ministry	111.758 €	2024-2028
Antje Walter	FPI	Spanish Ministry	111.758 €	2024-2028
Chunya Song	FPI	Spanish Ministry	111.758 €	2024-2028
Maria Ribeiro	FPI	Spanish Ministry	111.758 €	2024-2028
Robert Cavaluzzi	FPI	Spanish Ministry	111.758 €	2024-2028
Kiril Aksenov	FPI	Spanish Ministry	111.758 €	2024-2027
Noemi Bonfiglio	FPI	Spanish Ministry	111.758 €	2024-2027
Melissa Donati	FPI	Spanish Ministry	111.758 €	2024-2028
Irtisha Chakraborti	FPI	Spanish Ministry	111.758 €	2024-2028
Qiu, Yue (Irene)	FPI	Spanish Ministry	111.758 €	2023-2026
Nerea Gorostiola	IKUR grant	Basque Government	66.300 €	2022
Suhail Matar	IKUR grant	Basque Government	41.258 €	2022-2023
Xu Qi Hui	IKUR grant	Basque Government	82.512 €	2022-2025
David Mateos	IKUR grant	Basque Government	82.512 €	2023-2025
Najemeddine Abdennour	IKUR grant	Basque Government	82.512 €	2023-2025
Li Chuan Ku	IKUR grant	Basque Government	41.258 €	2023-2025
Rachelle Hamelink	IKUR grant	Basque Government	66.564 €	2023-2026
Ana Joya	IKUR grant	Basque Government	82.512 €	2023-2025

2.C.2 Fellowships

PI	Grant	Funding Agency	Amount	Period
Vincenzo Verbeni	IKUR grant	Basque Government	66.564 €	2023-2026
Melissa Franco	Investigo program	Basque Government	66.218 €	2022-2024
Maddi Carrera	Investigo program	Basque Government	66.218 €	2022-2024
Iñigo Diez	Investigo program	Basque Government	66.218 €	2022-2024
Jon Castander	Investigo program	Basque Government	66.218 €	2022-2024
Cristina Comella	Investigo program	Basque Government	66.218 €	2022-2024
Alejandro Expósito	Investigo program	Basque Government	66.218 €	2022-2024
Jone Iraeta	Investigo program	Basque Government	6.552 €	2022-2023
Jaione Bengoetxea	Investigo program	Basque Government	18.935 €	2022-2023
Ana Bautista	Investigo program	Basque Government	36.817 €	2022-2023
Kshipra Gurunandan	Postdoctoral grant	Basque Government	124.267 €	2022-2025
Yongning (Tiger) Lei	Predoctoral grant	Basque Government	45.143 €	2023-2024
Patxi Elosegi	Predoctoral grant	Basque Government	95.961 €	2021-2025
Eneko Uruñuela	Predoctoral grant	Basque Government	93.405 €	2020-2024
Vicente Ferrer	Predoctoral grant	Basque Government	93.405 €	2020-2024
Irene Arrieta	Predoctoral grant	Basque Government	93.405 €	2020-2024
Trisha Breanne Thomas	Predoctoral grant	Basque Government	89.770 €	2019-2023
Francisco Javier Carrera	Predoctoral grant	Basque Government	35.820 €	2021-2022
Pavlina Heinzova	Predoctoral grant	Basque Government	89.870 €	2018-2022
Meritxell Garcia	Predoctoral grant	Basque Government	41.838 €	2020-2021
Ane Gurtubay	Postdoctoral grant	Gipuzkoa Government	9.100 €	2023-2024

PI	Grant	Funding Agency	Amount	Period
Ane Gurtubay	Postdoctoral grant	Gipuzkoa Government	9.100 €	2022-2023
Amaia Carrión	Postdoctoral grant	Gipuzkoa Government	16.176 €	2021-2022
Arthur Gary Samuel	Research Professor	Ikerbasque	49.335 €	2022-Today
Clara Martin	Research Professor	Ikerbasque	123.555 €	2022-Today
James Magnuson	Research Professor	Ikerbasque	95.040 €	2022-Today
Nicola Molinaro	Research Professor	Ikerbasque	80.077 €	2022-Today
Nicola Molinaro	Research Associate	Ikerbasque	35.249 €	2022
Pedro Manuel (Kepa) Paz-Alonso	Research Associate	Ikerbasque	109.739 €	2022-Today
Marie Lallier	Research Associate	Ikerbasque	79.386 €	2022-Today
Carmen Vidaurre	Research Associate	Ikerbasque	46.996 €	2023-2028
Simona Mancini	Research Associate	Ikerbasque	75.662 €	2024-2029
Cesar Caballero-Gaudes	Research Associate	Ikerbasque	75.662 €	2024-2029
Lucia Amoruso	Research Associate	Ikerbasque	9.201 €	2024-2029
Alejandro Tabas	Research Associate	Ikerbasque	26.943 €	2024-2029
Ileana Quiñones	Research Fellow	Ikerbasque	8.477 €	2023
Marina Kalashnikova	Research Fellow	Ikerbasque	67.775 €	2022-Today
Manuela Ruzzoli	Research Fellow	Ikerbasque	65.966 €	2022-Today
Efthymia Kapnoula	Research Fellow	Ikerbasque	101.509 €	2022-Today
Garikoitz Lerma-Usabiaga	Research Fellow	Ikerbasque	61.868 €	2022-Today
Svetlana Pinet	Research Fellow	Ikerbasque	57.601 €	2023-Today
Amaia Carrión	Research Fellow	Ikerbasque	7.625 €	2024-Today

2.C.2 Fellowships

PI	Grant	Funding Agency	Amount	Period
Brendan Costello	Research Fellow	Ikerbasque	11.665 €	2024-2029
Antje Stoehr	Research Fellow	Ikerbasque	8.749 €	2024-2029
Alberto Furgoni	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2018-2021
Ana Bautista	Predoctoral INPhINIT La Caixa	Caixa Foundation	117.900 €	2023-2026
Chiara Luna Rivolta	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2018-2021
Florent Dueme	Predoctoral INPhINIT La Caixa	Caixa Foundation	115.092 €	2018-2022
Giorgio Piazza	Predoctoral INPhINIT La Caixa	Caixa Foundation	115.092 €	2019-2023
Ioanna Tanouki	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2018-2021
James Christopher Barry	Predoctoral INPhINIT La Caixa	Caixa Foundation	115.092 €	2022-2025
Jiaqi Mao	Predoctoral INPhINIT La Caixa	Caixa Foundation	115.092 €	2022-2025
Kshipra Gurunandan	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2017-2021
Marco Antonio Flores	Predoctoral INPhINIT La Caixa	Caixa Foundation	115.092 €	2022-2025
Meng Xing	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2018-2021
Piermatteo Morucci	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2017-2021
Stefano Moia	Predoctoral INPhINIT La Caixa	Caixa Foundation	122.592 €	2018-2021
Yi-Ting (Silvia) Yang	Predoctoral INPhINIT La Caixa	Caixa Foundation	115.092 €	2022-2025
Sandra Rodríguez	Predoctoral grant	Tatiana Pérez de Guzmán el Bueno Foundation	99.600 €	2021-2025
Jose Antonio Gonzalo Gimeno	Predoctoral grant	Tatiana Pérez de Guzmán el Bueno Foundation	105.000 €	2024-2028

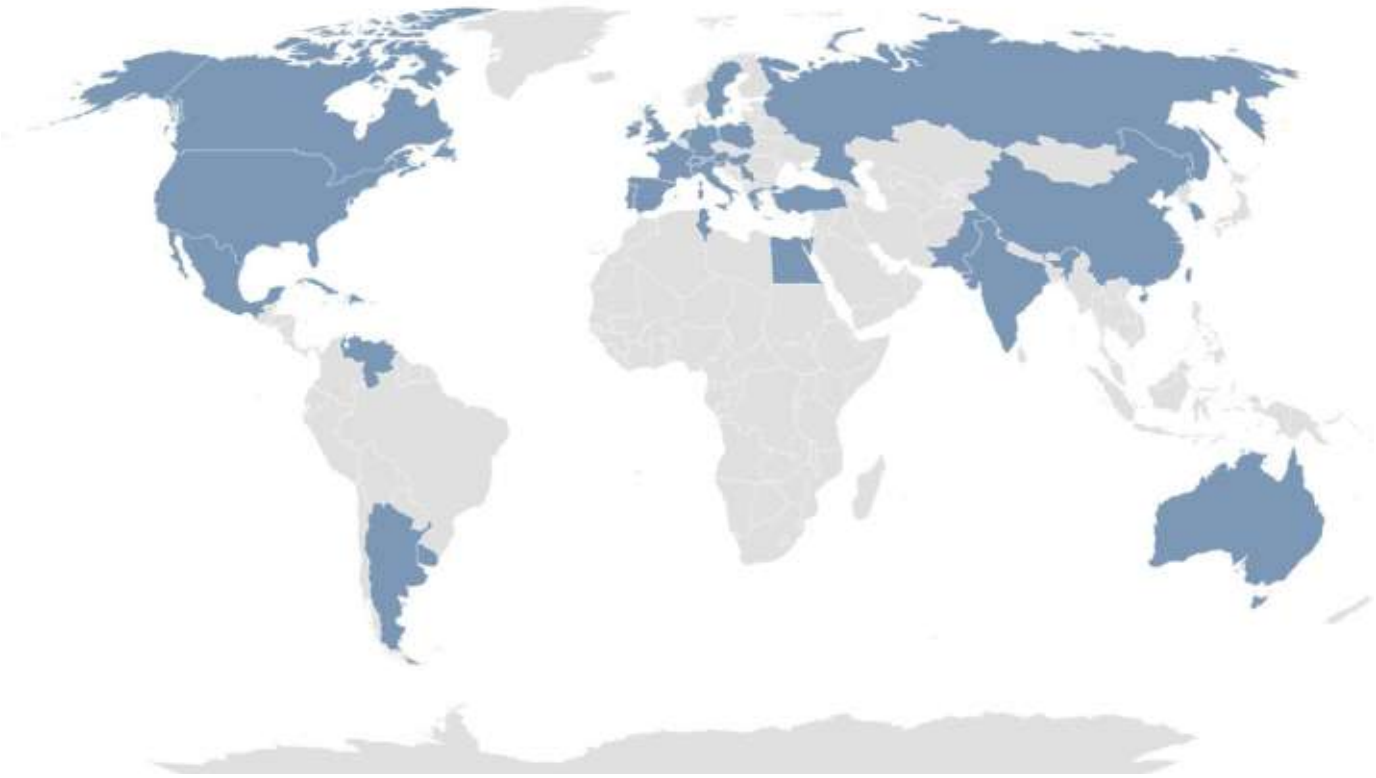

SIEMENS
Protocol View Image Tools Evaluation Scroll System Add-On Options Help
Exam
TA: 0:14 PM: REF PAT: 3 Voxel size: 1.6×1.6×1.6mm Rel. SNR: 1.00
Parameters
Slices per slab 128
Slice thickness 1.6 mm
FoV read 260 mm
FoV phase 100.0 %
Orientation Sagittal
AutoAlign Head
TR 3.15 ms
06:26
00:14
06:26
Σ 13:06
Stimu=FL SAR=NM Archive request accepted.
11.09.2023
PATIENT ID -> PROJECT NAME -> BIPLASPRO

As of December 31st, 2024, the BCBL has reported an average workforce (FTE) of 136.91 people, with a balanced gender distribution (63% of the staff are women) and a strong international profile, with over 56% of the team coming from abroad.

The growing trend in the recruitment of research personnel aligns with the center's strategic objectives to strengthen its scientific capacity. Between 2021 and 2024, the BCBL welcomed 126 new employees, including 74 researchers and 52 non-researchers, representing 27 different nationalities. Of these new workers, 56% were international hires.

The high proportion of women in research roles reflects the BCBL's strong commitment to gender equality in science. Specifically, 66% of all new hires were women, with more than 80% of these women joining as researchers. Among the men hired, 72% were also appointed to research positions.

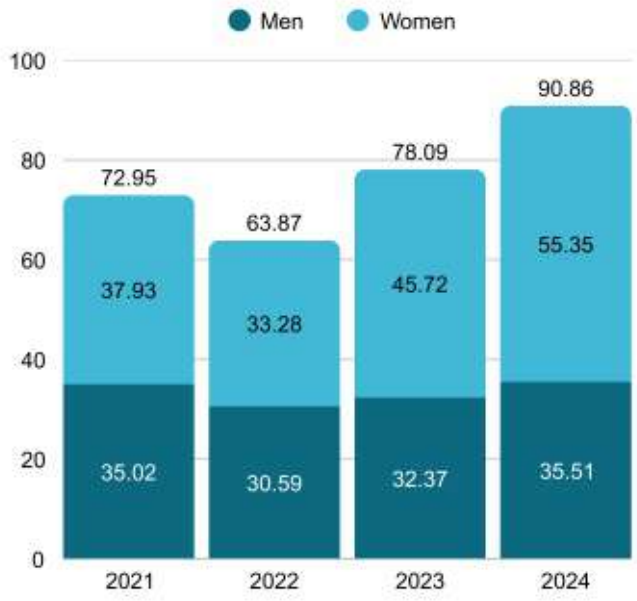
Nationalities in BCBL from 2021 to 2024

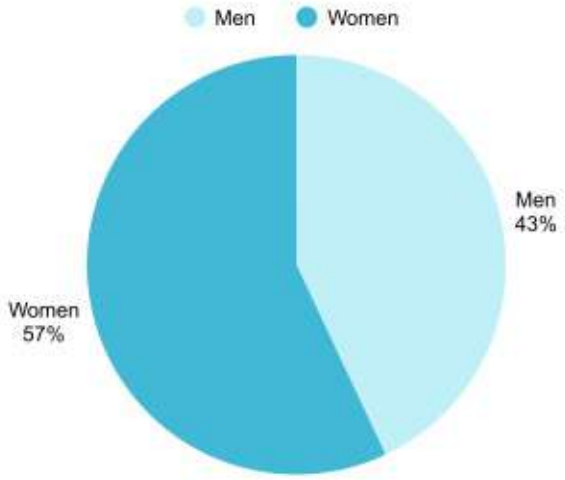


HUMAN RESOURCES OVERVIEW
(by FTE, Full-Time Equivalent)

BCBL Overview 2021-2024

Researcher Overview 2021-2024

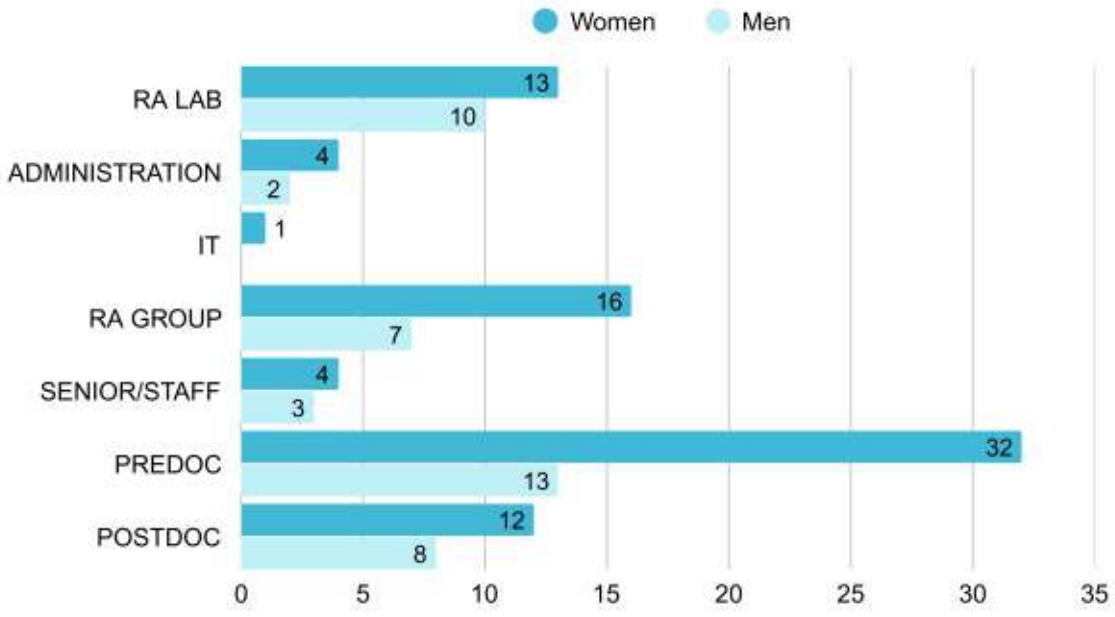




During the period between 2021 and 2024, the BCBL welcomed 126 new employees, from 27 different nationalities being the 56% of them foreigners.

New Employee by nationality 2021-2024

The distribution of this new hires by position is as follows:



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3.A BUILDING
3.B LABORATORIES
3.C RESEARCH FACILITIES

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FACILITIES AND RESOURCES

Today the BCBL has three sites. The headquarters (main laboratories and offices) are located in San Sebastián's Technological Park with a total surface area of 1,823 m2 (1,170 m2 for offices, meeting rooms, auditorium, library and lounge and 653 m2 for labs). The second location is a 100 m2 space located in the Jose Mª Korta building in the University of the Basque Country Campus. Finally, the BCBL extended its facilities in 2011 with Junior Lab in Vitoria (120 m2) alongside the Carmelitas Sagrado Corazón School.

MIRAMÓN & KORTA

The full complement of neuroscience methodologies is available, including EEG/ERP, NIRS, OCT, MEG, and fMRI. All facilities are connected to a high-speed local network that also supports communication between user workstations.

As far as possible, the same stimulus presentation and data recording hardware and software are employed across the experimental facilities, to ensure comparable experimental setups across different experimental methods/platforms (Behavioral, OCT, MEG, MRI, EEG, Eye Tracking, babyLAB and NIRS).

For special-purpose applications, a skilled technical group supports the installation and use of different hardware and software.

JUNIOR LAB

The BCBL JuniorLab is a laboratory for the scientific study of neurocognitive processes related to language established in Vitoria, in cooperation with the Carmelitas Sagrado Corazón School.

In 2011 the BCBL installed this permanent laboratory at the Carmelitas school in Vitoria, so that students at the school can participate in language-related neuroscientific research.

The BCBL JuniorLab has become a reference center for studying cognitive mechanisms in children and adolescents. There are cabins equipped with state-of-the-art behavioral, eye-tracking and EEG systems that allow us to conduct neuroscientific studies.

The behavioral systems make use of touchscreens to measure response times to visual or auditory stimuli. The eye-tracking device records gaze paths during reading or visual inspection of images presented on a screen. EEG systems provide electrophysiological recordings of neural electrical activity at the scalp and measure electrical potentials related to responses to visual or auditory stimuli.

Some of our objectives are to answer questions such as the following:

What is the best method for learning how to read? How do individual differences affect learning? How many languages should our children learn? When do children learn languages best?

The BCBL JuniorLab is equipped with 2 behavioral cabins, 1 eye tracker and 1 EEG. The behavioral cabins have a touch screen in order to ease participant performance. The EEG complies with the main laboratory's EEG standards. The eye tracker is a cutting-edge device specially designed with a mirror system that allows participants to move during the experiment. This feature is very critical in the case of child participation.

Miramón Headquarters
San Sebastián

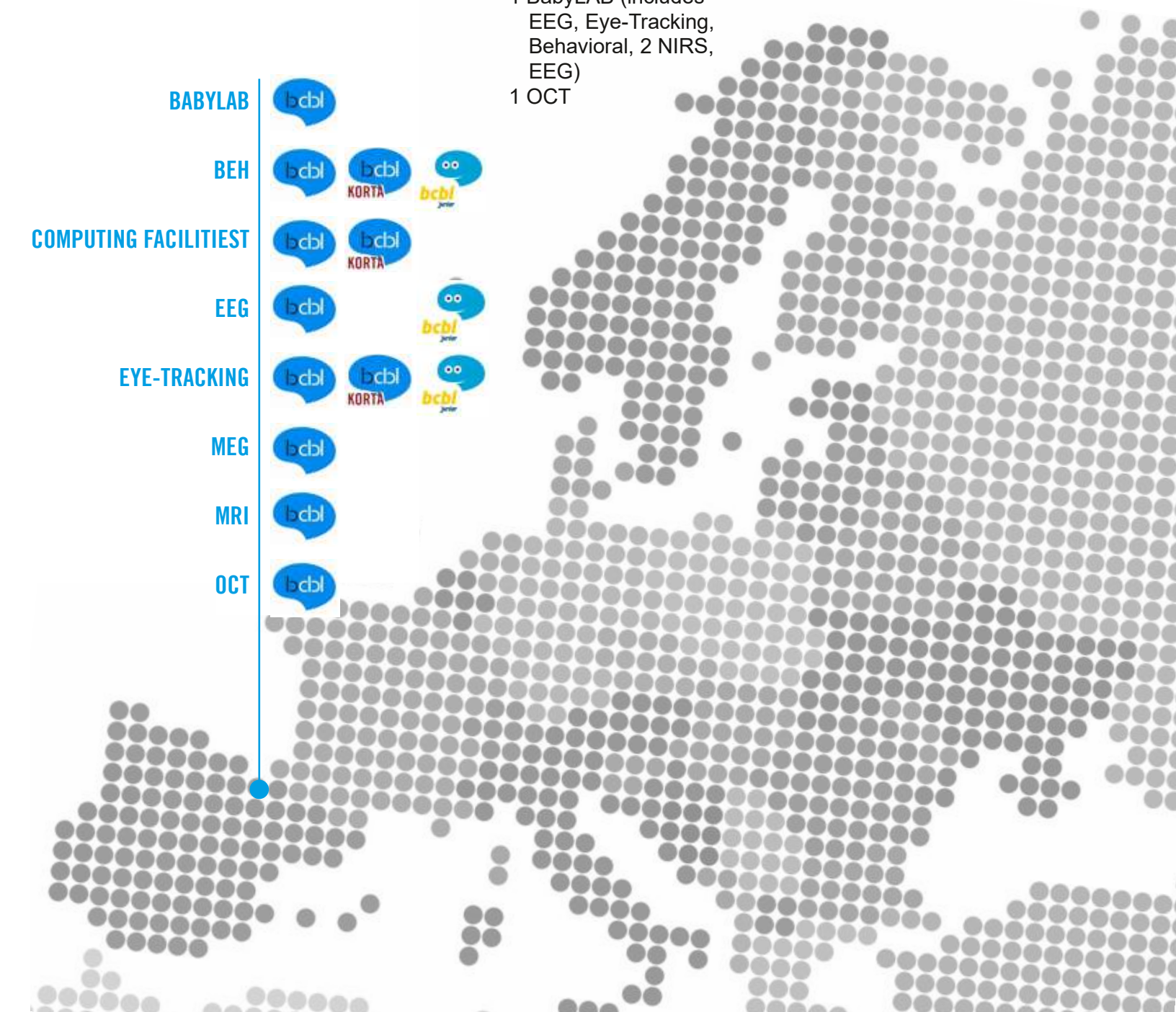
3 Behavioral
1 Production
1 MEG
(includes EEG, Eye-Tracking)
1 MRI
(includes EEG, Eye-Tracking)
3 EEG
2 Eye Tracking
1 BabyLAB (includes EEG, Eye-Tracking, Behavioral, 2 NIRS, EEG)
1 OCT

Korta LAB
San Sebastián

4 Behavioral
1 Production
2 Eye Tracking

Junior LAB
Vitoria

2 Behavioral
1 Eye Tracking
1 EEG




bcbl


BASQUE CENTER
ON COGNITION, BRAIN
AND LANGUAGE

BEHAVIORAL

Eight soundproof chambers are available to conduct behavioral experiments. Each chamber is equipped with a standardized, quality, experimental setup, which can collect reaction-time data such as push-button responses or naming latencies.

Chambers can be used for individual testing sessions with one experimenter monitoring individual participants, as well as for testing up to 4 participants simultaneously.

The **hardware** for each chamber includes:
- Monitors: ViewSonic G90FB 19″ CRT
- Soundcards: Soundblaster Titanium X-FI, with ASIO support
- Headsets: Sennheiser HMD 280 pro
- Push button response boxes

The **standard software packages** are:
- DMDX
- Presentation

The **recording booth** is one of the eight soundproof chambers and is specially configured for conducting both speech production and perception experiments. In addition to the standard experimental setup, this booth features enhanced acoustic insulation and calibrated audio equipment to ensure high-fidelity sound recording and playback. It is particularly well-suited for tasks involving precise voice onset measurements, phonetic analysis, or detailed auditory processing. The recording booth supports both manual and verbal responses, and its specialized configuration makes it ideal for studies requiring clean speech signals or tightly controlled auditory stimuli.

MEG

Magnetoencephalography (MEG) is a non-invasive method for recording cortical activity which boasts exceptional temporal and fine spatial resolution. It is used to map brain activity by recording magnetic fields produced by the electrical currents neurons generate when they communicate with each other.

Thanks to the excellent temporal and spatial resolution of MEG, we can determine when and where a particular region of the brain has been activated. This is critical for understanding how language abilities are implemented in the brain and the relationships between brain structures and their functions.

In 2023, BCBL acquired a new **MEG system**, and after a complex installation process, it is now ready for use. This upgrade enhances our capacity for high-resolution brain mapping, crucial for our ongoing research projects.

The MEG facility at the hosts a 306-sensor Megin Triux Neo® scanner (204 planar gradiometers and 102 magnetometers; arranged in a helmet configuration), equipped with ARMOR technology for instant recovery. It also has 12 bipolar input channels for registering physiological activity and 12 auxiliary analog input channels. This system allows the presentation of auditory and visual stimuli, and recordings can be performed with the participant sitting or lying down. The MEG device also includes an integrated 128-channel EEG system for simultaneous MEG and EEG recording, which can be acquired at a sampling rate of up to 5 kHz in either AC or DC. Furthermore, this model includes “zero helium boil-off” technology.

The facility at the BCBL includes active shielding to reduce external noise and MaxFilter™ software, which filters artifacts as well as internal and external noise sources. For data analysis, the Triux Neo® includes advanced analysis software, including powerful tools for visualization and source modeling of recorded data.

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MRI

Since June 2016 BCBL houses a Siemens 3T MAGNETOM PRISMAfit MR scanner that allows BCBL researchers to perform functional MRI (BOLD and perfusion ASL), structural MRI, diffusion-weighted MRI and MR Spectroscopy studies. This system uses the Siemens Total Imaging Matrix (TIM) 4G technology including the TimTX TrueForm and TimTX TrueShape technologies for parallel transmission and selective RF excitation for better B1 homogeneity, reduced Specific Absorption Rate (SAR), and enabling zoomed imaging with the ZOOMit application. The Tim 4G technology with up to 64 independent channels available for parallel reception are exploited with two dedicated 20-channel head coil and a 64-channel head/neck coil. The fully digital transmission and reception design with the DirectRF technology integrates all components inside the magnet room, connected with fiberoptic cables with the equipment room, for reduced noise and improved stability. The Prismafit system offers a large anatomical coverage with a maximum field of view (F0V) of 50 cm. Decisively, it comprises a unique XR 80/200 gradient coil with a maximum amplitude of 80 mT/m and a slew rate of 200 T/m/s simultaneously on all three axes for increased SNR in the most demanding applications, enabling us to obtain higher spatial and temporal resolutions, reduced scan times and excellent workflow with subject's comfort in mind. The scanner also integrates real-time monitoring of cardiac pulse, ECG and respiration signals.

The PRISMAfit system includes a new generation of MRI protocols, for example the CAIPIRINHA and MP2RAGE sequences for structural imaging, and the simultaneous multi-slice (SMS) sequences for highly-accelerated functional and diffusion-weighted imaging. The BCBL has a research agreement with Siemens Healthcare Spain for technological support and access to the latest MR sequences and protocols developed for MAGNETOM systems, as well as developing its own tailored MRI sequences with the Siemens IDEA and ICE programming environments. Furthermore, the BCBL has established agreements with international research centers (e.g. the Athinoula A. Martinos Center in MGH/ Harvard, the CMRR at the University of Minnesota, the Donders Institute in Nijmegen) to make the best imaging protocols available to our researchers.

In addition, the BCBL MRI lab is equipped with multiple stimulation and response MR-compatible peripherals for all type of fMRI studies, including 4-button optical response pads (Current Designs), response grips (Nordic Neurolab), a rear-projection video display (Panasonic SXGA+ 7000), an audio system comprising noise-cancelling headphones (MR Confon) and microphone (Optoacoustics), S14 insert earphones (Sensimetrics), a MR-compatible EyeLink 1000 Plus eye-tracking system (SR Research), and a MP-150 BIOPAC system for external monitoring of physiological signals (e.g. cardiac pulse, respiration, electromyography and skin conductance). For simultaneous EEG-fMRI experiments, a MR-compatible BrainAmp Plus system with up to 64 electrodes (Brain Products) is also available.

On September 2024 we had a significant upgrade to our MRI system, moving from the MR E11 to the XA30 version. This enhancement brings improvements in both hardware and software, ensuring a more advanced and efficient imaging experience.

- **New Hardware:** The upgraded system includes the latest hardware components, enhancing performance, speed, and image quality.
- **New User Interface:** A completely redesigned user interface offers a more intuitive and streamlined workflow.
- **4D Flow and Fingerprinting:** The XA30 system introduces innovative imaging techniques such as 4D Flow and MR Fingerprinting.

EEG

The center is equipped with four EEG systems that are installed in four Faraday cage - soundproof chambers. Each chamber is equipped with a BrainAmp DC® amplifier.

Using the recording software (Brain Recorder®) all the amplifier options, including the switch from DC to AC recording mode as well as selecting different filtering bandwidths, can be controlled. The BrainAmp DC® is more stable than older EEG systems in a variety of applications, and it supports simultaneous EEG/TMS and EEG/MEG input to the Brain Computer Interface and Neurofeedback.

Two chambers are equipped with a 64-channel system and two chambers with a 32-channel amplifier. The BrainAmp DC® is a portable amplifier which connects to any laptop and can be powered with batteries. As a result, the 32-channel amplifiers can also be used for experiments outside the center (e.g., in schools or hospitals).

Each chamber is also equipped with sets of electrodes that can be arranged on EasyCaps® in whatever pattern needed for a given experiment. Each cap has 64 equidistant electrode positions (10%-System); several different sizes are available, including those suitable for children.

For off-line EEG/ERP analyses, Vision Analyzer® 2.1 software is available on each computer via a network key.

Our center is equipped with the hardware and software resources to carry out and analyze a wide range of on-line reading experiments and experiments using the visual world paradigm.

An EEG fMRI compatible BrainAmp MR Plus (32 channels) has recently been acquired and multimodal type experiments can therefore be carried out.

EYETRACKING

Our center is equipped with the hardware and software resources to carry out and analyze a wide range of experiments investigating time-sensitive reading processes and using the visual world paradigm.

Our labs have one of the latest and most complete systems for eye tracking, the EyeLink 2K (SR Research Ltd.).

The EyeLink 2K system provides an excellent sampling rate (2000 Hz) and is especially suitable for real-time data collection. It can be used for monocular as well as binocular eye tracking, and is perfectly compatible with most contact lenses and eyeglasses. This system has also a high average spatial accuracy, down to 0.15º. Many paradigms can be implemented in the EyeLink 2K, such as the visual world paradigm, the boundary technique (parafoveal previews) or silent sentence reading. The EyeLink2K system uses a remote desktop mount, thus avoids the use of cumbersome head-mounted cameras.

Because the EyeLink 2K is also portable, it enables us to conduct fieldwork at other locations outside the center, in accordance witht he special needs of test population.

What kinds of studies use this technique?

Eye tracking enables us to investigate the underlying mental processes engaged during reading as well as image and video processing tasks. It can provide precise information on time-sensitive cognitive processes such as attention, memory, problem-solving, and language.

It is particularly useful for the study of reading, as it allows us to know exactly when the reader fixates each word or linguistic constituent as well as to identify the parts of a sentence are read, and which elements require more processing time or, conversely, are ignored.

In reading research, the most relevant types of eye movements are fixations and saccadic movements (rapid movements that last between 20 and 200 milliseconds).

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BABYLAB

In our state-of-the-art infant lab, several methods and techniques are available to investigate **the first steps in human language development.** The behavioral set-up allows us to use the Visual Habituation, Head-turn Preference, and Intermodal Preferential Looking procedures to assess preverbal infants' general language skills (from 3to 12 months of age) and to investigate older infants' syntactic and lexical knowledge up to 28 months of age.

Which techniques are used in the Babylab?

Near Infrared spectroscopy (NIRS) is a neuroimaging technique that records brain activity by measuring oxygen saturation in the blood. To do this, we place a cap containing a series of emitters and receivers of infrared light that is harmless to the baby. At BCBL we have these two devices:

NIRX: The NIRScout (NIRx) equipment is a functional near-infrared spectroscopy system (fNIRS) that is actively used at BCBL. This system allows neuroimaging studies in a flexible configuration and is suitable for research with participants of all ages, from babies to adults. Its design facilitates the collection of high-quality data in developmental and cognitive studies.

Lumo NIRS: The Gowerlabs LUMO system is an advanced fNIRS system with a modular and portable design, with more than 500 channels and short distance channels that improve spatial resolution and signal sensitivity. It is particularly suitable for studies on newborns and allows for 'hyperscanning' experiments to explore social interaction between individuals.

Electroencephalography is a safe, non-invasive technique that measures neural activity in the brain. The signals generated by neurons are recorded by a cap with small sensors, specifically designed for use with infants.

Eye-tracking allows us to measure precisely the eye movements and the location and duration of gaze fixations. To do this, we place a sticker on the baby's forehead as a reference point, so the camera can follow all the movements of one pupil. The procedure is completely respectful and harmless for the baby.

Behavioral studies measure babies' natural responses, such as the duration of their attention when they encounter visual or auditory stimuli. This allows us to study the mechanisms underlying our cognitive abilities.

The BCBL babyLAB offers a cutting-edge research venue within an exceptional environment for comprehensively investigating monolingual and bilingual language development.

OPTICAL COHERENCE TOMOGRAPHY (OCT)

An important aspect of research projects conducted at the BCBL involves presentation of visual stimuli, notably critical for studying the reading circuit, a major focus of research in the neurobiology of language.

We installed an Optical Coherence Tomography (OCT) during 2023, this is a non-invasive imaging technique that uses low-coherence interferometry to capture detailed, cross-sectional images of biological tissues in medical diagnostics and research settings. OCT provides high-resolution, real-time images of tissue microstructure (retinal imaging).

The BCBL is equipped with a Spectralis OCT device, which integrates all the features and tools of Spectralis. The integration of Heidelberg Engineering equipment allows us to perform a comprehensive analysis of the structural composition of the Optic Nerve Head (ONH) or the Nerve Fiber Layer (RNFL) by connecting to the HEYEXTM software platform.

The Spectralis system provides an excellent scan rate (40,000 A-scans/second) and is especially suitable for real-time imaging collection. It has an axial resolution (in tissue) of up to 3.9µm (digital) and transverse resolution (in tissue) of 14µm. A maximum field of view (30°x30°) can be scanned by the system. The isotropic high-resolution mode is 5 µm. The device is also equipped with a high-resolution 24” Monitor (1920x1200), and a computer with Quad Core Processor. This system uses a remote desktop mount, thus minimizing eye motions.

The OCT in our center also includes available software capable of segmenting retinal layers beyond the RNFL. It is sufficient to automatically define ten boundaries within the retina and allows identification of up to 11 retinal layers (ILM, RNFL, GCL, IPL, INL, OPL, ONL, ELM, PR1, PR2, RPE). Our system can also be used to perform OCT Angiography to visualize blood vessels without the need for contrast agents.

COMPUTING FACILITIES

The BCBL computing infrastructure includes a high-performance computing cluster (2 control nodes and 2 high-performance switches, 12 computing nodes with a total of 192 cores and 768GB of RAM memory, 2 nodes for visualization applications with two processors and 128GB of RAM each, and 2 GPU computing nodes with 512 GB RAM, 96 cores, and 2 Nvidia A16 GPU each). The whole cluster shares a 4TB high-performance filesystem based on GPFS.

In addition, BCBL staff members have the right to utilize the external computing clusters Atlas and Hyperion at DIPC under a working agreement between the two institutions. *https://dipc.ehu.eus/en/supercomputing-center?set_language=en*

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4.A RESEARCH LINES
4.B FUNDED PROJECTS

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RESEARCH

1/ LANGUAGE DEVELOPMENT ACROSS THE LIFE SPAN

The Language Development Across the Life Span research line explores how humans acquire and process language throughout different stages of life, from infancy to adulthood. Traditionally, it was believed that the capacity for language learning diminishes significantly as we age. However, BCBL's research challenges this notion by demonstrating that adult brains retain a remarkable level of plasticity, even when learning new languages. BCBL researchers have discovered that different language systems show distinct patterns of brain hemisphere specialization. This finding offers a fresh perspective on the neural organization of language and how different languages are processed by the brain at different life stages.

One of the most important recent discoveries in this area is that interference between second (L2) and third languages (L3) is greater than between L1 and L3. This suggests that there may be more overlap in the neural networks responsible for processing L2 and L3 than between either of these languages and L1. This insight challenges existing models of language learning and raises new questions about how multilingualism shapes brain function. Additionally, the finding that L3 learners may find it easier to inhibit interference from L1 than from L2 has significant implications for educational practices. By understanding how these different languages interact in the brain, educators can design more effective strategies to support adult learners in acquiring new languages.

This research has not only contributed to our theoretical understanding of how the brain processes multiple languages but also provided practical applications, particularly in adult language education. The ability of the adult brain to adapt and reconfigure itself during the learning of new languages highlights the importance of developing innovative teaching techniques that leverage this neuroplasticity.

2/ SPEECH PERCEPTION, PRODUCTIONS, AND DISORDERS

The Speech Perception, Production, and Disorders research line is dedicated to exploring how we perceive and produce spoken language and how various disorders can disrupt these processes. One of the most significant findings from this research is the discovery that speaking newly learned sounds during the early stages of second language (L2) acquisition can actually hinder a learner's ability to accurately perceive those sounds. This is a major departure from traditional models of language learning, which often emphasize the importance of immediate repetition. The BCBL researchers propose an alternative "Listen-Wait-Produce" model, where learners are encouraged to wait several seconds before repeating newly learned words. This delay reduces interference and leads to improved acquisition of new language sounds.

Additionally, the BCBL has found that learning pronunciation in a new language is optimized when learners are exposed to input from multiple speakers using "foreigner-directed speech." This type of speech, characterized as slower, louder, and exaggerated, helps learners better differentiate and understand the new sounds. Together, these findings represent a significant advancement in the field of multilingualism and language education, with implications for improving language instruction methodologies across the globe.

In terms of clinical applications, the BCBL has been utilizing Cortical Tracking of Speech (CTS)—a technique that measures brain oscillations related to continuous speech inputs—to explore how the brain processes language in real-time. This method has been used to investigate how the quality of linguistic exposure in early childhood predicts later language abilities. One of the more exciting applications of this research is the development of digital apps designed to identify preschool children at risk of reading difficulties, such as dyslexia. By detecting and addressing these risks early, such tools could have a profound impact on children's educational trajectories.

3/ READING AND DYSLEXIA

The Reading and Dyslexia research line seeks to understand the brain mechanisms that underpin reading and how these processes may be disrupted in developmental disorders like dyslexia. BCBL researchers have made groundbreaking contributions to the study of the Visual Word Form Area (VWFA), a brain region critical for recognizing written words. They have discovered that this region is functionally connected to two distinct neural networks: one that processes the visual features of words and another that transmits these features to higher-order language areas. This dual-pathway model has important implications for understanding how reading develops and how disorders such as dyslexia and alexia impair this process.

In one of the largest studies of its kind, the BCBL screened more than 2,000 children to investigate the thalamocortical circuitry involved in reading. Their research has shown that children with dyslexia display asynchronous brain activity during early stages of sound processing, suggesting that dyslexia may be rooted in auditory processing issues rather than in higher-level language areas. This discovery is significant because it points to new potential methods for early diagnosis of dyslexia, allowing for interventions before children even begin learning to read.

Moreover, genetic research led by the BCBL has identified 42 new loci associated with dyslexia, expanding our understanding of the genetic basis of this disorder. By combining genetic, behavioral, and neuroimaging data, researchers are developing more comprehensive models of how dyslexia manifests and how it can be detected early. The potential applications of this research are vast, ranging from the development of new diagnostic tools to the design of more effective educational interventions for children at risk for reading difficulties.

4/ MULTILINGUALISM

The Multilingualism research line focuses on how the brain manages multiple languages and how these languages interact cognitively and neurally. BCBL researchers have made significant progress understanding how different modalities of language —such as spoken and signed languages—are processed in the brain. In one innovative study, the BCBL team explored bilingual-bimodal individuals who use both spoken language and sign language. They discovered that despite the phonological differences between spoken words and signs, both forms of language activate similar brain regions related to meaning. This cross-modal activation provides compelling evidence that the brain's language systems are more interconnected than previously thought.

Beyond these modality-specific studies, BCBL's research on multilingualism also explores how proficiency in multiple languages affects cognitive functions such as memory, attention, and executive control. Research suggests that multilingual individuals often show greater cognitive flexibility and resilience, potentially providing protective benefits against cognitive decline later in life. The BCBL's work in this area is helping to reshape our understanding of how the brain accommodates multiple languages and how these languages influence other cognitive processes. This research has far-reaching implications for education, especially in regions where multilingualism is prevalent, as it provides evidence-based insights into the cognitive and neural benefits of learning multiple languages.

5/ NEURODEGENERATION, BRAIN DAMAGE, AND REHABILITATION

The Neurodegeneration, Brain Damage, and Rehabilitation research line investigates how language function is affected by neurological conditions such as stroke, brain tumors, and neurodegenerative diseases. One of the primary goals of this research is to develop methods for preserving language abilities in patients who undergo neurosurgery. In collaboration with clinical partners, BCBL researchers have developed techniques to map language areas in the brain before surgery, helping surgeons avoid damaging critical regions responsible for language production and comprehension during surgery.

One of the most exciting findings from this research is the discovery that the brain can reorganize itself to preserve language function following damage, particularly in patients with brain tumors. The BCBL team has identified neural markers of language reorganization and found that bilingual patients exhibit different patterns of recovery compared to monolingual patients. This personalized approach to neurosurgery ensures that language function is maximally preserved, improving outcomes for patients who undergo brain surgery.

In addition to neurosurgical applications, the BCBL is investigating how rehabilitation techniques can be optimized to support language recovery in patients with neurodegenerative diseases or brain damage. This research aims to develop new methods for assessing and treating language deficits, ultimately improving the quality of life for individuals affected by these conditions.

6/ LANGUAGE AND OTHER COGNITIVE SYSTEMS

The Language and Other Cognitive Systems research line explores the interaction between language and other cognitive domains such as memory, attention, and consciousness. One key finding from this research is that language processing can occur even without conscious awareness. Using high-resolution brain imaging, BCBL researchers have shown that stimuli presented too briefly to be consciously perceived still activate widespread brain regions involved in higher-order cognitive functions. This discovery challenges traditional notions of consciousness and highlights the brain's capacity for unconscious processing of language.

Another area of focus within this research line is how damage to specific brain regions can lead to selective impairments in language processing. By simulating brain lesions in computational models, BCBL researchers have demonstrated that certain language deficits—such as difficulty processing abstract or concrete words—can arise from relatively simple disruptions in neural networks. These findings provide valuable insights into the neural architecture of language and offer a framework for understanding how brain damage affects specific cognitive processes. This research has potential applications in the development of targeted interventions for individuals with language impairments due to brain injury or disease.

7/ ADVANCED METHODS IN COGNITIVE NEUROSCIENCE

The Advanced Methods in Cognitive Neuroscience research line is dedicated to developing cutting-edge technologies and methodologies for studying brain function. One of the most significant advancements in this area is the development of new techniques for measuring Cerebrovascular Reactivity (CVR), which assesses changes in brain blood flow in response to stimuli. This technique is particularly valuable for studying populations such as children and older adults with neurological conditions, where traditional neuroimaging methods may not be suitable.

Another major breakthrough in this area is the use of functional near-infrared spectroscopy (fNIRS), a neuroimaging technique that measures brain activity by shining infrared light through the scalp. fNIRS is particularly useful for studying brain function in infants and young children, populations that are challenging to study using conventional methods like MRI. BCBL researchers have used fNIRS to measure resting-state brain activity in infants and have found that early linguistic experience, such as exposure to multiple languages, influences the functional connectivity of brain regions involved in language processing.

In addition to these innovations, the BCBL is developing advanced fMRI techniques, such as multivariate multi-echo paradigm-free mapping (MvME-SPFM), which allows researchers to measure brain activity without strict control over stimulus timing, making it ideal for studying naturalistic language comprehension.

These technological advances enable BCBL scientists to study brain function with greater precision, flexibility, and applicability across diverse populations. The ability to map brain activity in more natural settings and in populations that were previously difficult to study opens up new possibilities for understanding how the brain processes language throughout the lifespan.

PROJECTS BY THE EUROPEAN COMMISSION

01. ERC-2015-AdG-692502 - STATISTICAL LEARNING AND L2 LITERACY ACQUISITION: TOWARDS A NEUROBIOLOGICAL THEORY OF ASSIMILATING NOVEL WRITING SYSTEMS,L2STAT.
PI Ram Frost. Budget: 800.000 € from 2016-2022

02. ERC-2018-COG-819093 - PHONEMIC REPRESENTATIONS IN SPEECH PERCEPCION AND PRODUCTION: RECALIBRATION BY READING ACQUISITION, READCALIBRATION.
PI Clara Martin. Budget: 1.875.000 € from 2019-2025

03. ERC-2023-StG-101115798: EMPIRICAL AND MECHANISTIC FOUNDATIONS FOR SYNERGISTIC PREDICTIVE PROCESSING IN THE SENSORY BRAIN,SynPrePro.
PI Alejandro Tabas. Budget:1.199.570 € from 2024-2029

04.MSCA-2022-DOCTORAL NETWORK-101119647: COnfident Decisions, CODE.
PI David Soto. Budget: 251.971 € from 2024-2027

AGENCIA ESTATAL DE INVESTIGACION

01. CEX2020-001010-S SEVERO OCHOA Center of Excellence.
PI Manuel Carreiras. Budget: 4.000.000 € from 2022-2025

02. RTI2018-096311-B-I00_FEDER: WHY DOES MUSICAL TRAINING ENHANCES SPEECH PROCESSING? A CORTICAL ENTRAINMENT PERSPECTIVE, TrainSynchro.
PI Nicola Molinaro. Budget: 171.336 € from 2019-2022

03. RTI2018-093547-B-I00_FEDER: IS THE BRAIN CONNECTOME A GOOD PREDICTOR FOR THE LANGUAGE NETWORK FUNCTIONAL MALLEABILITY?, LangConn.
PI Manuel Carreiras. Budget:169.400 € from 2019-2022

04. RTI2018-096242-B-I00: DOES VISUAL OSCILLATORY ACTIVITY IN THE ALPHA BAND CONTRIBUTE TO TYPICAL AND ATYPICAL READING DEVELOPMENT? A FOCUS ON VISUAL ATTENTION, VISOSCIL.
PI Marie Lallier. Budget: 72.600 € from 2019-2022

05. PGC2018-093408-B-I00: FUNCTIONAL AND STRUCTURAL CONTRIBUTIONS OF THE THALAMUS TO LANGUAGE SYSTEMS ACROSS DEVELOPMENT,THALANG.
PI Pedro Manuel Paz-Alonso. Budget: 84.700 € from 2019-2022

06. RTI2018-096216-A-I00 Marcadores oscilatorios de neuroplasticidad asociada al lenguaje en pacientes con tumores cerebrales: Un estudio longitudinal con MEG (MEGLIOMA), MEGLIOMA.
PI Lucia Amoruso. Budget: 72.600 € from 2019-2021

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07. RTI2018-098317-B-I00 El efecto de la experiencia lingüística en los mecanismos neurales del procesamiento metacognitivo en dominios no lingüísticos (MetacogniciónBilingüe), BILMETACOG.
PI Mikhail Ordin. Budget: 84.700 € from 2019-2021

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08. PID2019-105494GB-I00: USANDO LA NEUROIMAGEN DE CIRCUITO CERRADO PARA ENTENDER Y MANIPULAR LAS FUNCIONES METACOGNITIVAS, BrainMetaLoop.
PI David Soto. Budget:154.880 € from 2020-2024

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09. PID2019-107325GB-I00: TRILINGÜES BIMODALES: EL MAPEO DEL LÉXICO INTERLINGÜÍSTICO E INTERMODAL, Bi Tri.
PI Brendan Costello. Budget:121.000 € from 2020-2023

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10. PID2019-105528GA-I00: TURNOS CONVERSACIONES: DESARROLLO TEMPRANO DE LAS HABILIDADES DE TOMA DE TURNO CONVERSACIONAL EN NIÑOS BILINGÜES, CONTUR.
PI Marina Kalashnikova. Budget: 48.400 € from 2020-2023

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11. PID2019-105538RA-I00: CORRELATOS CONDUCTUALES Y ELECTROFISIOLÓGICOS DE LA VENTAJA BILINGÜE EN FUNCIONES EJECUTIVAS EN SUJETOS ANCIANOS SANOS, BILINGUALAGE.
PI Jesús Cespón. Budget: 60.500 € from 2020-2023

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12. PID2019-105520GB-I00: ESTUDIO CUANTITATIVO DE LAS FLUCTUACIONES EN LA CONECTIVIDAD FUNCIONAL Y ACTIVIDAD CEREBRAL EN REPOSO CON IMAGEN DE RESONANCIA MAGNÉTICA FUNCIONAL DE ASL Y MULTIECO BOLD, Qrsfmri.
PI Cesar Caballero-Gaudes. Budget: 47.432 € from 2020-2023

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13. PID2020-113945RB-I00: TENL: TEST NEUROLINGÜÍSTICO PARA LA VALORACIÓN DE LA AFASIA EN ESPAÑOL, TeNL.
PI Simona Mancini. Budget: 56.870 € from 2021-2025

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14. PID2020-114717RA-I00: EL PUNTO JUSTO DEL CONFLICTO COGNITIVO, SweetC.
PI Manuela Ruzzoli. Budget: 88.330 € from 2021-2025

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15. PID2020-113348GB-I00: CONECTANDO PALABRAS: EL PAPEL DE LA CO-ACTIVACIÓN EN LA ADQUISICIÓN DEL LÉXICO,COLEXI.
PI Arthur Gary Samuel. Budget: 66.550 € from 2021-2025

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16. PID2020-119131GB-I00: EL LÉXICO BILINGÜE: INTERFERENCIA Y SINERGIA, BLIS.
PI James Magnuson. Budget: 84.700 € from 2021-2024

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17. PID2020-113926GB-I00: LANGUAGE PRODUCTION ACROSS MODALITIES, LANGUAGES, AND CONTEXTS,CROSSPROD.
PI Clara Martin. Budget:102.850 € from 2021-2024

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18. PID2021-123574NB-I00: TIP-OF-THE-TONGUE EXPERIENCES AS A WINDOW TO INVESTIGATE THE NEURAL BASIS OF SEMANTIC AND EPISODIC MEMORY RETRIEVAL, ToTMRI.
PI Pedro Manuel (Kepa) Paz-Alonso. Budget: 114.708 € from 2022-2025

19. PID2021-122918OB-I00_FEDER: COGNITIVE AND BRAIN MECHANISMS OF READING IN THE DEAF, DeafReading.
PI Manuel Carreiras. Budget:199.408 € from 2022-2025

20. PID2021-123575OB-I00_FEDER: BEYOND LANGUAGE PRESERVATION: MAPPING SOCIAL COGNITION IN BRAIN TUMOR PATIENTS USING A MULTIMETHOD APPROACH, SCANCER.
PI Lucia Amoruso. Budget: 138.908 € from 2022-2025

21. PID2021-123578NA-I00: MULTIACTIONS: LANGUAGE INTERACTIONS IN MULTILINGUALISM, MultiActions.
PI Antje Stoehr. Budget: 63.694 € from 2022-2024

22. PID2021-123577NA-I00: CHARACTERIZING SENSORY AND COGNITIVE SIGNALS IN THE CORTICAL READING NETWORK, SENSOTIVE.
PI Garikoitz Lerma-Usabiaga. Budget: 43.366 € from 2022-2024

23. PCI2022-135031-2: TRACKING AND MODELING THE NEUROBIOLOGY OF MULTILINGUAL SPEECH RECOGNITION,NEUROSPEECH.
PI Nicola Molinaro y James Magnuson. Budget: 263.220 € from 2022-2025

24. PDC2022-133917-I00: CLOSING THE LOOP BETWEEN THE BRAIN AND REAL-LIFE, LOOP.
PI Nicola Molinaro. Budget: 74.750 € from 2022-2024

25. PID2022-136986NB-I00: LA MADURACIÓN NEURONAL Y LA EXPOSICIÓN AL LENGUAJE COMO PREDICTORES DE LA COMPETENCIA BILINGÜE INDIVIDUAL, Growing-upBIL.
PI Marina Kalashnikova. Budget: 112.500 € from 2023-2027

26. PID2022-136989O-I00: LA EXPOSICIÓN TEMPRANA A DOS IDIOMAS FOMENTA LA LECTURA: UN ENFOQUE DE INVESTIGACIÓN TRASLACIONAL,BILREADy.
PI Marie Lallier. Budget: 125.625 € from 2023-2026

27. PID2022-136987NB-I00: NORMAS DE ASOCIACIÓN LIBRE PARA LA LSE: MAPEO DEL LÉXICO SEMÁNTICO DE LA LENGUA DE SIGNOS ESPAÑOLA, SIGNifica.
PI Brendan Costello. Budget:112.500 € from 2023-2026

28. PID2022-136991NB-I00: LA RELACION TEMPORAL ENTRE EL HABLA Y LOS MOVIMIENTOS CORPORALES SIMULTÁNEOS Y SU PAPEL EN EL PROCESAMIENTO DEL HABLA AUDIOVISUAL, BodyLingual.
PI Nicola Molinaro and Mikel Lizarazu. Budget: 144.375 € from 2023-2026

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29. PID2023-146423NB-I00: Trayectorias Léxicas: Seguimiento de la Codificación, Establecimiento y Desarrollo de Palabras en el Léxico Mental, LEXI: TRACK.
PI Efthymia Kapnoula. Budget: 119.000 € from 2024-2028

30. PID2023-148756NB-I00: Habla Dirigido a Extranjeros: Función e Impacto Didácticos, DIFI.
PI Clara Martin. Budget: 126.500 € from 2024-2027

31. PID2023-148910NB-I00: El Poder Motivacional del Conflict Cognitivo,SpinC.
PI Manuela Ruzzoli. Budget: 147.000 € from 2024-2028

32. PID2023-149267NB-I00: Examinando la Conciencia en la Percepción de Conjuntos con Psicofísica Optimizada e Imágenes Cerebrales en Bucle Cerrado, A-EPIC.
PI David Soto. Budget: 170.125 € from 2024-2028

33. PID2023-149410OB-I00: GlioPrecision: Mapeo preciso de la función y reactividad cerebrovascular en el cerebro individual sano y gliomas, GlioPrecision.
PI Cesar Caballero-Gaudes. Budget: 183.500 € from 2024-2027

34. PID2023-149585NB-I00: Modelos de redes recurrentes de aprendizaje estadístico, ReNeMoS.
PI James Magnuson. Budget: 108.250 € from 2024-2027

35. CNS2023-144936: EL LEXICO DE LA LENGUA DE SIGNOS ESPAÑOLA,LSE-LEX.
PI Brendan Costello. Budget: 193.566 € from 2024-2026

BASQUE GOVERNMENT

01. PI 2018-1-29 PRAD: PHONEMIC RECALIBRATION IN AVERAGE READER AND DYSLEXIC CHILDREN.
PI Clara Martin. Budget: 50.000 € from 2018-2021

02. PI 2019-54 LOOKING FOR WORDS: EARLY SPEECH SEGMENTATION ABILITIES AND THEIR RELATION TO VOCABULARY DEVELOPMENT IN BILINGUAL INFANTS.
PI Marina Kalashnikova. Budget: 43.395 € from 2019-2021

03. PI 2019-104 QUANTIFYING THE DYNAMICS OF SPONTANEOUS BRAIN FLUCTUATIONS WITH CALIBRATED FUNCTIONAL MAGNETIC RESONANCE IMAGING TECHNIQUES.
PI Cesar Caballero-Gaudes. Budget: 48.912 € from 2019-2021

04. PI 2020-1-0024 ACS.eus (APHASIA COGNITIVE SCREENING IN BASQUE): FILLING GAPS AND OVERCOMING BIAS IN CURRENT APHASIA ASSESSMEN.
PI Simona Mancini. Budget: 48.400 € from 2020-2022

05. PIBA_2021_1_0003: CONTRIBUTION OF MAGNOCECULLAR AND PARVOCELLULAR VISUAL SYSTEMS TO NORMAL READING AND DYSLEXIA (PIBA KEPA).
PI Pedro Manuel (Kepa) Paz-Alonso. Budget: 50.000 € from 2021-2024

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06. PIBA_2022_1_0014: CHARACTERIZING AND QUANTIFYING RELIABLE MRI METRICS OF THE READING CIRCUITRY: DATASETS AND TOOLS.
PI Garikoitz Lerma-Usabiaga. Budget: 50.000 € from 2022-2024

07. PIBA_2022_1_0015: A DEEP LEARNING APPROACH TO UNDERSTAND NEURAL COMPENSATORY MECHANISMS IN DYSLEXIA.
PI Mikel Lizarazu. Budget: 50.000 € from 2022-2024

08. KK-2023/00090 ELKARTEK- INVESTIGACIÓN MULTIDISCIPLINAR EN TECNOLOGÍAS NEUROMÓRFICAS DISRUPTIVAS, SILICON BURMUIN.
PI Garikoitz Lerma-Usabiaga. Budget: 141.455 € from 2023-2025

09. KK-2024/0041 ELKARTEK- INVESTIGACIÓN COLABORATIVA SOBRE BIOMARCADORES Y MÉTODOS ALTERNATIVOS DE DIAGNOSIS Y SEGUIMIENTO TERAPÉUTICO DE HIPERTENSIÓN PULMONAR ASOCIADA A FIBROSIS bmG24.
PI Cesar Caballero-Gaudes. Budget: 106.893 € from 2024-2025

10. ADVANCED PROTOCOLS FOR DIAGNOSIS AND COGNITIVE REMEDIATION FOLLOWING STROKE. AP4CORESTROKE.
PI David Soto, Manuel Carreiras y Simona Mancini. Budget: 168.067 € from2023-2024

11. #NEURAL2SPEECH: DECODING SPEECH AND LANGUAGE FROM THE HUMAN BRAIN.
PI Nicola Molinaro. Budget:93.508 € from 2023-2024

12. 2024333023 SALUD Potenciación - BIOSTROKE: EL PAPEL DE BIOMARCADORES Y BARRERA HEMATOECEFÁLICA EN EL PRONÓSTICO DEL ICTUS.
PI Simona Mancini. Budget: 25.851,72 € from 2024-2026

DIPUTACIÓN FORAL DE GIPUZKOA – GIPUZKOAKO FORU ALDUNDIA

01. RED I+D OF 232019 TENDIENDO PUENTES ENTRE LAS NEUROCIENCIAS Y LA NEUROCIRUGÍA: MAPEO DE ÁREAS ELOCUENTES EN PACIENTES CON TUMORES CEREBRALES.
PI Ileana Quiñones. Budget: 29.240 € from 2019-2021

02. RED I+D 422/022: BASES CEREBRALES DEL MANTENIMIENTO DE LOS EFECTOS BENEFICIOSOS DEL ENTRENAMIENTO EN CAPACIDADES COGNITIVAS SUPERIORES EN MAYORES.
PI Pedro Manuel (Kepa) Paz-Alonso. Budget: 64.099 € from 2022-2023

03. RED NEXT 2022-CIEN-000029-01: LOS MARCADORES NEURALES DEL DETERIORO COGNITIVO LEVE EN PACIENTES CON CÁNCER DE MAMA: UNA APROXIMACIÓN MULTIMODAL HACIA LA DETECCIÓN, PREDICCIÓN Y MONITORIZACIÓN, MultiModalCRCI.
PI Manuela Ruzzoli. Budget: 148.440 € from 2022-2023

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04. RED I+D 2023-CIEN-000070-01 - BASQUE GENETIC VARIATION DB BASE DE DATOS DE VARIACIÓN GENÉTICA VASCA, BasqGenVar.
PI Amaia Carrión. Budget: 57.647 € from 2023-2024

05. RED I+D 2024-CIE4-000042-01 - KEINU HIZKUNTZA ETA IRAKURKETA BURMUINEAN, IraKeinu.
PI Brendan Costello and Garikoitz Lerma-Usabiaga. Budget: 63.530 € from 2024-2025

PROJECTS FUNDED BY OTHER INSTITUTIONS

01. Funded by TATIANA PÉREZ DE GUZMÁN EL BUENO FOUNDATION. Lectura típica y atípica e interacciones tálamocorticales: Una visionmecanística de la lectura basada en redes funcionales y estructurales.
PI Pedro Manuel (Kepa) Paz-Alonso. Budget: 8.348 € from 2019-2021

02. Funded by LA CAIXA FOUNDATION. DYSTHAL: DYSLEXIA AND THE THALAMUS: INTEGRATING ANATOMY AND FUNCTION IN A MECHANISTIC ACCOUNT OF THE READING BRAIN, DYSTHAL.
PI Manuel Carreiras. Budget: 500.000 € from 2019-2024

03. Funded by BBVA FOUNDATION. RITMOS QUE LEEN: IMPACTO DE UNA INTERVENCIÓN MUSICAL-RÍTMICA TEMPRANA EN EL DESAROLLO DE LA LECTURA.
PI Marie Lallier & Nicola Molinaro. Budget: 40.000 € from 2023-2025

04. Funded by NATIONAL SCIENCE FOUNDATION (USA). FY2019-008: EXAMINING VARIABILITY IN THE NATIVE LANGUAGE AND ITS INFLUENCE ON SECOND LANGUAGE LEARNING.
PI Manuel Carreiras and Simona Mancini. Budget: 72.055,00 € 2018-2024

05. Funded by FUNDACIÓN CIENTÍFICA AECC. Biomarcadores de recuperación cognitiva postquirúrgica en tumores cerebrales.
PI Manuel Carreiras. Budget: 300.000 € 2020-2023

06. Funded by META. Natural language processing in brains and algorithms, META.
PI Pinet, Svetlana. Budget: 150.000 € 2022-2026

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ERC-2015-AdG-692502 - STATISTICAL LEARNING AND L2 LITERACY ACQUISITION: TOWARDS A NEUROBIOLOGICAL THEORY OF ASSIMILATING NOVEL WRITING SYSTEMS, L2STAT

[Budget
800,000 €
[Coordinator
PI R. Frost

[Funding Agency
European Research Council
[Type of Project
ERC Advanced Grant
[Time Frame:
2016 - 2022

The overarching goal of L2STAT is to understand L2 literacy acquisition by bringing together, for the first time, recent advances in the neurobiology of statistical learning (SL), a detailed statistical characterization of the world's writing systems, and neurally-plausible general principles of learning, representation, and processing. L2STAT aims to provide a new theoretical framework that considers L2 learning and SL a two-way street: SL, on one hand, attunes learners to the regularities of a new linguistic environment, while L2 environment, on the other hand, shapes learners' sensitivity to its specific types of statistical properties. The project will examine the assimilation of reading skills in four novel linguistic environments and, in turn, investigate how exposure to their distinct writing systems shapeSL. L2STAT is an interdisciplinary project that launches five mutually informative research axes in parallel: 1) we employ advanced methods from computational linguistics and machine learning to precisely characterize the statistics of four highly contrasting writing systems (English, Spanish, Hebrew, Chinese). 2) We study learning that results from biologically inspired computational models exposed to these statistics, to generate a priori predictions regarding what statistical properties can (or cannot) be learned, and how neural mechanisms constrain the representations learned during L2 literacy acquisition. 3) We develop psychometrically reliable behavioral tests of individuals' capacities to extract regularities in the visual and auditory modalities. 4) We use state of the art neuroimaging techniques including EEG, MEG, fMRI to probe the neurobiological underpinning detecting regularities in the visual and auditory modalities. 5) We conduct behavioral experimentation in four sites (Israel, Spain, Taiwan to track literacy acquisition longitudinally in the four different languages.

ERC-2018-COG-819093 - PHONEMIC REPRESENTATIONS IN SPEECH PERCEPCION AND PRODUCTION: RECALIBRATION BY READING ACQUISITION, READCALIBRATION

[Budget
1,875,000 €
[Coordinator
PI C. Martin

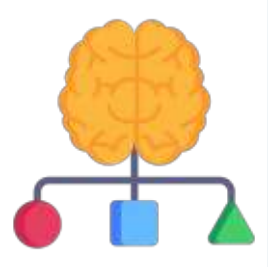
[Funding Agency
European Research Council
[Type of Project
ERC Consolidator Grant
[Time Frame:
2019 - 2025

The main goals of this project are to demonstrate that reading acquisition (RA) drastically reshapes our phonemic inventory, and to investigate the time course and fine-grained properties of this recalibration. The main innovative and groundbreaking aspect of this project is the merging of two research fields: (1) reading acquisition and (2) phonemic recalibration. These two fields, alongside a deep and extensive exploration of the (3) perception-production link, culminate in a new research line that pushes the boundaries of our understanding of complex interactions between auditory and visual language perception and production. We will demonstrate that phonemic representations (PRs) become more stable (less dispersed) during the process of learning to read, and that this recalibration varies according to the grapheme-phoneme conversion rules of the reading system. We will explore such recalibration by means of the first cross-linguistic longitudinal study examining the position and dispersion of PRs, both in perception and production of phonemes and words. Secondly, we will explore how recalibration develops when RA is impaired as is the case in children with dyslexia—informing the research field of (4) dyslexia—and when pre-reading PRs are unstable as is the case in deaf children with cochlear implants—informing the research field of (5) deafness. Finally, the research will also be extended to PR recalibration during RA in a second language—informing the research of (6) bilingualism. This proposal provides the first systematic investigation of phonemic recalibration during literacy acquisition and will provide important insight for pragmatic research and theoretical accounts of language perception, production, and phonemic recalibration. This project will also have major implications for the clinical field (theories and remediation of dyslexia and deafness), as well as for social policies and education (bilingualism, spoken and written language teaching).

ERC-2023-StG-101115798 - EMPIRICAL AND MECHANISTIC FOUNDATIONS FOR SYNERGISTIC PREDICTIVE PROCESSING IN THE SENSORY BRAIN, SynPrePro

[Budget
1,199,570 €
[Coordinator
PI A. Tabas

[Funding Agency
European Research Council
[Type of Project
ERC Starting Grant
[Time Frame:
2024 - 2029



Humans effortlessly process over 200 spoken words per minute in casual conversation, a task that speech recognition algorithms still fail to accomplish. Our superior performance stems from our capacity to predict what the speaker may say next. Understanding how the brain uses these predictions to process the sensory input is crucial to understand perceptual function and dysfunction: dyslexia, autism and psychosis have all been linked to an impaired handling of predictions. Hierarchical predictive coding (HPC) is the current leading framework to understand how predictions help us processing sensory inputs. However, HPC is only compatible with the function and organization of the cerebral cortex. This is a decisive shortcoming: while only cortical stages have the foresight to perform conceptually accurate predictions, only subcortical stations have the temporal properties required to correctly process fast sensory inputs. SynPrePro will reformulate HPC as an integrated theory explaining how cortical and subcortical stages work together to proficiently process fast and complex sensory inputs like speech. A unique experimental-theoretical approach will be used to study the human auditory pathway as a model for sensory pathways in four work packages (WPs). WP1 will use cutting-edge human neuroimaging to unravel the implementation of HPC in the auditory pathway. WP2 will use innovative model-based neuroimaging to identify the mechanisms responsible for the generation of conceptually accurate and temporally precise predictions. In WP3 a ground-breaking computational model will be developed to identify the neural mechanisms implementing HPC in the thalamocortical loop. WP4 will use big-data analytics to disentangle how cortical and subcortical stages work together to swiftly process speech. The outcomes will turn the cortical paradigm of HPC into an integrated theory of cortico-subcortical interactions, revolutionizing our understanding of perceptual function and dysfunction.

MSCA-2022-DOCTORAL NETWORK-101119647: COnfident DEcisions, CODE

[Budget
251,971 €
[Coordinator
PI D. Soto

[Funding Agency
European Research Executive Agency
[Type of Project
MSCA Doctoral Networks
[Time Frame:
2024 - 2027

Virtually every decision we make comes with a sense of confidence—a subjective estimate of decision quality. The human capacity for confidence has tremendous social, clinical, and industrial impact. Children who can correctly judge their own level of confidence perform better academically. In the elderly, confidence declines faster than other cognitive functions. Confidence plays a key role in our clinical understanding of brain-related disorders including dementia, anxiety, addiction, and depression. In industry, confidence aids trust in algorithms and automated systems, creating more natural interactions with smartphones and self-driving cars. Although the past decade has seen major advances in our scientific understanding of decision confidence, its mechanisms remain largely understood. This gap in understanding significantly hampers the translation into real-world applications, such as educational programs and clinical interventions. A major challenge for the immediate future is to address this gap, by expanding fundamental knowledge on decision confidence and explicitly bridging the research to technologies, interventions, and clinical practice. CODE aims to address this need. We are an international, interdisciplinary and intersectoral training network that spans fundamental and applied confidence-based research, linking academia, industry, education, and clinical practice. By reaching across domains that traditionally work in silos, CODE will provide critical new insights into decision confidence, paving the way for important future confidence-based applications. We will train doctoral students to become interdisciplinary decision confidence experts of the future—equipped to flexibly apply their knowledge to a wide variety of domains and sectors, who are exceptionally well prepared for successful careers in either academia or industry.

CEX2020-001010-S SEVERO OCHOA Center of Excellence

[Budget
4,000,000 €
[Coordinator
PI M. Carreiras

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Centros o Unidades de Excelencia
[Time Frame:
2022 - 2025

To tackle these fascinating topics, the BCBL proposes a two-pronged Research Program for 2021-2024 that will: (1) advance neural and behavioral models and theories of language processing; (2) translate this knowledge into clinical and educational applications beneficial to society. These twin goals will be accomplished as follows: First, by optimizing our research lines to tackle new challenges at the frontiers of language research. Second, by attracting highly skilled researchers whose expertise complements our current strengths, building theoretical depth and a multidisciplinary approach alongside expertise in neuroimaging, computational modeling and other advanced methods. Third, by continually upgrading and updating our facilities to assure increased research output and attract young talent. Fourth, by making fundamental contributions to applied neuroscience: i) Educational Neuroscience—exploiting the latest advances in neuroscience to inform educational approaches in critical areas such as native and foreign language-reading, second language learning, early detection of learning disabilities, and development of software for the diagnosis and remediation of language disorders; ii) Neuroscience and Health—translating neuroscientific advances to develop more effective therapeutic avenues for language and cognitive rehabilitation following neurological disease, with special attention to the bilingual brain. This includes improving brain surgery outcomes and recovery in patients undergoing surgery for epilepsy or tumors in language areas and developing software for rehabilitation of patients with aphasias and neurodegeneration.

RTI2018-096311-B-I00_FEDER: WHY DOES MUSICAL TRAINING ENHANCES SPEECH PROCESSING? A CORTICAL ENTRAINMENT PERSPECTIVE, TrainSynchro

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2022

[Budget
171,336 €
[Coordinator
PI N. Molinaro

Recent studies have shown that musicians outperform nonmusicians on a variety of tasks related to speech processing, suggesting that musical training may boost our ability to process auditory language. Yet, we know very little about the neurocognitive mechanisms underlying this advantage observed in musicians. On one hand, several studies suggest that musical training enhances sensitivity of auditory pathways to sound in general. This would improve human acoustic skills which may in turn transfer to language acquisition and processing. On the other hand, it has been hypothesized that musical training might refine the interaction between motor and auditory regions. This in turn would boost the ability to develop regular and precise temporal predictions, utilizing more fine-tuned motor production plans of the spoken sounds. Understanding which driving force underlies the improved language performance in musicians is a topic of central interest in cognitive neuroscience, with inevitable implications for the development of intervention strategies for language acquisition and associated developmental disorders. This project aims to inform such applied research by uncovering the neural mechanisms underlying this advantage observed in musicians. To achieve this, we will study auditory cortical entrainment in musicians and nonmusicians. Cortical entrainment refers to the ability of the brain to naturally synchronize its internal oscillatory activity with the rhythm of the external auditory signals. This phenomenon has been shown to play a pivotal role in the extrapolation of linguistic tokens from acoustic signals and in the construction of coherent auditory representations. Crucially, different components of this phenomenon have been linked to both passive auditory sensitivity (involving auditory regions) and active predictive timing (involving premotor regions). Comparing rhythmic auditory processing and cortical entrainment to speech and music in musician vs nonmusicians will provide us with a unique model to (1) evaluate the specific aspects of language processing that are enhanced by music training; (2) unveil the specific neurocognitive mechanisms underlying such improved performance; and (3) use the fundamental knowledge of (1) and (2) to define more effective interventions for language disorder treatments.

RTI2018-093547-B-I00_FEDER: IS THE BRAIN CONNECTOME A GOOD PREDICTOR FOR THE LANGUAGE NETWORK FUNCTIONAL MALLEABILITY?, LangConn

[Budget
169,400 €
[Coordinator
PI M. Carreiras, I. Quiñones

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2022

The current project introduces a novel multivariate network-based approach where the combination of functional and structural measures will allow us to characterize the language connectivity fingerprints (i.e., connectome) while also accounting for its intrinsic individual variability. Using this pioneering approach, we will characterize the connectome underlying the decoding and integration of linguistic signals and determine whether this connectome could be used to predict individual differences in language performance. For the first time, structural and language-related functional measures will be collected on the same participants across different language-specific tasks (i.e., comprehension and production) in two different languages (i.e., Spanish-L1 and Basque-L2). Defining and characterizing the language connectome will enable investigation into the capacity of this system to react to salient language-related events. The location of Donostia-San Sebastian, home to the BCBL, combined with established collaborations with the Hospital Universitario Cruces in Bilbao, provides a unique opportunity to address this question. The Basque Country features a Spanish-Basque bilingual population, allowing us to study individuals with different linguistic profiles. Thus, here at the BCBL, we have access to two distinct populations in which neural plasticity appears to play a remarkable role in terms of neural adaptability: (1) adults second language learners and (2) pre-surgical patients with low-grade gliomas affecting perisylvian areas involved in the processing of linguistic signals. While the first group allows us to investigate neural plasticity associated with the acquisition of new language-specific knowledge in a healthy and functionally typical brain, the second group of participants enables us to study the neural capacity to negotiate L1 and L2 language information after the removal of a critical language-related area. In summary, our primary goal is to determine to what extent the language connectome could be used to predict plastic changes associated with language-related salient events. Thus, in order to test the predictive power of the language connectome, we propose a longitudinal approach in which both adult L2 learners and pre-surgical patients will be recorded before and after the occurrence of the critical event. Specifically, L2 learners will be recorded before and after they learn to read/speak in a second language, and pre-surgical patients will be tested before brain surgery, and again six months later. By longitudinally tracking individual profiles at both behavioral and neural levels focusing on changes in the network topology and dynamics, we can bridge the knowledge gap between language functions, bilingualism and brain plasticity.

RTI2018-096242-B-I00: DOES VISUAL OSCILLATORY ACTIVITY IN THE ALPHA BAND CONTRIBUTE TO TYPICAL AND ATYPICAL READING DEVELOPMENT? A FOCUS ON VISUAL ATTENTION, VISOSCIL

[Budget
72,600 €
[Coordinator
PI M. Lallier

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2022

In most cases, developmental dyslexia, a specific deficit in learning to read, is associated with phonological auditory difficulties which are thought to explain grapheme-to-phoneme conversion deficits. However, symptoms of dyslexia are not always observed in the presence of phonological deficits. To explain the potential origin of dyslexia in individuals that do not exhibit any phonological processing difficulties, the visual attention span (VA span) deficit hypothesis has been proposed (Bosse, Tainturier, & Valdois, 2007). In the present proposal, we will focus on refining the VA span deficit hypothesis from the novel perspective of neural and behavioral oscillatory processing. We will test the assumption that the origin of VA span deficits in dyslexia and the contribution of VA span skills to reading development possibly reside in neural alpha oscillations (8-12 Hz). In addition, we will test the proposal that cross-linguistic differences in letter-sound mappings regularity (the orthographic depth) modulates the strength of the VA span deficits in dyslexia and their visual oscillatory underpinnings. Firstly, we will determine whether the development of visual oscillatory activity/ processing contribute (longitudinally and cross-sectionally) to the development of VA span skills: we will compare two groups of Spanish-speaking children: one at the very early stages of reading acquisition (beginning of Grade 1) and one at the end of reading acquisition (Grade 5) to highlight the developmental dynamics of the association between VA span skills, visual oscillations and reading. Grade 1 children will be re-tested one year and a half later at the end of Grade 2 to study the longitudinal contribution of alpha oscillations to VA span and reading skills. Secondly, we will investigate whether impairments on alpha oscillatory visual mechanisms relate to dyslexia associated with a VA span deficit: we will compare the VA span skills, oscillatory skills, and reading skills of dyslexic adults to their chronological age-matched and reading age-matched skilled reader controls. Lastly, we will test the hypothesis that the strength of this oscillatory visual deficit in dyslexia is modulated by the orthographic depth of the language learned: we will compare the severity of VA span and alpha oscillatory impairments between French (deep orthography) and Spanish (shallow orthography) dyslexic adults. Overall, this project will contribute to explaining part of the current puzzling heterogeneity characterizing the visual manifestations of dyslexia, since it considers the language learned as a potential source of this heterogeneity. The present project should have a strong impact not only on the neurocognitive models of reading but also on educational and health systems both for Spanish and French speaking communities. Lastly, we hope that the outcomes of this research will contribute to improving the management of dyslexia at the individual level by allowing practitioners to formulate more precise predictions for the expected symptoms.

PGC2018-093408-B-I00: FUNCTIONAL AND STRUCTURAL CONTRIBUTIONS OF THE THALAMUS TO LANGUAGE SYSTEMS ACROSS DEVELOPMENT, THALANG

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2022

[Budget
84,700 €
[Coordinator
PI P.M. Paz-Alonso

Since the early 1960s, evidence from spontaneous and surgical lesions has pointed to the involvement of the human thalamic nuclei in language function. Several proposals have been put forward regarding a thalamic role in cognitive function in general, and language function in particular. However, to date, our understanding of the role of the thalamus in language function remains limited. The thalamus is a diencephalic structure with massive white matter fiber projections to almost the entire cerebral cortex. It is involved in the flow of sensory signals to the cortex and continues to contribute to the processing of information within cortical hierarchies. Among other functions, the thalamus is involved in the regulation of consciousness, sleep and alert states, the motor system, language, memory and attention, as well as in clinical conditions such as schizophrenia, Alzheimer's disease and dyslexia. Recently, we developed the first probabilistic atlas of the human thalamic nuclei combining high-resolution ex vivo magnetic resonance imaging (MRI) and histology, and have implemented a companion segmentation toolbox in the neuroimaging package FreeSurfer to support in vivo study of the thalamus and its subnuclei in MRI research. The proposed research project will capitalize on this tool, the well-known neuroanatomy of thalamocortical connections, and the use of multimodal MRI techniques to investigate: 1) the developmental trajectories of the thalamic nuclei gray-matter volume and white matter connections across the lifespan and their relation to individual differences in language-related variables; 2) the functional and structural involvement of specific thalamic nuclei and their thalamocortical interactions in language production, speech comprehension and reading in a large sample of young adults; 3) the functional and structural contributions of thalamocortical circuits to reading in both typically and atypically-developing samples with reference to some of the most important theories of reading and dyslexia. Thus, this research project aims to conduct a comprehensive multimodal investigation of thalamic contributions and thalamocortical interactions in language function within neurocognitive, neuroanatomical and psycholinguistic frameworks. A key focus will to better understand how reading disabilities may occur as a consequence of breakdowns in thalamocortical circuits. In this regard, this project stands at the cutting edge of national and international research precisely tracking the role of the thalamus in language function. Furthermore, it will allow the development of a mechanistic model to explain the thalamic subnuclei and their interactions with cortical regions to central language systems.

RTI2018-096216-A-I00 Marcadores oscilatorios de neuroplasticidad asociada al lenguaje en pacientes con tumores cerebrales: Un estudio longitudinal con MEG (MEGLIOMA), MEGAGLIOMA

[Budget
72,600 €
[Coordinator
PI L. Amoruso

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2021

Recent evidence suggests that the presence of a brain lesion in close topographical relation with language-related areas triggers its functional reorganization. That is, by putting into play neuroplasticity mechanisms, the brain seeks to adapt and transfer linguistic functions from damaged to healthy areas adjacent to the lesion or contralateral to it. There is currently a considerable debate on the role of these mechanisms. While the recruitment of perilesional tissue is widely accepted as a marker of favorable outcomes, the involvement of the right hemisphere remains controversial, with evidence suggesting neither adaptive nor maladaptive plasticity. In this context, our comprehension of language plasticity has been traditionally based on studies mapping brain function with hemodynamic techniques in stroke patients. However, this approach has certain limitations. On the one hand, due to its limited temporal resolution, hemodynamic techniques do not allow capturing the spectro-temporal activity associated with linguistic processing, which occurs in the millisecond timescale and involves specific brain rhythms. On the other hand, the sudden and acute nature of stroke lesions only allows studying compensatory mechanisms once brain damage has occurred (i.e., post-stroke plasticity). Here, we will focus on a notable and relatively understudied population, namely, patients with low-grade gliomas (LGGs). Due to its slow growth (4mm per year), this type of tumor allows the brain to progressively adapt and transfer linguistic functions gradually without severe neurological symptoms. Thus, compensatory mechanisms can be traced once the tumor is removed through surgery, but most importantly, before resection, providing new insights into the brains capacity of maintaining homeostasis in the presence of a lesion. By implementing a longitudinal design by mapping language function with magnetoencephalography (MEG) before and after surgery, this project aims to identify biomarkers of neuroplasticity that underlie successful compensation of linguistic abilities in patients with LGGs. Additionally, a clinical aim of the project is to aid neurosurgeons in planning surgery strategy by means of preoperatively mapping eloquent areas with MEG, and through the design of personalized behavioral tasks (e.g., based on the patient's linguistic profile). Furthermore, these tasks will be combined with direct electrical stimulation (DES) during the on-line intra-operative phase of the surgery to remove the tumor according to functional boundaries. By doing so, we seek to overcome the existing fragmentation between basic and clinical research, to optimize the quality of tumor resection while minimizing the risk of post-operative neurological deficits, ultimately improving patients' well-being and quality of life.

RTI2018-098317-B-I00 El efecto de la experiencia lingüística en los mecanismos neurales del procesamiento metacognitivo en dominios no lingüísticos (MetacogniciónBilingüe), BILMETACOG

[Budget
84,700 €
[Coordinator
PI M. Ordin

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2021

Many studies aim at challenging or supporting the bilingual advantage in cognitive control, yet few studies have explored the effect of bilingualism on metacognition, i.e., the ability to monitor one's own cognitive performance and the outcome of the cognitive processes across different task domains (linguistic and non-linguistic). Metacognitive processing may be influenced by the experience of an individual in a specific domain. Since bilinguals possess greater experience with linguistic tasks, they may display improved metacognitive awareness in tasks that are linguistic in nature—provided their languages differ enough in typology and phonetics to influence speech and language processing while switching. Improved metacognitive performance is reflected in better error-detection and monitoring while performing tasks in more familiar domains. However, the hypothesis that individual experience in a certain domain (e.g., in language processing) leads to enhanced metacognitive processing in this domain has not yet been explicitly tested. Moreover, there is no evidence that enhancement of metacognitive processing skills in one domain can be transferred another (e.g., from linguistic to nonlinguistic), which would be the case if metacognitive processing in different domains relies on the same neural mechanisms within circuits. Building upon preliminary evidence presented in this proposal, this project will address, for the first time, how the bilingual experience and linguistic environment interact with metacognitive processing at both behavioral and neural levels. Within the framework of the proposed project, the following questions will be focused on: 1) How does bilingualism influence metacognitive sensitivity, metacognitive efficiency and metacognitive bias in performing linguistic and non-linguistic tasks in visual and auditory modalities? 2) Which brain circuits are involved in metacognitive processing in linguistic and non-linguistic tasks, and how they are affected by bilingualism and by the social linguistic environment? These issues will be addressed in a series of behavioral and EEG experiments followed by an fMRI study aimed at defining the brain networks and substrates involved in metacognitive processing. The results will show how individual differences in long-term experience affect these networks and modulate metacognitive processing.

PID2019-105494GB-I00 USANDO LA NEUROIMAGEN DE CIRCUITO CERRADO PARA ENTENDER Y MANPIULAR LAS FUNCIONES METACOGNITIVAS, BrainMetaLoop

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2020 - 2024

[Budget
154,880 €
[Coordinator
PI D. Soto

The ability to reflect upon one's own thoughts and behavior (i.e. metacognition) is a key constituent of the human mind. How the human brain implements metacognition and how the resulting meta-knowledge is used to promote adaptive control of behavior remain key unresolved questions in psychology and neuroscience. There are currently no established neuroimaging protocols that can efficiently manipulate and improve metacognition and self-reflection. This project will tackle these issues by developing novel, innovative neuroimaging paradigms to define brain mechanisms of metacognition and crucially to manipulate them in real time using closed-loop neurofeedback. This research project will tackle these fundamental issues in three key areas: (i) metacognitive awareness of perceptual decision making; (ii) metacognitive monitoring of one's internal representations during mental simulation, and (iii) self-knowledge during problem solving. The ultimate goal of BrainMetaLoop is to understand and modulate metacognitive functions in a way that adaptive control of behavior can be promoted across different task contexts. This truly multidisciplinary project involves a highly integrated research vision from cognitive neuroscience, experimental psychology, and areas of computer science and engineering. Besides the important implications for neurocognitive accounts of human self-control and metacognition, the project will have ramifications for artificial intelligence research and education, by laying the scientific foundations to exploit the power of reflection to promote learning, self-control and metacognitive functions in educational settings.

PID2019-107325GB-I00 TRILINGÜES BIMODALES: EL MAPEO DEL LÉXICO INTERLINGÜÍSTICO E INTERMODAL, BiTri

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2020 - 2023

[Budget
121,000 €
[Coordinator
PI B. Costello

If you are a Spanish-Basque bilingual, you may have asked yourself how the different words for 'apple' (manzana and sagarra) relate to one another in your mind. If you know Spanish and Spanish Sign Language (LSE), you might have wondered the same about manzana and its corresponding sign. This project sets out to examine bilingualism by investigating, and comparing, two types of relationships: 1) how words from different languages relate to each other, and 2) how a change in modality (from an oral-aural language to a visual-gestural language) affects that relationship? Our proposal consolidates existing resources for psycholinguistic research on Spanish Sign language and introduces a set of novel studies on a unique population: individuals fluent in two spoken languages (Spanish and Basque) as well as a signed language (LSE). This allows us to examine within-modal and across-modal relations in the same individuals. We also incorporate neuroimaging techniques (MVPA and fMRI) to study how these languages map out their concepts and coexist in the human brain.

PID2019-105528GA-I00 TURNOS CONVERSACIONES: DESARROLLO TEMPRANO DE LAS HABILIDADES DE TOMA DE TURNO CONVERSACIONAL EN NIÑOS BILINGÜES, CONTUR

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2020 - 2023

[Budget
48,400 €
[Coordinator
PI M. Kalashnikova

Language is learned and processed in the context of spontaneous face-to-face conversations. One of the foundational components in these interactions is conversational turn-taking, which enables interlocutors to have conversations without long pauses or interruptions that cause communicative breakdowns. Adults engage in turn-taking effortlessly because they are equipped with mature language processing capacities, and they can rely on various sources of information such as conversational context and language-specific cues. This is not the case for young children who do not have full access to all these cues since they are still in the process of acquiring their native language. This project aims to define the trajectory for development of conversational turn-taking abilities during the first four years of life, and to assess how this trajectory is modulated by language-specific properties and a child's individual experience acquiring language in a monolingual or bilingual context. This project comprises five experiments that employ a combination of observational, behavioral, and neurophysiological methods to investigate emerging conversational turn-taking skills in children 6 months to 3 years of age. It will combine experimental measures of children's ability to make online predictions about upcoming conversational turns with detailed acoustic analyses of their natural language input to evaluate the experiential factors that scaffold the development of turn-taking skills in the first years of life. We will study these factors in Spanish and Basque, two languages largely understudied in language acquisition research, and importantly, we will assess their acquisition in bilingual children, thus manipulating cross-linguistic information within a single participant. This innovative crosslinguistic and transdisciplinary approach will have an immediate theoretical impact by producing a theoretical account for early development of turn-taking abilities that incorporates influence of children developing linguistic competence, their individual linguistic experience, and the effects of the prosodic, lexical, and syntactic structure of their native language.

PID2019-105538RA-I00 CORRELATOS CONDUCTUALES Y ELECTROFISIOLÓGICOS DE LA VENTAJA BILINGÜE EN FUNCIONES EJECUTIVAS EN SUJETOS ANCIANOS SANOS, BILINGUALAGE

[Budget
60,500 €
[Coordinator
PI J. Cespón

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2020 - 2023

Previous studies report that bilingualism strengthens executive functions in elderly subjects and delays the clinical onset of Alzheimer's disease (AD) by several years. Moreover, various studies argue that speaking two or more languages involves continuous and active selection of the target language during conversation, inhibition of the non-target language, and shifting between languages to adapt the conversation to the demands of the context. However, recent works report negative or inconsistent results regarding the relationship between bilingualism and executive functions. Critically, most studies focused on the inhibition of irrelevant information through cognitive control abilities. However, it has been recently proposed that the bilingual advantage in executive functions primarily relates to executive attention or attentional switching (that is, the ability to switch attention from a previous to a current stimulus or set of features). Additionally, the vast majority of research on bilingual advantage in executive functions used visual tasks; however, considering that language is more related to the auditory than to the visual modality, the executive advantages of juggling two different languages could be more evident in auditory than in visual executive tasks. Also, as suggested by previous investigations, some results showing no bilingual advantage in executive tasks could be attributed to high CR of the participants and/or the low difficulty of the performed task. These mentioned factors would produce a ceiling effect in cognitive performance, masking the bilingual advantage. The main objective of this project to study the experimental conditions that are required to observe a bilingual advantage in specific executive functions (i.e., inhibition, attentional switching, and working memory) and identify underlying neural mechanisms in healthy elderly subjects. We will investigate whether or not the bilingual advantage is stronger in auditory than in visual tasks. In addition, we interrogate the extent to which the ceiling effect can be an explanatory mechanism of previously reported results showing no relationship between bilingualism and improved executive functions.
In order to achieve the abovementioned aims, we apply several visual and auditory executive control tasks in samples of elderly monolinguals with low and high CR and elderly bilinguals with low and high CR, who will perform a set of executive control tasks during an electroencephalogram recording. The experimental tasks will be designed to investigate a possible bilingual advantage in the three main types of executive processes. Moreover, the bilingual advantage in these mentioned executive processes will be investigated by applying analogous visual and auditory executive control tasks and by manipulating the task difficulty. Therefore, we will test the ceiling effect hypothesis in cognitive functioningby investigating whether or not the bilingual advantage is more evident in low than in high CR groups, and to what extent the bilingual advantage is modulated by difficulty of the task. Event-related brain potentials (ERP) associated with specific cognitive processes taking place during the performance of the designed executive control tasks (i.e., spatial stimulus-response compatibility tasks, Go/No-Go tasks, attentional-switching tasks, and n-back tasks) will be studied to reveal the neural mechanisms underlying the observed bilingual advantage(s).

PID2019-105520GB-I00 ESTUDIO CUANTITATIVO DE LAS FLUCTUACIONES EN LA CONECTIVIDAD FUNCIONAL Y ACTIVIDAD CEREBRAL EN REPOSO CON IMAGEN DE RESONANCIA MAGNÉTICA FUNCIONAL DE ASL Y MULTIECO BOLD, Qrsfmri

[Time Frame:
2019 - 2021
[Budget
47,432 €
[Coordinator
PI C. Caballero-Gaudés

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación

Recent years have seen a rapidly growing interest in methods that enable time-varying functional connectivity (FC) analysis of spontaneous brain activity using resting state functional magnetic resonance imaging (RS-fMRI) based on the blood oxygenated level dependent (BOLD) signal. Time-varying analyses have the potential to extract more information about brain function. They reveal dynamic FC patterns that explain differences in behavioral performance within and across individuals, as well as changes in cognitive state, arousal and vigilance. These analyses also distinguish between healthy controls and patients more effectively than traditional functional connectivity approaches, which rely on a static measure of synchronization between brain regions. Despite their increasing popularity, availability of data on neurophysiological mechanisms underlying time-varying fluctuations in spontaneous brain activity, particularly in the human brain, remains scarce. Likely due to the lack of methods to approach this research question accurately. Since the BOLD signal is an indirect measure of neuronal activity, reflecting dynamic changes in cerebral blood flow, cerebral blood volume and oxygen metabolism, traditional fMRI BOLD experiments preclude any quantitative, calibrated interpretation of any analysis and the corresponding findings. The goal of this project is to develop an integrated framework that jointly optimizes data acquisition protocols (MR pulse sequences and experimental procedures) and signal processing algorithms to enable an accurate and calibrated quantification of the dynamics of spontaneous brain activity and functional connectivity with concurrent ASL and multi-echo BOLD fMRI.
To succeed in such an unprecedented task, this project aims to:
- Design, implement, and optimize a new calibrated fMRI pulse sequence that acquires concurrent ASL and multiecho BOLD data with whole-brain coverage and relatively high spatial and temporal resolution, while optimizing the signal-to-noise ratio of both data.
- Develop novel signal processing algorithms to perform a multivariate deconvolution of ME-BOLD data based on low-rank and sparse regularized estimators and develop stability selection procedures with aimed to enhance the blind detection and quantitative characterization of neuronal-related transient, spontaneous events occurring at rest.
- Investigate instantaneous time-varying fluctuations in CBF/BOLD coupling of spontaneous brain activity during RS-fMRI and to formulate novel methodologies quantifying these variations in terms of BOLD, CBF, CMRO2 changes, relating them to subject-specific measures of cerebrovascular reactivity.
By pursuing these aims, throughout this project we will create new methods, acquire high-quality data and produce novel evidence about the vascular and neuronal processes of RS-fMRI. Not only is this project relevant for basic scientific studies of human brain function, but can also make an enormous impact in the clinical arena where RS-fMRI and calibrated-fMRI are increasingly adopted to examine neurovascular coupling in numerous neurovascular and neurological diseases.

PID2020-113945RB-I00 TEST NEUROLINGÜÍSTICO PARA LA VALORACIÓN DE LA AFASIA EN ESPAÑOL, TeNL

[Budget
56,870 €
[Coordinator
PI S. Mancini

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2025

Aphasia is an acquired impairment characterized by partial or complete loss of one or more modalities of linguistic communication. Several batteries and screening tests are available to neuropsychologists and speech therapists to assess the linguistic profile of brain damaged patients. These tools were primarily conceived for clinical purposes, providing a general assessment of cognitive functions, yet they are seldom complemented by neuroimaging techniques and do not account for consolidated findings from neurolinguistic research. The goal of the current project is to introduce a neurolinguistic approach to the domain of language impairment assessment. Concretely, an aphasia assessment tool is proposed, NeLT.esp (Neurolinguistic Test in Spanish), that centers on a variety of tasks and techniques that have been extensively used in research, and are therefore highly reliable to assess the integrity of linguistic behavior in several domains. Unlike existing tools, NeLT.esp involves validation of linguistic performance measures using neuroimaging techniques that allow for correlating the site and extent of a lesion and the integrity white matter tracts with the type and severity of the linguistic deficit. The realization of this project has important research, clinical, and social implications. From a research perspective, it will enrich our knowledge on the neurobiology of language functions. From a clinical perspective, neuropsychologists and speech pathologists will be able to rely on a valid, reliable and fine-grained tool to evaluate linguistic impairment. But more importantly, the possibility to receive a more careful screening will lead to more careful planning of intervention and treatment of linguistic deficits, thus significantly improving patients' quality of life.

PID2020-114717RA-I00 EL PUNTO JUSTO DEL CONFLICTO COGNITIVO - SweetC

[Budget
88,330 €
[Coordinator
PI M.Ruzzoli

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2025

In the Camera Obscura and World of Illusions Museum in Edinburgh (Scotland), among other brain-tricks, there is the Stroop effect. This well-known effect is largely employed to investigate cognitive control functions, which are responsible for flexible behavior and adaptation. In the Camera Obscura and World of Illusions Museum, the Stroop effect is used for entertainment. However, in Cognitive Psychology, cognitive conflict is considered a cost and an aversive signal. How can an aversive stimulus possibly be entertaining? In this project (SweetC), we propose a radical change in perspective, advocating that some degree of cognitive conflict can be beneficial for subsequent performance or pursuit rather than being a cost or aversive, as commonly assumed. We outline the theoretical ground supporting our view and propose three work-packages (WP) aimed at testing the positive impact of cognitive conflict on behavioral performance (WP1) and preferences (WP2). WP1 and WP2 are the scientific core of the project in which we collect behavioral, physiological, EEG and self-report data. Finally, in WP3, we aim to test the previous results through outreach activities (card games), which use cognitive conflict for entertainment and science dissemination. At the same time, data are collected from WP3 as part of the proposed research. SweetC offers a novel scientific perspective: a "sweet spot" for cognitive conflict exists, and it can be tested. To do so, we followed a multidisciplinary approach and combined Cognitive Sciences (i.e., control theories), Psychological Sciences (i.e., motivation) and Physiology (i.e., EEG and other measures) to advance scientific knowledge in these fields. SweetC also promises to have a strong translational impact on communication, advertisement, social sciences, and entertainment, as illustrated by the applications we develop in WP3. SweetC offers a creative solution to one of the social challenges in Horizon 2020 (Science with and for Society) because it merges controlled lab-testing with outreach activities in which the public both participates in, and benefits from the investigation. SweetC focuses on cognitive conflict, thereby capitalizing on a long tradition of studies in Cognitive Neuroscience. We will borrow experimental paradigms (e.g., the Stroop task) from this field and make use of neurophysiological evidence for conflict detection (e.g., Theta power enhancement, Mismatch Negativity). The neuropsychological evidence will be crucial for grounding the data generated in SweetC and providing reality checks. Since our main hypothesis of a "sweet spot" for cognitive conflict is ground-breaking, we will combine hypothesis-driven advanced statistical methods with explorations of behavioral and physiological measurements as well as self-reports. SweetC is undoubtfully risky; therefore, we will adopt a pre-registration policy (including registered reports, whenever possible) to benefit from peer-review before data collection and to promote the advancement of Science , both with and for Society.

PID2020-113348GB-I00 CONECTANDO PALABRAS: EL PAPEL DE LA CO-ACTIVACIÓN EN LA ADQUISICIÓN DEL LÉXICO, COLEXI

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2025

[Budget
66,550 €
[Coordinator
A. Samuel, E. Kapnoula

Word learning is important for all aspects of language use, essential in the acquisition of one's native language and later in learning a new language, where the number of words learned is critical for communication. In addition to its practical value, this issue also has great theoretical significance; examining how words are learned will allow us to reach a more comprehensive understanding of the representations and processes involved in language use. This project focuses on the cognitive mechanisms that subserve novel word learning.

In the last two decades, research has identified a critical factor consistently found to boost word learning: sleep (Davis & Gaskell, 2009; Dumay & Gaskell, 2007; Gaskell & Dumay, 2003; Tamminen et al., 2010). However, it is not entirely clear what happens during sleep that aids word learning. According to a widely accepted memory model (see complementary learning systems model below), sleep is an ideal time for the brain to replay (i.e., re-activate) newly acquired information and build connections between existing and new representations. Interestingly, recent work suggests there may be alternatives to building such links by inducing coactivation of old and new information during training (e.g., by interleaving their presentation). Indeed, successful word learning has been found in studies using materials likely to induce co-activation of similar items (Kapnoula & McMurray, 2015), as well as in studies that explicitly used interleaving in training (Lindsay & Gaskell, 2013). Thus, it is highly likely that a facilitatory effect similar to that of sleep can be achieved by interleaving new and known words during active training. If that is so, we need to determine how this interleaving works and how it can be used to optimize learning, which is why we propose two sets of studies. The first set will examine how different ways of actively interleaving new and known words may affect word learning outcomes. Specifically, we will examine factors related to the type of the interleaved material, as well as details of the interleaving method. The second set of studies will focus on the role of prior knowledge in this process. Previous research has shown that the ability to learn a new word depends on whether an individual already knows many similar-sounding words (Storkel et al., 2006), as well as their overall vocabulary size (James et al., 2017). Across four experiments, we will examine the role of these factors in word learning, as well as how they interact with effects of explicit interleaving and off-line, sleep-driven consolidation. The results of the proposed research will clarify how co-activation of new and old words affects word learning. Crucially, in contrast to previous research, we will examine the effects of both explicit co-activation (via interleaving of items during training), as well as off-line coactivation, likely taking place during sleep. These mechanisms are of great theoretical importance in the research areas of cognition and language, and the systematic investigation proposed here will provide substantial new theoretical insights. In addition, the results will offer a more applied benefit: They will reveal tangible ways in which we can improve current teaching practices, enhancing student learning. Thus, the project will both advance basic science, and will provide information that can improve practices in second language learning.

PID2020-119131GB-I00 EL LÉXICO BILINGÜE: INTERFERENCIA Y SINERGIA - BLIS

[Budget
84,700 €
[Coordinator
PI J. Magnuson

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2024

Scientific understanding of the interaction of sound and meaning in language development and processing is in its infancy. The challenges are multiplied when one considers bilingualism. Given that half the world's population is bilingual, and more strive to be (cf. national efforts to promote language learning for economic benefit), this scientific challenge has important societal implications. This project addresses 2 key theoretical challenges: (a) how humans learn a second language without significant interference in the first, and (b) how 2 languages interact during online language processing. In Objective 1, we address interference from a second language (L2) on a first language (L1) during L2 acquisition with computational models. In our preliminary work, we avoid catastrophic interference (L2 "overwriting" L1) through a novel attractor network approach: L1 and L2 share phonological and semantic substrates, but L2 adds phonological and semantic features, and new "cleanup" units are added when L2 is introduced. This is an important advance, but inadequate, as human L2 learners do not necessarily interleave practice (speaking/listening time) on L2 and L1 (e.g., immersion learners). We propose that our attractor network avoids interference by coarsely mimicking the "complementary memory systems" theory, in which new experiences are integrated with prior knowledge in the hippocampus and medial temporal lobes (primarily in sleep-based consolidation). Activation of L1 during consolidation, triggered by L2 experience, could serve as sufficient interleaving to protect L1. We will implement the first comprehensive complementary memory systems model for bilingual lexical acquisition to evaluate this proposal. This will provide new insights into the processes involved in later L2 acquisition, with potential implications for L2 instruction. In Objective 2, we study interactions between lexicons in multilingual individuals using the graph-theoretic tools of network science. Building on the PI's prior network science research with English and other languages (including a novel approach to diffusion on networks to simulate the time course of word recognition), we will construct linked models of Spanish and Basque. First, we will construct large (~20k words) monolingual networks, with one layer representing phonological word forms (links based on sound similarity) and the other representing semantic relatedness (links based on meaning similarity). Phono-semantic interactions arise due to direct links between identical word nodes in the two layers (e.g., the phonological form and semantic nodes for GATO). We will test to what degree prior findings with English networks generalize to Spanish and Basque, and then create novel 'tripartite' bilingual networks by connecting Spanish and Basque phonological networks to shared semantics based on both languages. Resulting networks will generate novel hypotheses about cross-language interactions for phonological and semantic features for human language processing, which we will test with several experiments that will address the significant lack of research on spoken word recognition in Spanish and Basque). This project will advance understanding of interactions between languages in bilinguals and extend the scope of network science. Together, these projects will extend the frontiers of scientific understanding of (a) the development of bilingualism and (b) the implications of bilingualism for online language processing.

PID2020-113926GB-I00 LANGUAGE PRODUCTION ACROSS MODALITIES, LANGUAGES, AND CONTEXTS, CROSSPROD

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2024

[Budget
102,850 €
[Coordinator
PI C. Martin, S. Pinet

Extensive research in experimental psychology and neuroimaging has led to a good description of cognitive processes and neural networks involved in oral production, in both native (L1) and non-native (L2) speakers. Still, most studies, theories, and models focus on oral language production in isolation, and neglect investigating how the context of production (e.g., communicative goal, input modality) influences and modulates speech production. Furthermore, despite the prevalence of written language, neither written language production nor the similarities and differences between oral and written production have received sufficient attention in prior research. The main goal of this project is to extend current models of language production by incorporating these important yet neglected aspects, thus providing a better integrated and more complete picture of this complex linguistic skill. First, we will demonstrate that oral production varies with the input modality (i.e., picture, auditory word, visual word) both in native and non-native speakers (Objective 1). We will then contrast two output modalities (i.e., oral and written production) and reveal the (a)symmetrical pattern of the cross-modality interplay both in native and non-native speakers (Objective 2). A subsequent fMRI study will reveal the complex neural network activations at play during language production, as a function of both input and output modalities (Objective 3). Finally, we will reveal the role of the communicative intention in language production, showing the manner in which we speak (in a native or non-native language) changes depending on the didactic goal and addressee (Objective 4). Overall, this project will provide a necessary extension to the current knowledge on native and non-native language production by including contextual factors as well as production modalities.

PID2021-123574NB-I00: TIP-OF-THE-TONGUE EXPERIENCES AS A WINDOW TO INVESTIGATE THE NEURAL BASIS OF SEMANTIC AND EPISODIC MEMORY RETRIEVAL, ToTMRI

[Budget
114,708 €
[Coordinator
PI P. M. Paz-Alonso

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2025

The tip-of-the-tongue (ToT) phenomenon is a common experience of which neural mechanisms remain largely unexplored, and may provide an avenue for investigating processes behind successful and unsuccessful memory retrieval. Little is known in regard to the overlap between semantic and episodic memory retrieval processes involving ToTs. The main goal of the present project is to empirically test two theoretical accounts by investigating the convergence of episodic and semantic memory networks during successful and unsuccessful retrieval, as well as whether or not this convergence shows a differential posterior medial (PM) and anterior medial (AM) network recruitment as a function of the nature of the materials used. To achieve this, the research project will comprise of two studies. First, one behavioral study (N = 80) will be designed to understand if ToTs are affected when a label has been initially encoded and how often it has been retrieved. Then, three multimodal magnetic resonance imaging (functional MRI, diffusion MRI, quantitative MRI) studies (n = 40 per study, N = 120 total) will explore the functional and structural correlates involved in semantic and episodic retrieval processes in line with our ToT account while using different material types in line with the PMAT framework. The research project also emphasizes MRI data reproducibility, testing MRI results replicability using between-subjects and within-subjects experimental designs. The results of this study have the potential to provide major scientific contributions in our understanding of human memory (i.e., convergence/divergence between semantic and episodic memory networks), while also testing theoretical accounts trying to unravel the functional and structural neuroanatomical substrates of the ToT phenomenon (i.e., investigating which part of the circuitry fails when information cannot be retrieved from memory, in line with our ToT account) and predict the differential involvement of the AM and PM networks as a function of processing information about people and places, respectively (i.e., PM-AT framework). Results from this research project can pave the way for prospective clinical studies aimed at investigating anomic processes similar to ToT experiences in aphasic patients or memory failures in patients with Alzheimers disease.

PID2021-122918OB-I00_FEDER: COGNITIVE AND BRAIN MECHANISMS OF READING IN THE DEAF, DeafReading

[Budget
199,408 €
[Coordinator
PI M. Carreiras

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2025

Learning to read represents a huge challenge for deaf children given their limited access to the sounds of language and their incomplete knowledge of the language they are learning to read in. However, some deaf individuals do become skilled readers. Previous research has focused on the difficulties of deaf readers in relation to phonological processing. In contrast, in this study we will focus on skilled deaf readers. Moreover, current evidence on phonological processing in deaf readers is controversial. One of the goals of the present project is to resolve these controversies using different paradigms, stimuli, and participants to examine the role of phonological processes in deaf skilled readers who have learned to read in Spanish, a language with a transparent orthography. A second goal is to track the time course of visual, orthographic, semantic, and phonological (if any) processing, in skilled deaf readers. A third goal is to investigate the brain circuits involved in reading in skilled deaf readers and the information flow in these circuits. Experiments 1 to 4 will investigate goals 1 and 2, while Experiments 5 and 6 will address goal 3. In sum, we will examine the cognitive and brain mechanisms underlying reading in skilled deaf readers, paying special attention to the potential use of phonological codes. We will also compute the functional and structural connectivity of brain circuits recruited by skilled deaf readers during visual word recognition, with special attention to plasticity in the auditory cortex. We hypothesize that skilled deaf readers will show earlier and faster activation of visual, orthographic, and semantic codes than skilled hearing readers, and will exhibit more direct connections between orthography and semantics. In contrast, we expect to see effects due to phonological processing only in skilled hearing readers. Moreover, we expect to find functional and structural differences in the brain circuits engaged in reading in skilled deaf readers and their hearing peers, especially in areas of brain networks related to phonological and orthographical computations. The results will help us gain a better understanding of how deaf children learn to read, a process which necessarily differs from how hearing children learn to read. In addition, these results will be important for designing intervention programs to teach literacy to deaf children effectively.

PID2021-1235750B-I00_FEDER: BEYOND LANGUAGE PRESERVATION: MAPPING SOCIAL COGNITION IN BRAIN TUMOR PATIENTS USING A MULTIMETHOD APPROACH, SCANCER

[Budget
138,908 €
[Coordinator
PI L. Amoruso

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2025

Awake brain surgery is currently the first treatment option for slow-growing brain tumors. Around 80% of this type of tumor involve so-called eloquent areas: brain regions of high functional expressivity that need to be spared from resection to avoid severe post-operative deficits. Thus, localizing brain function prior and during the surgery is a must for optimizing the neurosurgical strategy and improving patients' prognosis and quality of life. Classically, functional mapping has mainly considered overt functions such as language. There are, however, other functions that despite being difficult to tackle due to their complexity and distributed nature, are critical for everyday life and thus need to be preserved. For instance, social cognition refers to the set of processes that allow us to make sense of conspecifics behaviors and interact with them on a daily basis. Two key networks supporting social abilities are the mirror neuron system (MNS) and the mentalizing system (MS). The former allows decoding other others' intentions from observing their movements, while the latter involves more abstract reasoning (i.e., Theory of Mind), and allows us to infer others' beliefs, mental states, and personalities. Damage to these networks can result in aberrant forms of social cognition. Indeed, the post-surgery appearance of acquired sociopathy resembling autistic and psychotic-like forms of social disorders as well as personality changes has been well-documented. Thus, mapping only language is no longer enough and social abilities need to be considered to preserve patients' quality of life. Here, we will focus on a very interesting and under-studied population, namely, patients with low-grade gliomas (LGGs). Due to their slow growth, this type of tumor allows the brain to progressively adapt and transfer functions from damaged areas to healthy ones without severe neurological symptoms. Overall, the present project pursues a threefold objective. First, at a theoretical level, it aims at identifying neural markers of social cognition plasticity in a longitudinal fashion (i.e., post- vs. pre-surgery), namely, how brain tumors impact the functional reorganization of the MNS and MS networks. To achieve this, we will use a multimethod approach combining neuropsychological, behavioral, MEG and f/MRI measures. Second, at the clinical level, the present project aims to help neurosurgeons with planning surgery strategy adapted to the patient, as to maximize tumor resection while preserving social functions. Last but not least, it involves an interdisciplinary translational effort in bridging together Social Neuroscience and Neurosurgical Oncology for the optimization of individualized patient treatment. By doing so, we expect to overall improve patients' well-being, allowing them to preserve not only language but their personality and relational life. In other words, to preserve who they are.

PID2021-123578NA -I00 MULTIACTIONS: LANGUAGE INTERACTIONS IN MULTILINGUALISM, MultiActions.

[Budget
63,694 €
[Coordinator
PI A.Stoehr

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2024

A considerable portion of the world's population is multilingual, that is, speaks more than two languages. The interactions between the first (L1), second (L2), and third (L3) languages in the multilingual mind have only recently started receiving attention. Understanding these multidirectional interactions between L1, L2, and L3 during foreign language learning and use is essential to improving foreign language teaching strategies, ultimately leading to better foreign language command. This project focuses on phonological interactions between L1, L2, and L3 in multilingual language learning and use. The phonology of foreign language learning plays an especially relevant role in communication: the shortest utterances can reveal a foreign accent, even if they are grammatically correct. Such foreign-accented speech has a special social relevance as it may lead to stigmatization or prejudice. The central objective of this proposal is to systematically investigate phonological influence of the L1 and the L2 on the L3, as well as the reverse phonological influence of the L3 on the L2 and on the L1 in multilingual language learning and use among adults. Moreover, we will test if bilingualism constitutes an advantage in phonological aspects of subsequent language learning. In the first set of experiments, we investigate the impact of L1 versus L2 orthography on L3 production and perception of Spanish-Basque-English and Basque-Spanish- English trilinguals (language combinations presented in the acquisition order: L1-L2-L3). In the second experiment, we test if Spanish-Basque-English and Basque-Spanish-English trilinguals' L1 or L2 phonologies are more affected by L3 transfer in speech production. In the third experiment, we investigate if bilinguals learn novel phonological properties more successfully than monolinguals. To this end, Spanish-Basque bilinguals and Spanish functional monolinguals will be trained on a variety of phonological properties that are novel to the bilinguals L1 and L2 and to the monolinguals L1. This project has profound implications for various stakeholders, including educators, foreign language learners, and researchers. In particular, the findings will allow educators to improve foreign language teaching, which is of highest societal relevance. Understanding multidirectional interactions between L1, L2, and L3 during foreign language learning and use is essential for creating successful foreign language teaching strategies that lead to a better command of foreign languages. The theoretical implications for the field of multilingualism research are essential, as the findings may allow to build the first model on multidirectional phonological interactions in multilingual language acquisition and use. The present project is ground-breaking for its novel focus on orthographic effects in multilingual language learning and its potential bilingual advantage in subsequent language learning. The project will take place in a unique linguistic environment where Spanish and Basque are widely spoken, and English is taught in schools. This will allow us to recruit large samples of both novice learners and experienced foreign language-speakers and, thus, considerably increase generalizability of the obtained findings.

PID2021-123577NA-I00: CHARACTERIZING SENSORY AND COGNITIVE SIGNALS IN THE CORTICAL READING NETWORK, SENSOTIVE

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2024

[Budget
43,366 €
[Coordinator
PI G. Lerma-Usabiaga

Many important tasks, such as reading, require the coordination of sensory and cognitive processing. Regions of ventral occipito-temporal (VOT) cortex, close to the visual field maps, are part of the neural circuitry that is engaged by reading. Multiple investigators have shown reproducible reading-related activations using functional magnetic resonance imaging (fMRI), electrocorticography (ECoG), and electroencephalogram (EEG) experiments across individuals and orthographies. We refer to the regions of the VOT that are more responsive to words than to other stimulus categories as the VOT reading circuitry (VOTRC). Le et al. (2017) used fMRI and the population receptive field (pRF) analysis to characterize the visual responses in the VOTRC. A pRF describes the region of visual space in which a stimulus elicits a response from a voxel, and Le et al. (2017) reported that the pRFs in the VOTRC were stimulus-dependent, differing when contrast patterns comprised words versus checkers. To understand the origin of this stimulus dependency in the VOTRC, we quantified the stimulus-dependency in the ventral visual field maps (V1, V2, V3, hV4, VO-1) whose signals are delivered to the VOTRC, using words, false-fonts and checkers. Our preliminary results show that a small stimulus-dependent effect is measured as early as in V1 and becomes more pronounced in every subsequent map. Stimulus-dependent differences are also present in VOTRC, but they have a slightly different character. Comparisons between words and false fonts show significant differences between the signals in the VOTRC and a relatively posterior visual field map, VO-1. Specifically, VO-1 responds similarly to words and false fonts, whereas the VOTRC responses differ between false fonts and words.
We explain these results using a qualitative model, where response differences in the visual field maps arise from sensory signals and differences in the reading circuitry arise from the integration of sensory and cognitive signals. Based on the qualitative model, we hypothesize that:
(1) In visual field maps, it will be possible to manipulate the spatial characteristics of the stimulus to model the critical parameters that cause the pRF shifts.
(2) In the VOTRC, it will be necessary to extend the purely sensory pRF model to account for the presence of significant cognitive signals that define the stimulus category.
(3) The mix of sensory and cognitive signals in posterior and anterior VOTRC regions will differ and oppose one another To this end, we propose two experiments in this project: (1) a behavioral, functional, and structural magnetic resonance imaging (MRI) study with a total of 20 young adult participants, that will be scanned 3 times each. As a result of this experiment, we expect to create a model of the relation between the spatial characteristics of the stimuli and pRF estimates in the visual field maps, as well as an extended pRF model that will combine the effects of sensory and cognitive signals in the reading regions; and (2) a reanalysis of an existing dataset, where we will test the models developed in the first experiment. This improved pRF model will bring together vision and reading research and will open the doors of the stimuli referred quantitative modeling approach to reading research.

PCI2022-135031-2: TRACKING AND MODELING THE NEUROBIOLOGY OF MULTILINGUAL SPEECH RECOGNITION, NEUROSPEECH

[Budget
263,220 €
[Coordinator
PI N. Molinaro & J. Magnuson

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2025

More than half of people in the world speak at least two languages. Although the cognitive and neural bases of multilingualism have been studied intensively using behavioral and neuroimaging methods, we have only limited understanding of the computational bases for multilingual lexical knowledge and other aspects of language (e.g., syntactic processes). For example, some prior research suggests there is deep, continuous co-activation of the languages a person knows even when they are in a single-language context, while other research suggests modularity between languages under many circumstances. The simple question of whether there is co-activation across languages belies deeper questions, such as what the computational impact of co-activation would be (interference, facilitation, neutral, or some combination), and the nature of representations that would be implied by those impacts. We propose a research collaboration where we will use tools of computational neuroscience (neural networks and cutting-edge 'continuous speech tracking' using temporal response functions) to develop cognitive theories and implemented models of bilingual and trilingual language processing, which we will compare to neuroimaging data with high temporal and spatial resolution (magnetoencephalography, or MEG). MEG will be collected while monolingual, bilingual, and trilingual individuals process speech from languages they know under conditions designed to promote attention to a single language (isolated words or continuous speech from only 1 language) or two languages (random interleaving of isolated words from 2 languages, or more ecological 'code-switching' between 2 languages). We will use continuous speech tracking to relate neural activity to both theoretically-generated hypotheses regarding potential impacts of language co-activation and the behavior and internal activity of neural network models.

PDC2022-133917-I00: CLOSING THE LOOP BETWEEN THE BRAIN AND REAL-LIFE, LOOP

[Budget
74,750 €
[Coordinator
PI N. Molinaro

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2024

Non-invasive brain stimulation (NIBS) directly interrupts brain homeostasis through inadequately regulated inputs and poorly understood mechanisms, neglecting the environment as a critical factor. As a straightforward but radial alternative, we propose to monitor real-time brain activity but act on signals from the environment. We will approach this aim by leveraging a phenomenon known as cortical tracking of speech (CTS): The temporal alignment between fluctuations in electrical brain activity and fluctuations in the speech signal, which correlates with speech intelligibility and comprehension. We will test the applicability, conditions, and validity of a paradigm shift in NIBS, pushing self-regulation and plasticity of the brain through ad-hoc, adaptive, non-invasive sensory stimulation. Moreover, Loop will break new ground technologically since we will develop the platform for introducing this novel NIBS paradigm to the general public and to market through LoopAir, a portable, non-invasive, wireless, and effortless headphone prototype integrated with a new generation of electroencephalography sensors (dry, active). When listening to speech in podcast or audiobook formats, a drop in CTS is observed and the physical properties of the speech will be modulated automatically, leading to a re-alignment of the neural activity with the speech signal. Therefore, Loop offers a new scientific approach, a new tool for language telerehabilitation, and data for future research, creating a product ecosystem that "Loops" between neuroscience, neurotech devices, digital services, and end-users. Patients, neuro-clinicians, researchers, and the public can then reap the benefits of mutual interactions through an integrated neuro-technological platform and new market opportunities on NIBS and brain-computer interface.

PID2022-136986NB-I00: LA MADURACIÓN NEURONAL Y LA EXPOSICIÓN AL LENGUAJE COMO PREDICTORES DE LA COMPETENCIA BILINGÜE INDIVIDUAL, Growing-upBIL

[Budget
112,500 €
[Coordinator
PI M. Kalashnikova

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2027

Language acquisition is one of the most notable characteristics of early human development, and babies' brains are prepared for this challenging task. As a result of rapid maturation and extensive exposure to language during their first year of life, babies tune in and begin to acquire the linguistic systems specific to their environment. Most theoretical frameworks of early language acquisition have identified these developmental trajectories for babies growing up in a monolingual environment. However, most babies in the world grow up acquiring two languages and, therefore, receive linguistically quantitative and qualitatively different information from monolinguals. These input qualities are powerful environmental factors that can shape the mechanisms involved in early language processing and influence the bilingual outcomes of bilingual babies.
This project will systematically assess the effects of early bilingual exposure and neural maturation on the emerging ability of bilingual babies to differentially process each of their languages in the first year and language-specific outcomes in their second year of life. To do this, we will track the language development of bilingual babies from 1 to 24 months of age. We will employ a unique combination of electrophysiological measures of babies' speech processing at the neural level and observational measures of the quantity and quality of early language input to the babies, as well as behavioral measures of the emerging bilingual competence of the babies.

PID2022-1369890B-I00: LA EXPOSICIÓN TEMPRANA A DOS IDIOMAS FOMENTA LA LECTURA: ENFOEQUE DE INVESTIGACIÓN TRASLACIONAL, BILREADy

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2026

[Budget
125,625 €
[Coordinator
PI M. Lallier

Reading is by far one of the most complex yet most important skills that a child develops in their first years of schooling. Research has consistently shown that early language development, in particular phonological development, lays the main foundations on which reading skills are built upon through formal instruction. Here we aim to determine whether learning two languages before learning to read—an increasingly common situation for children in our global world—could be a protective factor for impaired phonological and reading development (i.e., dyslexia). Unlike the substantial and very active field of research looking for the controversial bilingual advantage in domain general processes, research on the potential effects of bilingualism on reading development is almost inexistent, leaving important questions unanswered: Does early bilingualism modulate reading development? If it does, what are the underlying neurocognitive mechanisms? Our running hypothesis is that specific cases of bilingualism, paired with high exposure to dual-language contexts, enhance the readiness of neural and cognitive foundational skills to better handle difficulties encountered when learning how to read—a highly complex activity. We propose a novel scientific approach focusing on interhemispheric connectivity, which we argue is one of the most important factors underlying the positive effects of the exposure to dual-language contexts on reading acquisition. Through an innovative methodology involving both EEG, as well as structural and diffusion MRI in 200 school-aged Spanish-Basque bilingual children with and without dyslexia, we aim to validate a novel mechanistic account of bilingualism's effects on interhemispheric connectivity to explain different developmental trajectories of reading skills in bilinguals. Based on this validated model, we aim to design and validate an intervention of interhemispheric connectivity through neurofeedback to foster cognitive compensatory strategies that will mitigate the negative consequences of reading failure. The expected results of this project should have a significant impact on all the levels of translational research, through the development of universally appealing products such as cutting-edge interventions and assessment batteries to detect specific reading deficits, quantify their severity, and determine their prognosis and response-to-intervention outcomes as a function of the language background of the child.

PID2022-136987NB-I00: NORMAS DE ASOCIACIÓN LIBRE PARA LA LSE: MAPEO DEL LÉXICO SEMÁNTICO DE LA LENGUA DE SIGNOS ESPAÑOLA, SIGNifica

[Budget
112,500 €
[Coordinator
PI B. Costello

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2026

This project aims to collect free association norms for Spanish Sign Language (LSE). We will work closely with collaborators in the USA who are working on a lexical database of American Sign Language (ASL) and will collect free association data for ASL in parallel to this project in a first joint attempt to collect free association data for signed languages. The resulting data set will allow us to map the semantics of the LSE lexicon by creating a network that characterizes how different meanings are interconnected, and to quantify semantic properties such as entropy, semantic neighborhood density and clustering. In addition, we will use this dataset to investigate how the intersection of form (phonology) and meaning (semantics) gives rise to systematicity and iconicity in the sign lexicon. Importantly, having two large data sets will allow us to compare the two languages to find commonalities that may be traced back to the shared visual-gestural modality. Comparing the data for LSE to similar existing data sets for spoken Spanish will reveal how modality impacts the way in which lexical meaning is expressed. This project will continue an important line of research into the lexicon of Spanish Sign Language, an understudied language, and will provide valuable insight into the role of modality in shaping how language is structured and processed by the human mind.

PID2022-136991NB-I00: LA RELACIÓN TEMPORAL ENTRE EL HABLA Y LOS MOVIMIENTOS CORPORALES SIMULTÁNEOS Y SU PAPEL EN EL PROCESAMIENTO DEL HABLA AUDIOVISUAL, BodyLingual

[Budget
144,375 €
[Coordinator
PI N. Molinaro and M. Lizarazu

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2026

The audiovisual speech processing literature has lagged behind the objective study of natural gesture kinematics. Prior research has mostly focused on lip movements and phonetic perception in highly controlled and unnatural experimental settings. Herein, the present project aims to extend the current literature by taking advantage of (i) on-line body tracking methods to ensure fine-grained temporal estimation of multiple simultaneous co-speech gesture kinematics, and (ii) the most recent information offered on theoretic approaches for studying how electrophysiological brain dynamics encode the incremental nature of multimodal speech and language. Utilizing these methods, we expect to gain major novel insights into the neurophysiological mechanisms involved in the processing of connected ecological audiovisual speech. Different from previous studies, in BodyLingual we pursue a novel research path focused on advancing our knowledge about the role of rhythmic supra-segmental visual information (also defined as visual prosody) that helps listeners decode overall message structure. What is the role of co-speech gestures in human communication? Are they related to acoustic and/or abstract linguistic speech features? In audiovisual speech perception, do co-speech gestures enhance cortical tracking of speech and comprehension? Which levels of speech/linguistic processing are modulated by speech gestures? Is this enhancement stronger compared to lip movements only? Which neural networks are involved in tracking the multimodal components of natural audiovisual speech? Here we propose a comprehensive approach with 3 work packages. In the first work package, we will evaluate the relation between the temporal structure of speech and the related co-speech gestures in a natural speech production study. Body movements will be tracked by a dedicated motion capture device (Kinect). The second work package focuses on the evaluation of the brain mechanisms involved in audiovisual speech comprehension in two MEG experiments. In the third work package, we will record stereo-electroencephalographic (sEEG) data from patients with refractory epilepsy to study the frequency-specific spatiotemporal dynamics underlying audiovisual speech comprehension. In BodyLingual we expect to afford major insights into the cross-modal interaction between auditory, visual and premotor systems for attaining speech comprehension in audiovisual ecologically rich (and often noisy) conditions.

PID2023-146423NB-I00: Trayectorias Léxicas: Seguimiento de la Codificación, Establecimiento y Desarrollo de Palabras en el Léxico Mental, LEXI: TRACK

[Budget
119,000 €
[Coordinator
PI E. Kapnoula

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2028

The overarching goal of this project is to delineate the trajectory of how lexical representations (i.e., words) are established and how they transform after that over time. As such, the proposed research connects and extends two broad lines of work: (1) research on novel word learning and (2) research on spoken word recognition. Research on these two topics has evolved largely in parallel; however, there is now accumulating evidence suggesting that the two are interconnected. For example, recent work suggests that word learning unfolds in a gradual manner, while even well-known lexical representations maintain some degree of malleability. These results highlight the gradient and plasticity of lexical representations and point to the need for a common theoretical framework that unites the two literatures and accounts for the different instantiations of lexical plasticity in a comprehensive and consistent way. This project directly addresses this knowledge gap through the systematic examination of how lexical representations evolve, starting at the early encoding of unfamiliar (novel) words, moving on to the formation of newly-learned words, and finally the processing and plasticity of familiar words.
Specifically, the proposed research is structured along three Work Packages that examine key aspects of lexical processing related to word learning and/or lexical plasticity more broadly. Each Work Package is composed of a set of experiments that systematically examine a lexical dimension of interest: WP1 looks at the gradient trajectory between nonword and word processing by tracking the evolution of pre-lexical and lexical processing; WP2 examines the role of different lexical properties (phonological, orthographic, and semantic) in novel word learning; and WP3 examines the transition of novel words from temporary memory traces to consolidated representations.
All experiments will take advantage of sophisticated experimental techniques (e.g., eye-tracking) that will provide us with fine-grained measures of how spoken language processing unfolds in real time at the millisecond scale. In addition, all experiments involve the collection of data in multiple sessions (immediately following our experimental manipulation up to one week later), which will allow us to track the evolution of the lexical processing effects across multiple days.
In sum, this project will build on previous research and synthesize existing lines of work into a comprehensive and coherent account of word learning, lexical development, and plasticity. From a theoretical perspective, the findings of this project will provide invaluable novel insights into the nature, learning, and processing of words, but they may also have broader implications (e.g., for second language learning).

PID2023-148756NB-I00: Habla dirigido a Extranjeros: Función e Impacto Didácticos, DIFI

[Budget
126,500 €
[Coordinator
PI C. Martin

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2027

Foreign Directed Speech (FDS) is a speech register that native speakers use when addressing non-native (foreign) listeners. FDS is mostly characterized by a slower speech rate and vowel hyperarticulation (i.e., expansion of the vocalic triangle formed by the three corner vowels /a, i, u/). Several studies have (indirectly) shown that FDS has a didactic impact (i.e., facilitates speech perception), with listeners rating FDS as clearer speech than NDS (Native Directed Speech). A recent project conducted within our group explored the didactic impact of FDS and observed that word learning and pronunciation improve when foreign listeners are exposed to FDS relative to NDS. We also showed that FDS elicits greater cortical tracking of speech (i.e., better processing) than NDS in foreign listeners. Certainly attributed to its increased clarity, FDS has been considered to serve a didactic function (i.e., help foreign listeners in perception and comprehension), however, a lack of direct experimental evidence persists. Now that we have some experimental evidence that FDS is indeed beneficial for foreign listeners, many novel and interesting following questions can be raised. The present project will thus provide further evidence on the didactic impact of FDS on foreign listeners, and the very first direct evidence on the didactic function of FDS.

In Section 1, we will investigate FDS production and its didactic function. Our main goal will be to explore whether FDS is language-, speaker- and listener-specific, or if it is universal. More specifically, we will explore whether FDS depends on the target language and the listeners native language (Objective 1). We will also investigate whether FDS is automatically produced by any native speaker addressing a foreign listener (Objective 2) and whether FDS is used to address any foreign listener regardless of their proficiency (Objective 3). We hypothesize that FDS is a flexible register, mainly used by teachers and multilingual speakers (because of their knowledge of foreign listeners needs), adaptable to the listeners' proficiency (i.e., needs).

In Section 2, we will explore FDS perception and its didactic impact. Our main goal will be to explore to what extent FDS promotes language processing and comprehension. More specifically, we will address whether prediction, comprehension, listening effort, attention and information retention are promoted by FDS relative to NDS (Objective 4). We will then investigate whether FDS helps foreign listeners because of the acoustic adjustments per se, or because of the intention of the speaker (Objective 5). Finally, we will assess whether FDS use is appropriate and useful for foreign listeners regardless of their proficiency (Objective 6). We hypothesize FDS improves all relevant aspects of speech perception and comprehension when the register is appropriately dedicated to the listener (i.e., positive speakers' intention and adaptation to the listener's needs).

The outcome of this project will be highly relevant for models on multilingual communication and speech accommodation. It will also have important pragmatic implications, given that a large majority of people around the world communicate in foreign languages or with foreign listeners.

PID2023-148910NB-I00: El Poder Motivacional del Conflic Cognitivo, SpinC

[Budget
147,000 €
[Coordinator
PI M. Ruzzoli

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2028

Cognitive control, the set of mental processes essential for adaptive and goal-directed behavior, is foundational to both animals and humans. These functions serve to inhibit automatic responses that may be incorrect or unsafe, playing a pivotal role in cognitive and psychological development, as well as overall mental and physical well-being. Despite its significance, a key question remains unanswered in cognitive research: what are the factors that spontaneously engage or sustain cognitive control over extended periods? Understanding triggers of cognitive control is paramount for theoretical advancement. It also has practical implications for enhancing performance in educational and professional settings, optimizing cognitive and psychological development, and promoting lifelong mental health. We propose an overarching concept termed "cognitive conflict" to encapsulate the diverse stimuli that provoke cognitive control. Broadly defined, cognitive conflict arises from deviations from expectations, uncertainty, surprises, errors, interference in decision-making, and cognitive effort.
While existing theories suggest that cognitive conflict effectively triggers cognitive control, its intrinsic value as a motivator—independent of external rewards—has been largely overlooked. Our proposal seeks to address this gap by systematically investigating whether instances of cognitive conflict can serve as a "motivational spin", prompting individuals to exert greater effort and persistence in the absence of external incentives. This novel hypothesis holds promise for two reasons: first, cognitive conflict is ubiquitous in real-life scenarios, and second, the brain exhibits heightened sensitivity to such conflict. If confirmed, the notion that cognitive conflict can intrinsically reward effortful engagement opens new avenues for harnessing diverse stimuli to activate innate brain networks and incentivize human behavior, beyond traditional monetary rewards.
Our research, organized into three experimental work packages, aims to test this hypothesis comprehensively. We will gather subjective and phenomenological data from real-life contexts, systematically manipulate critical factors influencing the experience of cognitive conflict, and collect electro-bio-physiological measurements across the lifespan. By exploring the motivational potential of cognitive conflict, our study represents a paradigm shift in cognitive control literature. Rather than being solely costly, we propose that cognitive conflict possesses intrinsic hedonic properties, offering new insights into human motivation and self-regulating behaviors.

PID2023-149267NB-I00: Examinando la Conciencia en la Percepción de Conjuntos con Psicofísica Optimizada e Imágnes cerebrales en Bucle Cerrado, A-EPIC

[Budget
170,125 €
[Coordinator
PI D. Soto

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2028

The proposed research aims to unravel the intricate relationship between visual awareness and ensemble perception within the neuroscience of consciousness. Traditional studies on visual consciousness have often focused on single-object paradigms, neglecting the brain's representation of visual ensembles. This 4-year project addresses this gap by exploring how the brain processes clusters of visual information using ensemble or summary statistical representations. Ensemble perception has been proposed as a solution to the 'awareness puzzle,' reconciling the richness of subjective experience with the limited neural resources available for attention and working memory functions. The project will shed light on the mechanisms of ensemble perception, their relationship to visual awareness, and the potential for experimental manipulation of ensemble representations to induce changes in subjective experience across diverse perceptual domains. The research is comprised of four studies. The first study investigates the role of visual awareness in ensemble perception using psychophysical paradigms enhanced by Bayesian optimization algorithms. Customized experimental conditions will be adjusted dynamically to distinguish between conscious and unconscious perceptual processes, considering the personal nature of consciousness and interindividual variability in ensemble perception. In the second study, a computational framework for ensemble perception using pattern classification approaches will be developed from machine learning and computer vision models applied to functional MRI data. This will aid in understanding the neural representation of visual ensembles and how they relate to conscious experience. The third study builds on the computational framework to develop real-time fMRI protocols based on decoded neurofeedback (DecNef) training to manipulate ensemble representations. This innovative approach allows individuals to bias specific brain activity patterns towards a particular representational state, providing causal insights into the role of ensemble coding in subjective experience. The fourth and final study extends the neurofeedback protocol to social cognition by testing the ramifications of ensemble representation manipulation in the context of race biases in the processing of faces in crowds, addressing a significant issue in social cognitive research. Overall, this work is positioned at the intersection of psychology, neuroscience, computer science, and engineering, leveraging advancements in real-time functional MRI technology, machine learning, and neurofeedback training. Through a multidisciplinary approach, this project aims to provide novel insights into the neural mechanisms underlying ensemble perception and its impact on conscious experience across diverse perceptual domains.

PID2023-149410OB-I00: GlioPrecision: Mapeo preciso de la función y reactividad cerebrovascular en el cerebro individual sano y gliomas, GlioPrecision

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2027

[Budget
183,500 €
[Coordinator
PI C. Caballero-Gaudés

Cerebrovascular reactivity (CVR) indicates the blood flow response to vasoactive stimuli and is a vital biomarker for cerebrovascular health that contributes significantly to the diagnosis and treatment of neuropathological conditions, while enhancing our understanding of human brain function and physiology. Functional magnetic resonance imaging (fMRI) based on blood-oxygenation level-dependent (BOLD) contrast can provide accurate and reliable estimates of CVR and vascular delay across the whole brain, emerging in recent years as a promising alternative to standard, but more invasive, imaging techniques. Specifically, utilizing simple paradigms like self-induced breath-holds (BH) or natural breathing in a resting state (RS) can induce a vasodilatory response that offers similar performance for CVR mapping to gas manipulations (e.g., an elevated CO2 concentration). Despite the efficacy of these paradigms, most existing fMRI methods for BH-induced and RS-based CVR mapping are tailored for group analyses, neglecting the crucial need for individual assessments in clinical applications. GlioPrecision will pioneer cutting-edge multi-echo fMRI methodologies to map CVR, vascular delay, and functional networks at an individual level, with a focus on the presurgical evaluation of glioma patients. Our project will establish the most extensive database of high-quality BH-induced CVR and RS multi-echo fMRI, coupled with physiological data, from a gender-balanced healthy cohort across the adult lifespan. This unique resource will enable us to create the first normative atlases and charts of BH-induced and RS-based CVR and vascular delay, facilitating the identification of abnormalities in the presence of gliomas through innovative segmentation algorithms and the detection of neurovascular uncoupling. GlioPrecision aims to unravel the existence of CVR-related networks through precision functional mapping of individuals, introducing novel techniques to generate subject-level brain parcellations from BH-task fMRI data. This approach will deepen our understanding of the interplay between cerebrovascular and functional fluctuations in both the healthy individual brain and in the presence of a glioma. By harnessing these precision mapping tools, we aim to shed new light on how cerebrovascular and functional brain networks are affected by the tumour and how they might modulate its growth. By advancing personalized neuroscience and medicine, GlioPrecision will contribute to a more individualized paradigm in the study of human brain function and physiology, ultimately enhancing the planning of surgical strategies for glioma patients.

PID2023-149585NB-I00: Modelos de redes recurrentes de aprendizaje estadístico, ReNeMoS

[Budget
108,250 €
[Coordinator
PI J. Magnuson

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2027

Statistical learning (SL) refers to an organism's ability to become sensitive to coherent covariation in its environment, and is a core basis for adaptive perception, cognition, and action. After nearly 30 years of SL research, there is still a lack of comprehensive models that can simulate the range of human SL. In this project, we explore the potential for Simple Recurrent Networks (SRNs) to simulate relevant behavioral and neural data, develop analyses to reveal their emergent computations, and test novel model predictions with experiments with human subjects. In SL studies, subjects are exposed to sequences of elements, i.e., syllables, and it has been reported that humans readily attune to recurring word-like patterns. Similar to feedforward networks (FFNs), SRNs have input, hidden, and output layers, but add a context layer: a copy of hidden states at the previous time step, which is part of the input. With this rudimentary memory, SRNs learn surprisingly complex, distant dependencies. Given the recurring pattern ABC, an SRN would learn first-order contingencies (A->B->C) but also second-order contingencies (A also predicts C). Nonetheless, SRNs fell out of favor due to apparent failures to model aspects of SL, and assertions that SRNs are incapable of learning patterns in some SL studies. However, these assertions were based on misunderstandings, such as the assumption that SRNs only learn first-order transition probabilities [TPs]. In our pilot work, with appropriate inputs or minor parameter adjustments, SRNs readily succeed in cases where they were previously reported to fail. Other pilot simulations show that SRNs are capable of handling several cases for which it was previously asserted that SRNs could not address. In Work Package (WP) 1, we compare SRNs and FFNs on several key SL patterns. FFNs can only learn first-order TPs, so comparisons identify which SL patterns require more. Subsequent analysis will focus on discovering SRNs emergent computations, providing hypotheses for WP3. In WP2, we simulate neural entrainment signatures of learning with SRNs compared to FFNs. When subjects are exposed SL sequences (e.g., syllables with patterns ABC, DEF, GHI, JKL repeating randomly), phase-locked neural entrainment in EEG emerges initially at the driving frequency (syllable rate, e.g., 3 syllables/second [3 Hz]) and later at word rate (1 Hz, since there are 3 syllables/word). This provides an implicit measure of SL. To emulate EEG time series, we extend SRNs discrete syllabic responses to fine-grained time series by sustaining these pulses (1/3 s/syllable) and adding noise and temporal jitter. Pilot work suggests this approach simulates neural entrainment, but it is unsatisfactory since there is no dynamic behavior in the model. We will explore 2 more motivated approaches: extrapolating attractor dynamics from network activity (Noelle & Cottrell, 1996) vs driving formal neural oscillation simulations with network activity (Otero et al, 2022). We will examine entrainment predicted by models for a variety of SL tasks to generate hypotheses for WP3. In WP3, we test hypotheses from WP1 and WP2 with human subjects. Simulations from WP1 will provide candidate tasks capable of testing computationally-specific hypotheses, and those from WP 2 will provide hypotheses for testing the true implications of neural entrainment. Together, the WPs will provide the most significant computational advance in SL in more than a decade, with a framework capable of comprehensively accounting for behavioral and neural signatures of SL, while identifying specific computations that may underlie SL.

CNS2023-144936: EL LEXICO DE LA LENGUA DE SIGNOS ESPAÑOLA, LSE-LEX

[Budget
193,566 €
[Coordinator
PI B. Costello

[Funding Agency
AGENCIA ESTATAL DE INVESTIGACION
[Type of Project
Proyecto de Investigación
[Time Frame:
2024 - 2026

Sign languages offer a unique perspective into the properties of human language. However, applying that perspective presents a challenge because signed languages do not have the same resources and documentation that one might find for spoken languages like English or Spanish, or even a minority language like Basque. This project aims to redress that shortcoming by creating a lexical database of Spanish Sign Language (LSE) that will contain over 6,000 signs with detailed information about the form and meaning of the signs. The project builds on an existing database developed at our research center and draws on other LSE resources, in addition to leveraging a collaboration with a team in Boston (USA), who are in the process of simultaneously creating a similar lexical database for American Sign Language. Moreover, the project takes advantage of an existing research line that is breaking new ground by the collection of free association norms to map the meaning space occupied by the words or, in this case, signs of a language. We intend to gather three types of information for the 6,000 signs that we have gathered from existing databases and dictionaries: phonological encoding, describing the form of each sign; semantic information, describing the meaning of each sign; and lexical indices, describing properties of signs, such as how often a person encounters them (familiarity) or how the relationship between the form of the sign and its meaning (iconicity). To collect this information, we are using a new digital platform that enables sign language users to contribute signs (recorded by their webcams) and to label those signs with information, i.e., how it is articulated or how common it is. The platform allows us to collect a substantial amount of data from signers all over Spain, while also allowing us to test the platform and further its development it so that it can be realized as a flexible data collection tool for sign language researchers. Another novelty of this study is the implementation of artificial intelligence to automatically identify signs, which will assist us in matching new videos with their database entries, therefore streamlining sign labelling. These tools will make it easier to process visual sign language data, speeding up the process of catching up to data-rich spoken languages. Moreover, this work poses broader applications and may lead to better accessibility options for deaf and hearing people who do not use the same language. The LSE-LEX database will provide detailed characterization of the lexicon of Spanish Sign Language that shows us how signs are related to one another in terms of their form, meaning, and the overlap between the two. The database will also facilitate comparison to the lexicon of spoken languages, such as Spanish, which lives side-by-side with LSE, and with other sign languages, to see how much modality shapes the way that signs create networks of meaning. LSE-LEX will also serve as a tool for future work: any studies related to sign language processing in our brains will be able to apply the database to select signs according to specific characteristics that will be documented owing to this study.

PI 2018-1-29 PRAD: PHONEMIC RECALIBRATION IN AVERAGE READER AND DYSLEXIC CHILDREN

[Budget
50,000 €
[Coordinator
PI C. Martin

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2018 - 2021

Reading acquisition (RA) changes brain functions and cognition profoundly. Despite ample research on RA, the recalibration of phonemic representations (PRs) by RA and how such recalibration is impaired in dyslexia has yet to be explored. The present project will shed light on this understudied field of research by demonstrating how RA affects speech sound perception and production, which is imperative for improving the modelling of speech perception and production, teaching strategies, and language disorder remediation. Learning to read changes the way one perceives spoken words and boosts phonemic awareness. In fact, after reading acquisition, spoken words with inconsistent phonemes (i.e., phonemes that have many spellings) are recognized more slowly and less accurately than those with consistent phonemes (i.e., that have only one possible spelling; 'orthographic consistency effect'). Moreover, reading acquisition induces a boost in phonemic awareness (i.e., ability to distinguish and manipulate the minimal sounds of speech). Here, we claim that the consequences of RA can be explained by a unique and common phenomenon, which is the recalibration of PRs by literacy acquisition. More specifically, we propose that (1) PRs (in perception and production) become more stable (less dispersed) during the process of learning to read, accounting for the phonemic awareness boost during RA. We also predict that (2) this recalibration varies with the consistency of the reading system (i.e., (in)consistency of phonemeto-grapheme conversion rules), which would in turn explain the 'orthographic consistency effect'. Thirdly, we argue that (3) phonemic recalibration is impaired in dyslexic patients.

We will explore phonemic recalibration and test our three main hypotheses by means of the first cross-linguistic and -sectional study examining the dispersion of PRs along with processing speed (both in perception and production of phonemes and words) in pre- and post-RA children, acquiring literacy in languages that differ in their conversion rules. We will demonstrate that Spanish-Basque bilinguals learning to read in Spanish or in Basque differ in their PRs when considering target phonemes that are shared by the two languages but do not follow the same phoneme-to-grapheme conversion rules (e.g., the phoneme /b/, consistent in Basque – always spelled 'b'– and inconsistent in Spanish –spelled 'b' or 'v'–). Additionally, in order to explore the impairment of PR stabilization in dyslexia, we will compare children at risk of dyslexia (who later develop dyslexia) and dyslexic children with chronological age controls. We hypothesize that dyslexia is associated with an impairment in PR stabilization (i.e., all PRs remain highly dispersed after RA). Such a result would account for the (previously reported) lack of phonemic awareness boost and 'consistency effect' in this population. This proposal provides the first systematic investigation of phonemic recalibration during reading acquisition, which is highly relevant for the fields of language development and impaired reading acquisition, enabling better detection of risks of dyslexia and the creation of remediation tools. Furthermore, findings from this project will make an essential contribution to pragmatic research and theoretical accounts of language perception and production and will inform the adaptation of teaching strategies for reading acquisition in more than one language.

PI 2019-54 LOOKING FOR WORDS: EARLY SPEECH SEGMENTATION ABILITIES AND THEIR RELATION TO VOCABULARY DEVELOPMENT IN BILINGUAL INFANTS

[Budget
43,395 €
[Coordinator
PI M. Kalashnikova

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2021

Infants receive extensive exposure to speech in their environment from the moment they come to this world and even earlier, and they face the challenging task of using this input to build their own native language skills. One of the most challenging tasks in language acquisition that encountered by infants early on consists of segmenting the continuous speech that they hear around them. Speech segmentation plays an essential role in the process of vocabulary development as it enables infants to establish an initial store of word forms and subsequently incorporate these word forms into their growing lexicon. This relation to later lexical development suggests that individual indices of speech segmentation abilities assessed during the first year of life can be employed as reliable predictors of more sophisticated linguistic skills at the phonological, lexical, and grammatical levels developed much later in childhood. However, the exact mechanisms that underlie the emergence and consolidation of early speech segmentation abilities remain poorly understood. Furthermore, there is no evidence regarding the effects of bilingual language exposure on the development of early linguistic ability despite the fact that the majority of infants around the world are bilingual and must learn to segment speech input in two languages simultaneously. These two limitations are addressed in the present project that aims to systematically measure the emergence and consolidation of speech segmentation abilities in bilingual infants. We adopt a multidisciplinary approach that combines the use of neurophysiological and behavioral infant measures and cross-sectional and longitudinal designs to chart the development of speech segmentation and lexical processing during an infant's first year-and-a-half of life. This will be achieved via three experiments enabling us to trace the developmental path from infants' early mechanisms of speech encoding to the emergence of productive vocabulary. Specifically, these experiments focus on the emergence of three skillsets that are essential for the processes of extracting words from continuous speech, speech comprehension, and vocabulary growth: speech segmentation, word recognition, and word learning. We expect to demonstrate that bilinguals will not exhibit an overall delay in speech segmentation and lexical development, but instead, the developmental trajectory of their language-specific encoding skills will develop based on their exposure and emerging competence in each of their languages. This project will facilitate the determination of the developmental timeline for the acquisition of early lexical skills specifically tailored to bilingual infants, essential for the design of age and population-appropriate assessment tools for the early classification of infants who are and are not at-risk for language delays.

PI 2019-104: QUANTIFYING THE DYNAMICS OF SPONTANEOUS BRAIN FRUCTUATIONS WITH CALIBRATED FUNCTIONAL MAGNETIC RESONANCE IMAGING TECHNIQUES

[Budget
48,912 €
[Coordinator
PI C.Caballero-Gaudés

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2024

Recently, there has been rapidly growing interest in methods that enable time varying functional connectivity (FC) analysis of brain activity using resting state functional magnetic resonance imaging (RS-fMRI) based on the blood oxygenated level dependent (BOLD) signal. Time-varying analyses have the potential to extract more information about brain function and reveal dynamic FC patterns that explain differences in behavioural performance within and across individuals, changes in cognitive state, arousal and vigilance. In addition, such analyses can aid in distinguishing between healthy controls and patients more accurately compared to traditional functional connectivity approaches, which consider a static measure of synchronization between brain regions. Notwithstanding their increasing popularity, there is still scarce availability of data, and thus information, regarding the neurophysiological mechanisms underlying time-varying fluctuations in spontaneous brain activity, particularly in the human brain, probably due to the lack of methods to approach this research question accurately. Traditional fMRI BOLD experiments preclude any quantitative, calibrated interpretation of analyses and corresponding findings because the BOLD signal is an indirect measure of neuronal activity, reflecting dynamic changes in cerebral blood flow, cerebral blood volume and oxygen metabolism. The goal of this project is to develop an integrated framework that jointly optimizes data acquisition protocols (MR pulse sequences and experimental procedures) and signal processing algorithms to enable an accurate and calibrated quantification of the dynamics of spontaneous brain activity and functional connectivity with concurrent ASL and multi-echo BOLD fMRI.

PI 2020-1-0024 ACS.eus (APHASIA COGNITIVE SCREENING IN BASQUE): FILLING GAPS AND OVERCOMING BIAS IN CURRENT APHASIA ASSESSMEN

[Budget
48,400 €
[Coordinator
PI S. Mancini

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2020 - 2022

Aphasia is an acquired impairment characterized by partial or complete loss of any or all the modalities of linguistic communication: speaking, reading, listening and writing. Several normed tests are available to assess the linguistic and cognitive profile of brain-damaged patients for Germanic and Romance languages. Yet, for languages like Basque, no standardized test is yet available, limiting the opportunity to conduct research on aphasia but, more importantly, undermines the reliability and validity of assessments conducted in clinical settings, as well as patients' access to adequate speech therapies. The goal of the current project is to develop an aphasia assessment tool in Basque that condenses clinical and research domains. Namely, we will focus on the broad spectrum of linguistic abilities tested by comprehensive aphasia batteries, and, at the same time, test language-specific properties with a research- and experimental-oriented approach (i.e. relying on evidence and tools developed in neurolinguistic and cognitive neuroscience of language research) and adopt a computerized approach. Concretely, an aphasia assessment tool is proposed, ACS.eus (Aphasia Cognitive Screening in Basque), that focuses on language comprehension and production using a variety of tasks implemented in an electronic tablet application. Such tasks have been extensively used in the psycholinguistic and cognitive neuroscience of language literature and are therefore highly reliable for assessing the integrity of expressive and receptive linguistic functions. Each task assesses a specific language function and mechanism, such as naming, repetition, lexical access, semantic knowledge morphology and morphosyntax production and comprehension, with visual as well as auditory input. The realization of this project has important research, clinical and social implications. By testing an understudied language like Basque, this project will contribute to filling an important gap and to overcoming a bias in aphasia research and assessment towards Germanic and Romance languages, as revealed by recent analyses. From a research perspective, the assessment of several different linguistic functions in aphasic speakers will significantly enrich our knowledge on the mechanisms underlying language production and comprehension. From a clinical perspective, neuropsychologists and speech therapists will be able to rely on a valid, reliable and fine-grained tool to evaluate linguistic impairment in a language for which no reliable tool has been developed. More importantly, this project is poised to benefit Basque society as a whole. The possibility for more accurate screening can pave the way towards personalized and specific assessment, in turn, leading to more focused and effective intervention, significantly improving patients' quality of life.

PIBA_2021_1_003: CONTRIBUTION OF MAGNOCECULLAR AND PARVOCELLULAR VISUAL SYSTEMS TO NORMAL READING AND DYSLEXIA

[Budget
50,000 €
[Coordinator
PI P. M. Paz-Alonso

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2021 - 2024

Visual recognition is a necessary first step for many of the activities we perform on a daily basis. Identifying the pill we need to take, discriminating a familiar face in a crowd, or reading a novel are everyday examples of cognitive complex operations that require a refine engagement of our visual system. The magnocellular and parvocellular streams are the major visual pathways characterized by different histologic and physiologic properties and specializations regarding the stimuli they are oriented towards. Although empirical evidence in humans regarding the involvement of these visual pathways is limited, prior research in cognitive neuroscience and other related fields has underlined their potential contribution and differential implication to object recognition evinced the differential involvement of these pathways in object recognition and in dyslexia. However, to date, the neurodevelopmental trajectories of these pathways and their specific contributions to visual recognition and typical and atypical reading remains unknown. Here, we apply behavioral and multimodal structural and functional MRI indexes to 1) characterize the developmental trajectories of the contribution of magnocellular and parvocellular visual pathways to the recognition of object and letter strings and to 2) investigate the involvement of these visual streams in typical and atypical reading, as well as their interaction with the brain reading networks. To this end, we will examine a total sample of 180 participants aged 8 to 25 in two separate studies (N = 80, Experiment 1; N = 100 Experiment 2) using behavioral, structural and functional MRI techniques. The proposed research project is unique in its exploration of the contribution for the visual pathways to visual recognition and reading processes, and in the examination of the dynamic interplay between changes in brain structure, function, and behavioral outputs of typical and atypical developing groups.

PIBA_2022_1_0014: CHARACTERIZING AND QUANTIFYING RELIABLE MRI METRICS OF THE READING CIRCUITRY: DATASETS AND TOOLS

[Budget
50,000 €
[Coordinator
PI G. Lerma-Usabiaga

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2024

Successful reading requires neural processing and communication between large parts of the brain. Among those regions, there is substantial evidence that one of the critical reading circuitry components is located in the ventral occipito-temporal reading circuitry (VOTRC). Quantifying the neural circuitry of reading requires identifying the locations, functional responses, and structural characteristics at both group and individual levels. Although the VOTRC is well-suited for quantitative study and evaluation, a major portion of the analysis remains incomplete. Furthermore, there are significantl differences in the characterization of VOTRC — both anatomically and functionally — between studies. Therefore, the first objective of the present project is to obtain a detailed functional, structural, and cytoarchitectonic account of this region, to discern whether the VOTRC is characterized as a set of discrete functional and anatomical regions, or as a distributed continuum with a functional gradient of word recognition. This reproducible characterization of the VOTRC will guide the second objective of the project: the identification and evaluation of reading related quantitative MRI metrics in the VOTRC. To this end, we will densely sample a total of 40 young adult participants in two separate studies (Experiment 1: N = 10 and 10 repetitions; Experiment 2: N = 30, 2 repetitions and 2 groups, controls and dyslexics) using behavioral, structural and functional MRI, along with advanced modeling techniques. At completion, we will obtain a reliable characterization of the VOTRC, a list of robust MRI-related VOTRC measures, a better understanding of the relations among these measures, and an assessment of their relationship to reading behavior. We will publicly share the raw and preprocessed anonymized datasets, the stimuli, acquisition sequences, and containerized computationally reproducible software tools required to replicate the results in our established and new experimental data. Moreover, the proposed research project is unique in its characterization and quantification of the neural circuitry of reading. This knowledge will pave the way towards more reproducible reading research, improved collaboration between research centers, better neurobiological metrics for characterizing different reading scores, and the development of a diagnostic model that clarifies differences between typical and atypical readers.

PIBA_2022_1_0015: A DEEP LEARNING APPROACH TO UNDERSTAND NEURAL COMPENSATORY MECHANISMS IN DYSLEXIA

[Budget
50,000 €
[Coordinator
PI M. Lizarazu

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2024

The ability to comprehend spoken and written language quickly and effortlessly, often in noisy environments, is a fundamental everyday necessity. This becomes particularly important for atypical populations, such as dyslexics, where there is significant evidence of early and pervasive linguistic deficits. These deficits originate from speech sounds analysis (phonology) and lead to reading problems, resulting in daily struggles in educational and work environments. Despite this, a majority of adult dyslexic readers maintain normal spoken language abilities. This suggests that they use strategies to compensate for poor phonological processing during speech comprehension. Since the phonological deficit is thought to be the cause of the reading problems, the same compensation mechanisms could also be relevant for their reading. Furthermore, within the adult dyslexic population there are those who have reached near-typical reading ability, compensating for their original deficit. Yet, to-date, there is no in-depth understanding of what these strategies are at the neuro-cognitive level.
The goal of this project is to use a state-of-the-art combination of advanced neuroimaging techniques and deep learning artificial neural network algorithms to uncover the neural dynamics of the compensatory strategies used by dyslexics during speech processing and reading. Addressing these issues will improve existing remediation techniques for an estimated 50 – 100 million dyslexics in Europe alone. To date research in dyslexia is mostly focused on understanding dyslexia and designing reading remediation techniques for pre-reading children. Dyslexic adults, however, are more likely to have naturally developed speech comprehension and reading compensation strategies due to life-long daily exposure to spoken and written language. This population currently receives the least public support and would immediately benefit in their social and working lives from improving their reading abilities. Discovering the compensation mechanisms that work in adults can apply to populations of children and adolescents by designing novel remediation strategies.

KK-2023/00090: ELKARTEK- INVESTIGACIÓN MULTIDISCIPLINAR EN TECNOLOGÍAS NEUROMÓRFICAS DISRUPTIVAS, SILICON BURMUIN

[Budget
141,455 €
[Coordinator
IKERLAN
[BCBL PI
G. Lerma-Usabiaga

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación ELKARTEK
[Time Frame:
2023 - 2025

SiliconBurmuin aims to create a multidisciplinary neurocomputing community in the Basque Country, bringing together technological centers, scientific research institutes, and industrial companies. This community will: (1) identify the key biological structures and mechanisms that play an important role in vision across different species, and (2) transform this knowledge into new mathematical frameworks, silicon neuromorphic features, and computer vision algorithms to address industrial challenges and enable new experiments of interest in neuroscience and clinical research. To achieve this goal effectively over time, SiliconBurmuin will establish strong connections with the ongoing Horizon Europe project NimbleAI, with which it shares coordination, to strengthen ideas, knowledge, and technology through a prototyping platform where intellectual property related to both projects can be implemented. In addition to outlining the research objectives and direction of SiliconBurmuin, this document argues that the coordination and co-funding of aligned projects at the EU and regional level could act as a catalyst to raise regional awareness of its potential to help meet global challenges such as digital and semiconductor sovereignty.

KK-2024/0041- ELKARTEK- INVESTIGACIÓN COLABORATIVA SOBRE BIOMARCADORES Y MÉTODOS ALTERNATIVOS DE DIAGNOSIS Y SEGUIMIENTO TERAPÉUTICO DE HIPERTENSIÓN PULMONAR ASOCIADA A FIBROSIS, bmG24

[Budget
106,893 €
[Coordinator
CIC biomaGUNE
[BCBL PI
C. Caballero-Gaudés

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación ELKARTEK
[Time Frame:
2024 - 2025

The collaborative research project bmG24 is led by CIC biomaGUNE (BMG), with partners from BIOGIPUZKOA (BIOG), CIDETEC (CID), VICOMTECH (VIC), BCBL (BCBL), GAIKER (GKR), TECNALIA (TEC), and LEARTIKER (LEA). It focuses on early diagnosis and therapeutic monitoring of pulmonary hypertension (PH) associated with fibrosis. PH is a complex condition often leading to irreversible heart and lung diseases, increasing mortality, and cardiovascular events, especially due to an aging population.
bmG24 aims to innovate diagnostic, technological, and therapeutic approaches for two PH subtypes: PH associated with heart failure (HP-IC) and PH linked to idiopathic pulmonary fibrosis (HP-FPI). Preclinical and clinical models will be developed, including in vivo and in vitro 3D models of lung and heart tissue, using human pluripotent stem cells (hiPSC), immortalized cell lines, and 3D printed organoids. These models aim to replace animal testing and simulate biological processes of human pathology to support new biomarker development and therapeutic tracking, especially with novel nano-formulations.
One goal is creating an advanced HP-FPI pig model for future nanotoxicity studies and exploring alternatives to animal models for more accurate human pathology representation. The project aligns with European and US initiatives aimed at reducing animal testing, such as the 3Rs principle (Replace, Reduce, Refine). A cost-effective HP-FPI model resembling human pathology is essential, as current models, like the bleomycin mouse model, fail to predict clinical outcomes after successful preclinical trials.
bmG24 will develop in vitro platforms and bioreactors for lung and heart tissue cultivation, mimicking mechanical and electrical stimuli. Additionally, precision-cut lung slices (PCLS) from human tissue will be included as promising ex vivo models for studying pulmonary fibrosis. Furthermore, early diagnosis through image-based biomarkers will be key to improving prognosis and treatment. The project also aims to advance MRI 4D flow imaging techniques, accelerating data acquisition for earlier detection of cardiac transplant rejection in severe heart failure patients. Finally, PET imaging will be explored for molecular biomarkers, including a mitochondrial complex I inhibitor (18F-flurpiridaz), a fibrosis marker (68Ga-FAPI), and a calcium channel tracer (CaVs), to enhance understanding and diagnosis of PH associated with fibrosis.

ADVANCED PROTOCOLS FOR DIAGNOSIS AND COGNITIVE REMEDIATION FOLLOWING STROKE, AP4CORESTROKE

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2024
[Budget
168,067 €

[Coordinator
PI M. Carreiras & D. Soto
[Partners
- Biocruces: M.M. Freijo, J. Cortés
- Biodonostia: A. López de Munain, P. De La Riva
- Achucarro: A. Martín
- CICBiomagune: P. Ramos
- DPIC: I. Arganda-Carreras
- BCMaterials: S. Lanceros Méndez
- Tecnalia: A. Ramos, C. Vidaurre.

Stroke is one of the most common causes of adult disability, resulting in impairments of both physical (e.g., hemiparesis) and cognitive functions (e.g., aphasia, agnosias and the 'neglect' syndrome). Currently, there are over 80 million people in the world who have survived a stroke with varying degrees of disability. Neurocognitive deficits following stroke, including fatigue, remain difficult to treat, and there are currently no accepted effective therapies for their rehabilitation. The negative impact of stroke on patients' quality of life can be devastating.
The key strategic goals of this project are: (i) Provide new ground on the role of molecular biomarkers in the blood and the brain-blood barrier for predicting cognitive recovery after stroke. (ii) Devise novel diagnostic tools by means of real-time neuroimaging of cerebro-vascular impairments in stroke that can be translated to the clinic and, (iii) develop the new generation of automatic brain-computer interfaces for personalized neurocognitive training in stroke. Notably, the new technology to be developed in the project is extensible to the assessment of other neurological conditions such as neurodegenerative diseases and early dementias.

This project involves a truly multidisciplinary and highly integrated research vision on stroke. This approach aims to enhance the health and well-being of the increasingly ageing population by providing both basic and translational insights that improve clinical diagnosis, interventions, and industrial applications. This project proposal is led by the BCBL and unites world-leading talent working in the Basque Country. Key contributions range from research on molecular biomarkers of neurological disease (Achucarro), stroke neuroimaging in animal models and humans (CICBiomagune), stroke clinician-scientists (BioCruces and BioDonostia), advanced neuroimaging methods and brain-computer interfaces (BCBL, Tecnalia), new materials for portable electrophysiological recordings of brain activity (BCMaterials), and cutting-edge analysis pipelines for image processing and biomarker discovery based on deep neural network models (DIPC).

#NEURAL2SPEECH: DECODING SPEECH AND LANGUAGE FROM THE HUMAN BRAIN

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2024
[Budget
93,508 €

[Coordinator
PI N. Molinaro
[Partners
- HiTZ Zentroa UPV/EHU: A. Barrena, E. Agirre, E. Navas, I. Saratxaga, I.Hernaez (IKUR-HPC&IA community)
- University of Connecticut: J. Magnuson
- University of Aberdeen: A. Klimovich-Gray

Can speech be decoded from neural brain activity? Addressing this question is critical for restoring communication among people who have lost their ability to speak due to some speech motor disorders (e.g., aphasia). On another level, assessing the quality of the perceived speech from brain recordings can provide precious data in the context of linguistic process affected by a particular brain disorder.
The ongoing rapid development of artificial intelligence has made it increasingly feasible to decode the neural signals of human activities (Huang et al., 2021). The development of “the neural language decoder” is more possible than ever. For instance, intended speech can be reasonably decoded from intracranial (hence highly invasive) neural recordings of people that cannot speak (Anumanchipalli et al., 2019; Angrick et al., 2022). This evidence stimulated further research on decoding speech from noninvasive brain recordings. The overall goal is to develop decoders (e.g., Huth et al., 2016; Makin et al., 2020; Krishna et al., 2020; Brumberg et al., 2018) that take non-invasive brain recordings and reconstruct arbitrary language stimuli that a participant is hearing, the speech that is naturally produced or even imagined, or its meaning (i.e., semantics). Interestingly, beyond speech reconstruction, such decoders should be able to predict how that participant’s brain responds to speech utterances in natural language. In fact, the similarity between these algorithms and the brain primarily depends on their ability to predict words from context.
Interesting approaches have been developed, taking advantage of natural language models to model neural activity recorded non-invasively from functional Magnetic Resonance Imaging (fMRI: Tang et al., 2022) or Magnetoencephalography (MEG: Heilbron et al., 2022). Despite the relevance of such initial proofs, they only scratch the surface. Developing these approaches to the point of making them useful for patients will require sustained effort from interdisciplinary teams. The present consortium of researchers has been planning the necessary improvements for creating more efficient neural speech decoders.
This effort implie0s the joint interaction of experts across different disciplines, such as optimization of multimodal neuroimaging methods (BCBL and the University of Aberdeen), improvement in language technology and speech signal processing (HitZ Zentroa, Ixa Taldea and Aholab SPL Group, UPV/EHU), and application of computational neuroscience approaches (University of Connecticut). The BCBL and the University of Connecticut are already working on a NSF/AEI granted project to develop a neural network model of human speech recognition of multiple languages. On the other hand, BCBL, UPV/EHU, and University of Aberdeen have been working on separate projects focused on (i) neural models applied to speech processing and (ii) the classification of developmental dyslexia syndrome based on neural speech processing data.

2024333023: SALUD Potenciación - BIOSTROKE: EL PAPEL DE BIOMARCADORES Y BARRERA HEMATOENCEFÁLICA EN EL PRONÓSTRICO DEL ICTUS

[Funding Agency
GOBIERNO VASCO
[Type of Project
Proyecto de Investigación SALUD potenciación
[Time Frame:
2024 - 2026

[Budget
25,851.72 €
[Coordinator
Instituto de investigación Sanitaria Biobizkaia
[BCBL PI
PI S. Mancini

The BIOSTROKE project falls within the Neurosciences area of RIS3 Basque Health, aiming to develop innovative diagnostic, prognostic, and therapeutic procedures for the treatment of neurological and psychiatric disorders. It focuses particularly on stroke, one of the leading causes of mortality and disability, seeking to improve its diagnosis, treatment, and prevention. Given the global significance of cerebrovascular diseases, recognized as a public health priority by the World Health Organization, research into aging is being actively promoted by various entities such as the Basque Government, the Carlos III Health Institute, the Horizon 2020 European Framework Programme, and the U.S. National Institutes of Health (NIH).
BIOSTROKE also contributes to the United Nations 2030 Agenda Sustainable Development Goals (SDGs), especially SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), and SDG 17 (Partnerships for the Goals). It aligns with specific targets of the Euskadi 2030 Agenda, such as enhancing care for chronic and mental illnesses, promoting health research and innovation, advancing gender equality in the workplace, and strengthening development cooperation policies.
From a scientific standpoint, BIOSTROKE is aligned with the Neurobiosciences area of the IKUR strategy of the Basque Government. It fosters research excellence and collaboration among participating centers and research groups, through demonstrated interaction and joint activity between their principal investigators.

Gipuzkoako Foru Aldundia
Diputación Foral de Gipuzkoa

2019 RED I+D OF 232019 TENDIENDO PUENTES ENTRE LAS NEUROCIENCIAS Y LA NEUROCIRUGÍA: MAPEO DE ÁREAS ELOCUENTES EN PACIENTES CON TUMORES CEREBRALES

[Funding Agency
Diputación Foral de Gipuzkoa
[Type of Project
Proyecto de Investigación RED I+D
[Time Frame:
2019 - 2021

[Budget
29,240 €
[Coordinator
PI I. Quiñones

An ant colony is composed of hundreds of thousands of individuals organized in a hierarchical manner (Purcell et al., 2014). Each of these individuals has a specific function within the colony; however, the synergy between them is what allows these functions to be carried out successfully. But what would happen if the ant colony were attacked, and hundreds of individuals died? Interestingly, we can establish a very clear analogy between the functioning of an ant colony and the functioning of our brain. Current theories attempting to explain the functioning of the human brain propose that our brain operates as a network of hierarchically organized neural networks 2-4. These neural networks follow the same principles of synergy applicable to insect colonies. If we focus on the cognitive functions that support language, which is the general theme of this research program, we can state that the neural network that supports language is a complex system of networks organized synergistically and hierarchically. Returning to the analogy between ant colonies and the brain, we might ask what would happen if a brain injury affects an eloquent region (critical regions for processing linguistic signals). Paradoxically, the brain is a plastic organ, highly malleable, which allows it to reorganize and redistribute the functions of the different nodes that make up a neural network 5-7. Thus, in the presence of a brain injury, the brain might be capable of compensating for the functions of the affected areas by assigning those functions to healthy regions.

PROJECTS FUNDED BY THE PROVINTIAL GOVERNMENT OF GIPUZKOA

RED I+D 422/022: BASES CEREBRALES DEL MANTENIMIENTO DE LOS EFECTOS BENEFICIOSOS DEL ENTRENAMIENTO EN CAPACIDADES COGNITIVAS SUPERIORES EN MAYORES

[Budget
64,099 €
[Coordinator
PI P.M. Paz Alonso

[Funding Agency
Diputación Foral de Gipuzkoa
[Type of Project
Proyecto de Investigación RED I+D
[Time Frame:
2022 - 2023

Older adults represent the fastest-growing population in Europe. As people age, the risk of cognitive and functional decline increases. Researchers have explored various interventions to improve cognition and delay functional decline, including computerized cognitive training (CCT). This research has shown beneficial effects of CCT on different higher cognitive abilities in older adults. However, it remains unclear how these improvements relate to changes in brain regions associated with cognitive decline in aging.
Preliminary results from our previous CCT and structural and functional MRI projects suggest that, in healthy individuals aged 55 to 75, CCT improves executive function, memory, and attention, while having limited effects on language and inhibitory control processes. These improvements are primarily associated with fronto-parietal networks and the hippocampus. These findings are consistent with previous studies showing that training can enhance cognitive abilities linked to the lateral prefrontal cortex, temporal lobe regions, and hippocampus (Olesen et al., 2004; Jolles et al., 2010, 2013, 2016; Rosenberg-Lee et al., 2018) and with our lab's prior studies showing attention improvements through computerized training programs (Pozuelos et al., 2014, 2018).
Figure 1. Beneficial Effects of CCT on Fronto-Parietal Regions:
A) Brain activation in bilateral parietal regions and right prefrontal cortex associated with benefits in working memory (adapted from Olesen et al., Nature Neuroscience, 2004).
B) Electrophysiological correlates in frontal areas linked to training benefits in attentional networks (adapted from Pozuelos et al., Developmental Science, 2018).
The main goal of this project on healthy aging is to examine the long-term benefits of an executive function, memory, and attention training program in older adults (aged 55-75) and investigate its brain-based mechanisms in the prefrontal, parietal, and hippocampal regions. This project involves tracking 80 participants who previously took part in the training.
The results of this project potentially have significant scientific and applied impact, as there is currently limited empirical evidence on the long-term effects of cognitive training in healthy populations within this age range. Additionally, this project has the advantage of evaluating a CCT program designed by the study team, which can be optimally adapted based on its findings. This program could be easily implemented in day centers and nursing homes as a non-pharmacological intervention to enhance the well-being and quality of life of older adults.

RED I+D 2022-CIEN-000029-01: LOS MARCADORES NEURLAES DEL DETERIORO COGNITIVO LEVE EN PACIENTES CON CÁNCER DE MAMA: UNA APROXIMACIÓN MULTIMODAL HACIA LA DETECCIÓN, PREDICCIÓN Y MONITORIZACIÓN

[Budget
148,440 €
[Coordinator
PI M. Ruzzoli

[Funding Agency
Diputación Foral de Gipuzkoa
[Type of Project
Proyecto de Investigación RED NEXT
[Time Frame:
2022 - 2023

Between 2012 and 2016, there were 7,938 cases of breast cancer in the Basque Country, with a 5-year prevalence of 7,247 cases in 2016. Thankfully, survival rates have increased, with a national 5-year survival rate of 86% for women diagnosed between 2008 and 2013. However, the Mission Board for Cancer (2020) stresses the urgent need to better understand the impact of cancer treatment on patients' quality of life. Cognitive decline, particularly in breast cancer survivors, is one of the most common complaints during the survival phase.
Cancer-related cognitive impairment (CRCI) refers to cognitive decline caused by cancer and its treatments, as well as other factors like lifestyle and emotional changes. It impacts memory, attention, executive functions, and processing speed. However, there is often a disconnect between patients' perceptions of their cognitive deficits and objective cognitive test results. CRCI can appear before treatment begins and may persist for years, even up to 20 years in some cases.
CRCI negatively affects survivors' quality of life, work reintegration, and mental health. Many survivors experience a decline in cognitive abilities, which also affects their social relationships and work performance.
Cognitive impairment can also hinder proper cancer management and adherence to treatments, leading to functional decline and higher healthcare costs.
Research on CRCI is essential from healthcare, social, and economic perspectives. However, understanding the brain mechanisms underlying CRCI remains unclear. Studying these mechanisms is vital for developing biomarkers that can aid clinicians in diagnosing and monitoring CRCI, and for designing targeted interventions.
Objective: Identify neural markers associated with CRCI in breast cancer patients using behavior measures, subjective scales (PROMs), EEG, and fMRI.
1. Identify neurophysiological and neuroimaging changes during chemotherapy and the survival phase.
2. Determine the usefulness of EEG and MRI in detecting cognitive decline.
3. Explore biomarkers to predict CRCI development during chemotherapy and persistent CRCI post-treatment.
These efforts aim to improve early interventions, reduce cognitive decline, and enhance post-cancer recovery.

PROJECTS FUNDED BY THE PROVINTIAL GOVERNMENT OF GIPUZKOA

RED I+D 2023-CIEN-000070-1: BASQUE GENETIC VARIATION DB BASE DE DATOS DE VARIACIÓN GENÉTICA VASCA, BasqGenVar

[Budget
54,647 €
[Coordinator
PI A. Carrión-Castillo

[Funding Agency
Diputación Foral de Gipuzkoa
[Type of Project
Proyecto de Investigación RED I+D
[Time Frame:
2023 - 2024

The main objective of the BasqGenVar project is to create a database of Basque genetic variation, as a descriptive resource to characterize the genetic variability in the general urban Basque population (not selected for any specific disease). The execution of this project will have practical applications in research, clinical practice, and at the societal level.
In terms of basic research, the objective is twofold: on one hand, genetic analyses of this sample will inform us about the historical processes that have shaped the Basque population. As a secondary goal, this project will also increase the available sample to carry out genome-wide association studies in reading and language, as part of the international GenLang consortium, contributing to achieving the necessary sample size for genome-wide association studies with sufficient statistical power to detect small genetic effects on reading ability.
From a clinical perspective, a shared resource will be created for the scientific community, which can serve as a reference for the Basque population in studies that incorporate genetic information about patients, helping to interpret the relevance of different genetic variants and their frequencies in the population. Additionally, it will help to put polygenic risk scores in perspective for this population.
From a social standpoint, this study will help achieve a more personalized and better-informed medical service in the long term.

Gipuzkoako Foru Aldundia
Diputación Foral de Gipuzkoa

RED I+D 2024-CIE4-000042-01: KEINU HIZKUNTZA ETA IRAKURKETA BURMUINEAN, IraKeinu

[Budget
63,530 €
[Coordinator
PI B. Costello and G. Lerma-Usabiaga

[Funding Agency
Diputación Foral de Gipuzkoa
[Type of Project
Proyecto de Investigación RED I+D

[Time Frame:
2024 - 2025

The main objective of the IraKeinu project is to understand and characterize the neural networks involved in reading and sign language. Both information transmission methods rely on language and vision, sharing cognitive functions and thus depending on similar cortical regions. At the basic research level, the aim is to study the stages of language comprehension through reading (whether in alphabetic or logographic scripts) or sign language. A database will be created and expanded over time with participants of varying linguistic backgrounds (such as deaf, blind, and different reading modalities), with plans for publication to become a reference in combined reading and sign language studies. This approach will help better understand brain regions responsible for reading beyond alphabetic systems, reflecting the diversity of human linguistic experience.
Clinically, the results may have long-term applications. They aim to improve understanding of the neural mechanisms underlying sign language processing, contributing to better diagnosis and treatment for language issues in signers. Additionally, insights into reading mechanisms will support the creation of improved diagnostic, evaluation, and intervention systems for individuals with reading disorders, like dyslexia.
Socially, this study will have a dual impact. In the short term, the scientific community will benefit from the study's results and published data and methods. Over time, the database will expand, inviting other labs to share data. The long-term goal is to share findings with society, especially with sign language professionals and those involved with dyslexia. The impact of reading disorders, particularly dyslexia, is significant, affecting around 7% of primary school students and preventing many from contributing to society's full potential.

Lectura típica y atípica e interacciones tálamocorticales: Una vision mecanística de la lectura basada en redes funcionales y estructurales

[Budget
8,348 €
[Coordinator
PI P.M. Paz-Alonso and M. Carreiras

[Funding Agency
Fundación Tatiana Pérez de Guzmán el Bueno
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2021

Reading is one of the most exciting discoveries in our lives. It is the most relevant means of information transmission for knowledge dissemination and human progress. Instrumental for learning and other cognitive abilities, reading is an essential skill in modern societies for social, cultural, and economic exchanges. However, 5-10% of the world's population suffers from dyslexia, a developmental disorder characterized by difficulties to successfully master the elements of literacy. Despite impressive scientific advances in the study of the neurobiology of reading, we still do not know why some children learn to read without difficulty whereas others fail. This research project aims to develop a comprehensive and multidisciplinary investigation into the psycholinguistic, neurocognitive, and neuroanatomical bases of reading and dyslexia, shedding new light on how thalamocortical interactions support typical reading, and how reading disabilities occur as a consequence of breakdowns in these circuits. The ultimate goal is to generate a novel mechanistic account of reading and dyslexia by pioneering a multimodal neuroimaging approach to investigate: (1) how dynamically coordinated thalamocortical and cortico-cortical networks orchestrate reading; and (2) how dyslexia is characterized by atypical functional connectivity and abnormal structural connections in these brain circuits. This highly integrated investigation will lead to a new conceptualization of reading vital to understanding and diagnosing reading disabilities, developing novel diagnostic strategies for early detection of reading deficits, and informing educational approaches to learning how to read.

DYSLEXIA AND THE THALAMUS: INTEGRATIN ANATOMY AND FUNCTIN IN A MECHANISTIC ACCOUNT OF THE READING BRAIN, DYSTHAL

[Funding Agency
La Caixa
[Type of Project
Proyecto de Investigación
[Time Frame:
2019 - 2024

[Budget
500,000 €
[Coordinator
PI M. Carreiras

Reading is one of the most exciting discoveries in our lives. It has been the most relevant information transmission vehicle for knowledge dissemination and for humanity progress. Instrumental in learning other cognitive abilities, nowadays it is an essential skill in modern societies for social, cultural, and economic exchanges. However, one out of ten people suffer from dyslexia, a developmental disorder characterized by difficulties to master the elements of literacy successfully. Curiously, despite impressive scientific advances in the study of reading, we still do not know why some children learn to read without difficulty whereas others fail. This project will break new ground by developing a comprehensive novel, multidisciplinary investigation of the psycholinguistic, neurocognitive, and neuroanatomical bases of reading and dyslexia. It will also radically change the current research focus on the cortex. It aims to provide new light into how thalamocortical circuits support reading, and how reading disabilities occur as a consequence of breakdowns in these circuits. The ultimate goal is to generate a novel mechanistic account of reading and dyslexia by using a pioneering multimodal neuroimaging approach to investigate (1) how dynamically coordinated thalamocortical and corticocortical networks orchestrate reading; and (2) how dyslexia is characterized by atypical functional connectivity and abnormal structural connections in different brain circuits. Furthermore, we will generate a predictive model of neurobiology of dyslexia with machine learning techniques. Deficient tuning of specific thalamic nuclei with cortical areas could underlie different subtypes of dyslexia. This highly integrated investigation will lead to a new conceptualization of reading that is paramount to understand and diagnose reading disabilities, to develop effective therapies to treat them, and to inform optimal educational approaches for learning to read.

RITMOS QUE LEEN: IMPACTO DE UNA INTERVENCIÓN MUSICAL-RÍTMICA TEMPRANA EN EL DESAROLLO DE LA LECTURA

[Budget
40,000 €
[Coordinator
PI M. Lallier

[Funding Agency
Fundación BBVA
[Type of Project
Proyecto de Investigación
[Time Frame:
2023 - 2025

In the past decade, our research group has demonstrated that speech perception generates synchronization between speech rhythms and neural oscillations in auditory brain regions in the right hemisphere, which is also specialized in musical processes. The project 'Rhythms that Read: Impact of an Early Musical-Rhythmic Intervention on Reading Development' focuses on validating a musical intervention program for children in early childhood education (up to 3 years old), who are not yet expert readers and whose brains are still malleable and plastic. The goal of this work is to mitigate the risks of developing future reading problems. It argues that this musical intervention, centered on rhythmic-melodic activities, playfully promotes the creation of strategies that these children can use to enhance their reading acquisition in primary education stages.

FY2019-008: EXAMINING VARIABILITY IN THE NATIVE LANGUAGE AND ITS INFUENCE ON SECOND LANGUAGE LEARNING

[Budget
72,055 €
[Coordinator
PI M. Carreiras and S. Mancini

[Funding Agency
National Science Foundation
[Type of Project
Proyecto de Investigación
[Time Frame:
2018 - 2023

Previous research on native speakers suggests that there is a virtually unexplored aspect of variability in L2 processing: the L1 processing abilities that learners bring to their acquisition of a second or subsequent language. Throughout the L2 literature, there are extremely few studies that have ever examined the L1 and the L2 within the same learner. Moreover, in educational psychology, studies that have related L1 skills and L2 success typically relied on very general measures of assessment. For example, Sparks found that the best predictor of foreign language learning in high school, as measured by classroom grades, was performance on standardized (native) language tests in elementary school, showing an important relationship between L1 skills and L2 performance. The goal of the present study is to examine the relationship between L1 and L2 processing, focusing on a linguistic phenomenon shown to be challenging in both learner and native populations—pronoun resolution. We focus specifically on contexts that have been referred to in the literature as instances of 'referential ambiguity' and 'referential failure.' Recent research using event-related potentials has revealed variability in the processing of these contexts, which appears to be modulated by both characteristics of the linguistic context (verb type, associated behavioral task) and characteristics of the individual (working memory).

Biomarcadores de recuperación cognitiva postquirúrgica en tumores cerebrales

[Budget
300,000 €
[Coordinator
PI M. Carreiras

[Funding Agency
Fundación Científica AECC
[Type of Project
Proyecto de Investigación
[Time Frame:
2020 - 2023

A diffuse low-grade glioma (DLGG) is a primary brain tumor that affects an individual's cognitive faculties. The slow growth of this type of lesion allows the brain to reorganize its structure and functions, delaying the onset of the cognitive symptoms. However, DLGG unavoidably evolves to become a more invasive type of tumor, at the expense of both survival and the prognosis for healthy cognitive function. Malignant transformation of DLGG is directly related to tumor volume and to growth velocity. Surgical resection, which works by drastically decreasing tumor volume, has proven to be the most effective intervention for delaying anaplastic transformation. In the last decade, it has radically changed the life expectancy of these patients from 5 to 15 years, as stated in the most recent publications. Nonetheless, surgical resection of these tumors can unintentionally damage the neural substrates of critical cognitive functions, since DLGG frequently involves areas deemed to be language, motor, visuospatial, or memory hubs. In this ambitious translational project, which lies at the nexus of neurosurgery, neuroscience, biomedical imaging, computer science and statistics, we aim to build an accurate and reliable model that can predict an individual patient's postsurgical cognitive recovery using presurgical neuro-anatomical and neuro-functional information. This is a primary need, for both clinicians and patients, as it promotes better outcomes for surgeries, longer life expectancy, and better quality of life for patients. By applying machine learning algorithms to a compendium of clinical, behavioral, neuroanatomical, and connectomic features from a sample of individuals with DLGG and from healthy controls, we will be able to identify biomarkers of postsurgical cognitive outcomes (language, memory, executive functions, attention, and control). The tools we develop will allow surgical teams to tailor interventions on a patient-by-patient basis, both before and after surgery. By analyzing presurgical and postsurgical data by combining longitudinal and transversal approaches, we will investigate how the appearance of a brain lesion impacts brain network dynamics and whether this network malleability represents an adaptive advantage for post-surgery brain recovery processes. In sum, we will identify biomarkers of postsurgical cognitive recovery using presurgical neuroanatomical and functional information.

NATURAL LANGUAGE PROCESSING IN BRAINS AND ALGORITHMS

[Budget
150,000 €
[Coordinator
PI S. Pinet

[Funding Agency
META
[Type of Project
Proyecto de Investigación
[Time Frame:
2022 - 2026

In collaboration with Meta AI, we aim to use AI models to understand how language is coded in the brain. We record brain activity using a non-invasive technique, magnetoencephalography (MEG) while participants are typing sentences. Based on this study, we recently reported two main findings:
First, from the brain signals, it was possible to decode which letter participants are currently typing, with a character error rate as low as 20% in the best cases, meaning that 4 out of 5 characters can be accurately decoded. This result has important implications for patients that have lost the ability to communicate due to brain injury. While similar findings have been reported previously with electrodes implanted in patients' brains after surgery, our results constitutes the best performance that has been reported with non-invasive brain recordings, creating novel clinical opportunities for restoring communication abilities after brain injury.

Second, we report results on a more theoretical level, aiming to understand how the brain transforms thoughts into a sequence of words. We demonstrate that the brain generates a sequence of representations that start from the most abstract level of representations (the sentence context) and progressively transforms them into words, syllables, and actions (individual keystrokes). Moreover, our study reveals that the brain coherently and simultaneously represents successive words and actions. To do so, neural activity follows hierarchical dynamics, a special neural mechanism that maintains representations over long time periods and without interfering with future, current, and past actions. With these findings, we are getting closer to cracking the neural code of language, one of the major challenges of AI and neuroscience.


Amaia
Ane

5.A PUBLICATIONS
4.B OPEN ACCESS
5.C PARTICIPATION IN CONFERENCES
5.D PARTICIPANTS

05

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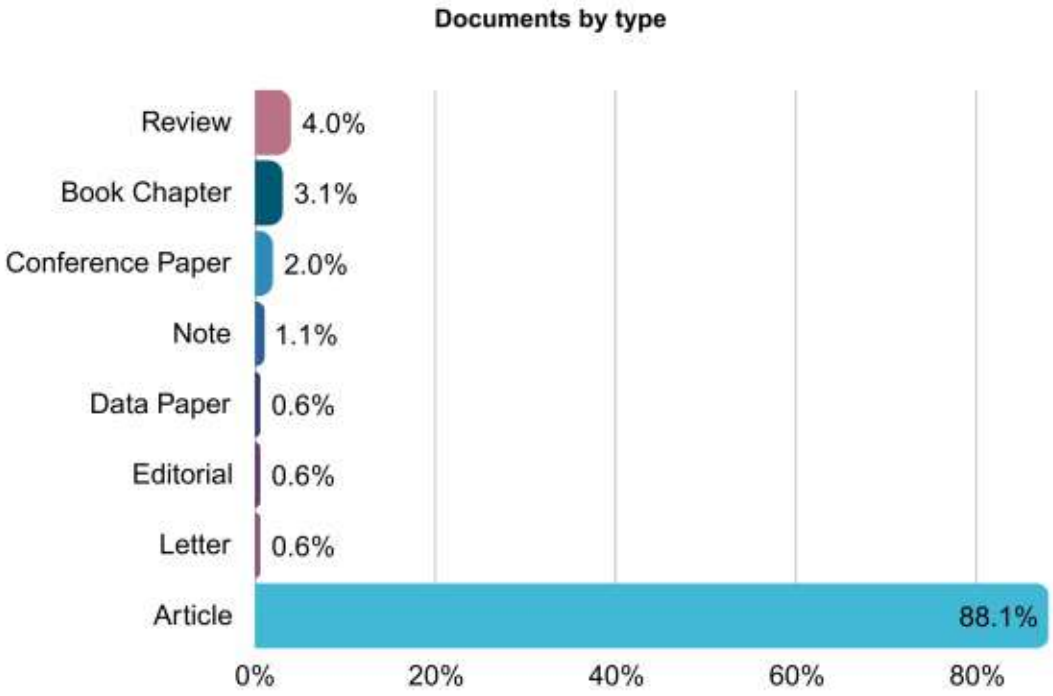
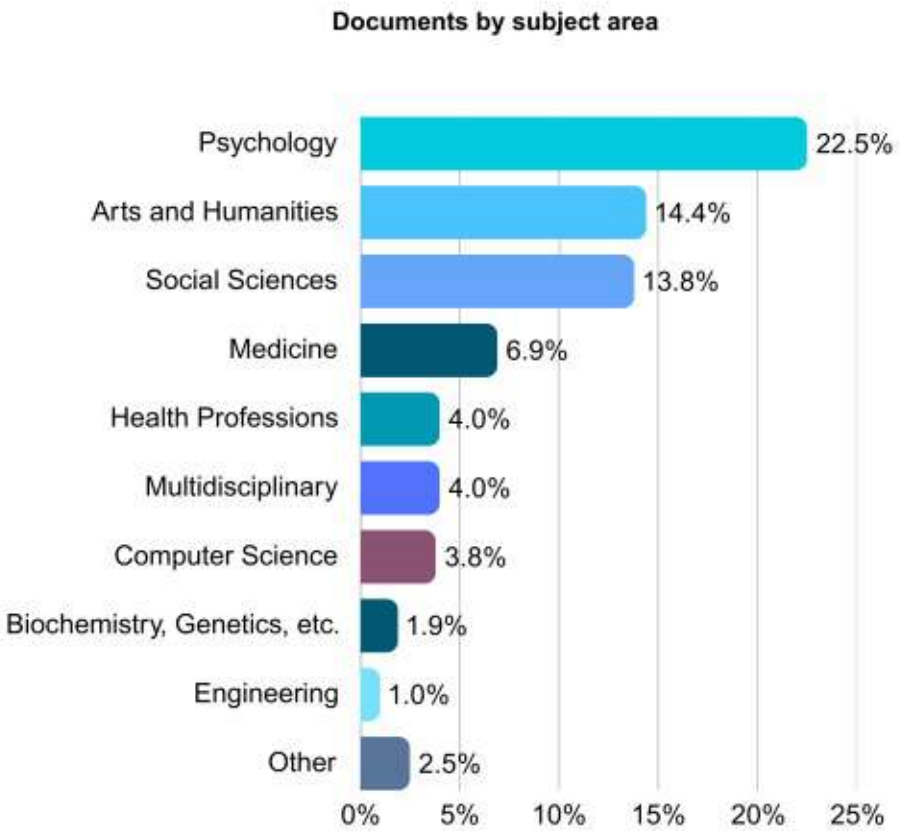
SCIENTIFIC PERFORMANCE

SCIENTIFIC OUTPUT

Between 2021 and 2024, BCBL has published **365 papers** across various formats, with 356 indexed in Scopus. The majority **(92,1%)** are **research articles and reviews**, reflecting the center's strong focus on high-impact contributions. Notably, most BCBL publications appear in top-tier journals, underscoring the quality and relevance of its research.

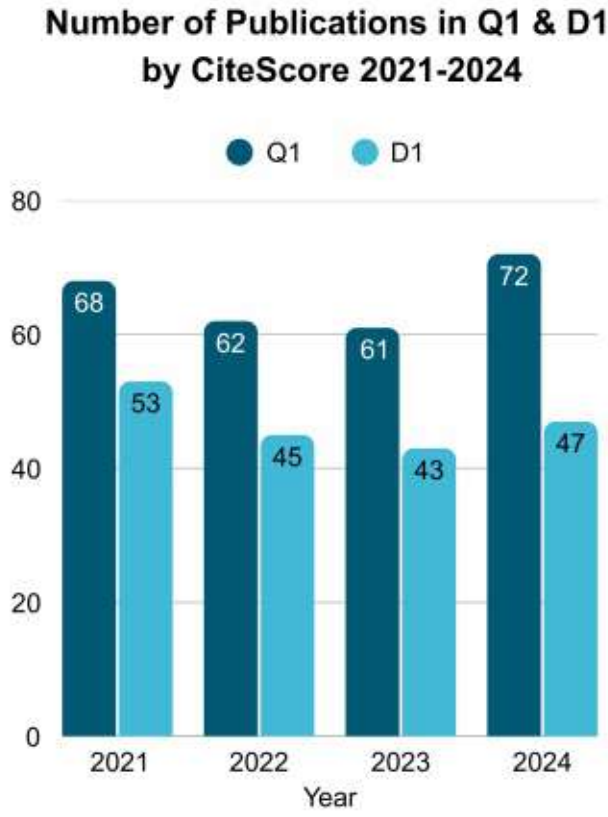


Scopus data from this period highlights BCBL's multidisciplinary approach, with its research spanning four key domains: Neuroscience, **Psychology, Arts and Humanities, and Social Sciences.** This breadth reflects the center's commitment to advancing knowledge across diverse fields.



VISIBILITY AND IMPACT OF THE SCIENTIFIC OUTPUT

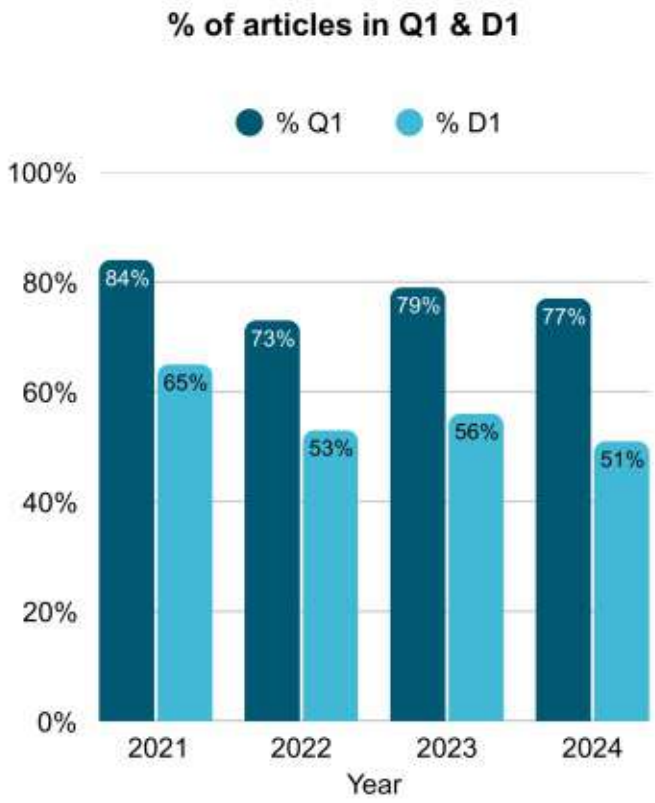
The number of publications in top journal percentiles, as measured by SciVal—the tool used for bibliometric analysis—reflects the extent to which an institution's research appears in the most-cited journals. Specifically, it indicates how many publications are in the top 10% (Decile 1, D1) or top 25% (Quartile 1, Q1) of the most-cited journals indexed by Scopus. Scopus, the database used for this analysis, provides the most comprehensive coverage of publications in the Social Sciences and Humanities, which is particularly relevant to BCBL's research output.



During the 2021–2024 period, BCBL has maintained a strong presence in high-impact journals, with an average of **66 publications per year** in Q1 journals and **47 publications per year** in D1 journals.

Note: The database used for this analysis is CiteScore from Scopus.

On average, **78% of BCBL's publications** during this period appeared in Q1 journals, while **56% were in D1 journals**. This consistent performance underscores BCBL's sustained impact and visibility in the field over the past four years.



Top 10 D1 Journals by number of articles

Below is a list of selected D1 journals in which BCBL researchers published between 2021 and 2024:

Scopus Source title	No. of articles in the journal	CiteScore
NeuroImage	20	11,3
Scientific Reports	17	7,5
Psychonomic Bulletin and Review	9	6,7
Cortex	8	7
Brain and Language	7	4,5
Language, Cognition and Neuroscience	7	4,5
Proceedings of the National Academy of Sciences of the United States of America	7	19
Attention, Perception, and Psychophysics	6	3,6
Bilingualism	5	8,9
Human Brain Mapping	5	8,3
Journal of Speech, Language, and Hearing Research	5	4,1

Note: Journal metrics for 2023 taken from latest Scopus Citescore.
**Citescore of an academic journal measures the yearly average number of citations to recent articles published in that journal.*

Top 10 D1 most cited Journals

Listed below are the top 10 most cited journals in which BCBL researchers published between 2021 and 2024:

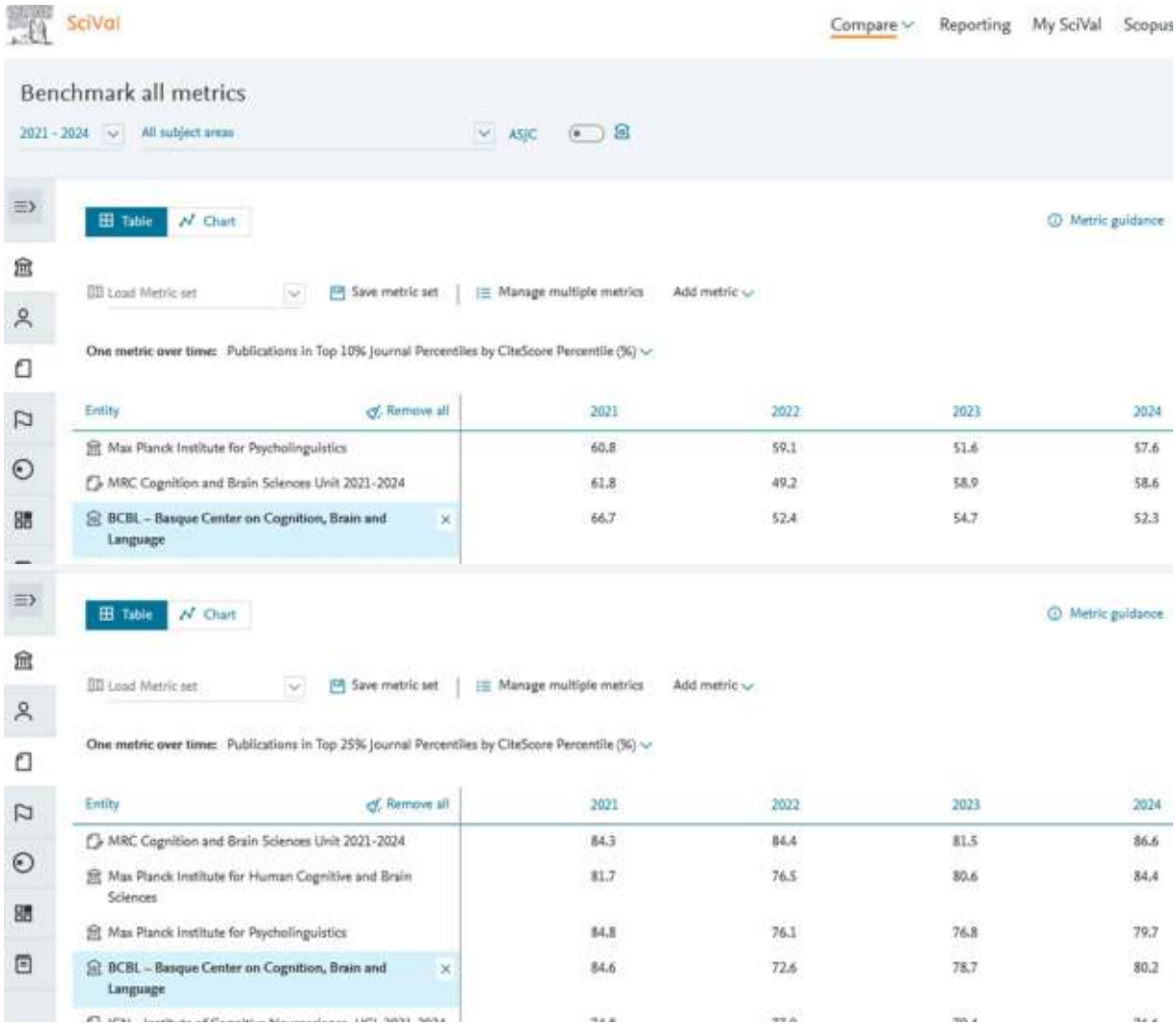
Scopus Source title	CiteScore	Citations
Proceedings of the National Academy of Sciences of the United States of America	19	175
NeuroImage	11,3	157
Sleep Health	6,3	107
Scientific Reports	7,5	92
Perspectives on Psychological Science	22,7	72
Cortex	7	68
Brain and Language	4,5	64
Nature Genetics	43	51
Human Brain Mapping	8,3	46
Developmental Science	8,1	39

Note: Journal metrics for 2023 taken from latest Scopus Citescore.
**Citescore of an academic journal measures the yearly average number of citations to recent articles published in that journal.*

BENCHMARKING AGAINST INTERNATIONAL CENTERS AND LEADERS IN THE FIELD

The BCBL (Basque Center on Cognition, Brain and Language) holds a **strong position** in terms of research visibility and impact when compared to other leading international research centers. Based on the percentage of publications in **Q1 (Top 25%)** and **D1 (Top 10%)** journals, the BCBL consistently ranks among the top institutions, demonstrating a significant presence in high-impact scientific publishing during the period from 2021 to 2024. Overall, the BCBL demonstrates **a high level of research visibility and impact,** securing a **top 4 ranking in Q1 publications and a top 3 ranking in D1 journals.** While a slight decline in 2022 suggests an area for improvement in maintaining consistency, the center has shown a **notable ability to recover** and remain highly competitive. Its strong presence in **high-impact journals** reinforces its reputation as a **leading international research institution in cognitive and brain sciences.**

BCBL may not hold the absolute **top position**, but it is certainly **among the most influential centers** in the field. Its publication strategy, visibility, and impact in the highest-ranking journals ensure that it remains a key player on the global research stage.



2021

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BOOK CHAPTERS/BOOKS

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In order to optimize the impact of publicly funded research at European and national levels, and since it is also essential to enhance economic returns while improving competitiveness through knowledge, in 2016 the BCBL launched its “Open Access” policy. This initiative aimed to disseminate the results of publicly funded research more broadly and quickly, to the benefit of researchers, innovation within the field, and society in general.

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ADDI is the digital archive for learning and research materials of the University of the Basque Country (UPV/EHU). It is designed to organize, archive, preserve, and disseminate intellectual output resulting from teaching and research activities via open access. This output includes: PhD theses, Master’s theses, end-of-degree projects, scientific papers, dissertations, book chapters, teaching material, etc.

The advantages of archiving these works in digital format in ADDI are:

- **Greater dissemination, visibility, and impact** of the work, as it becomes accessible to everyone via the Internet.

- As readers, researchers benefit from **full access text** of all published research in their field, not just what is available through institutional subscriptions.

- Access to **statistical data** on views and downloads of the works.

- A **centralized access point** for the entire scientific or teaching output of a professor, research group, educational innovation group, and university community in general.

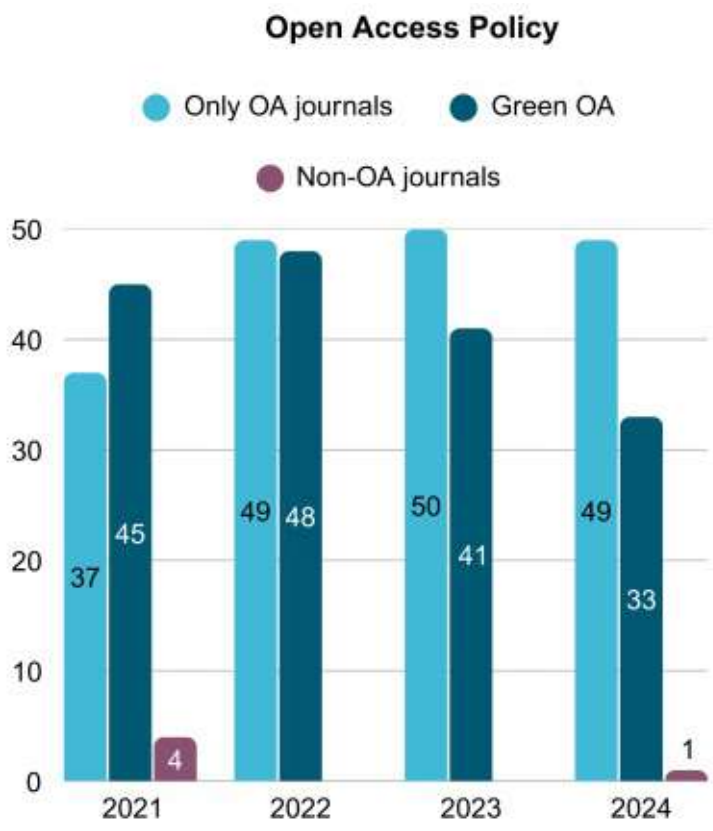
- Use of **persistent and stable identifiers** (handles) for each deposited material.

- Long-term **preservation** of digital materials.

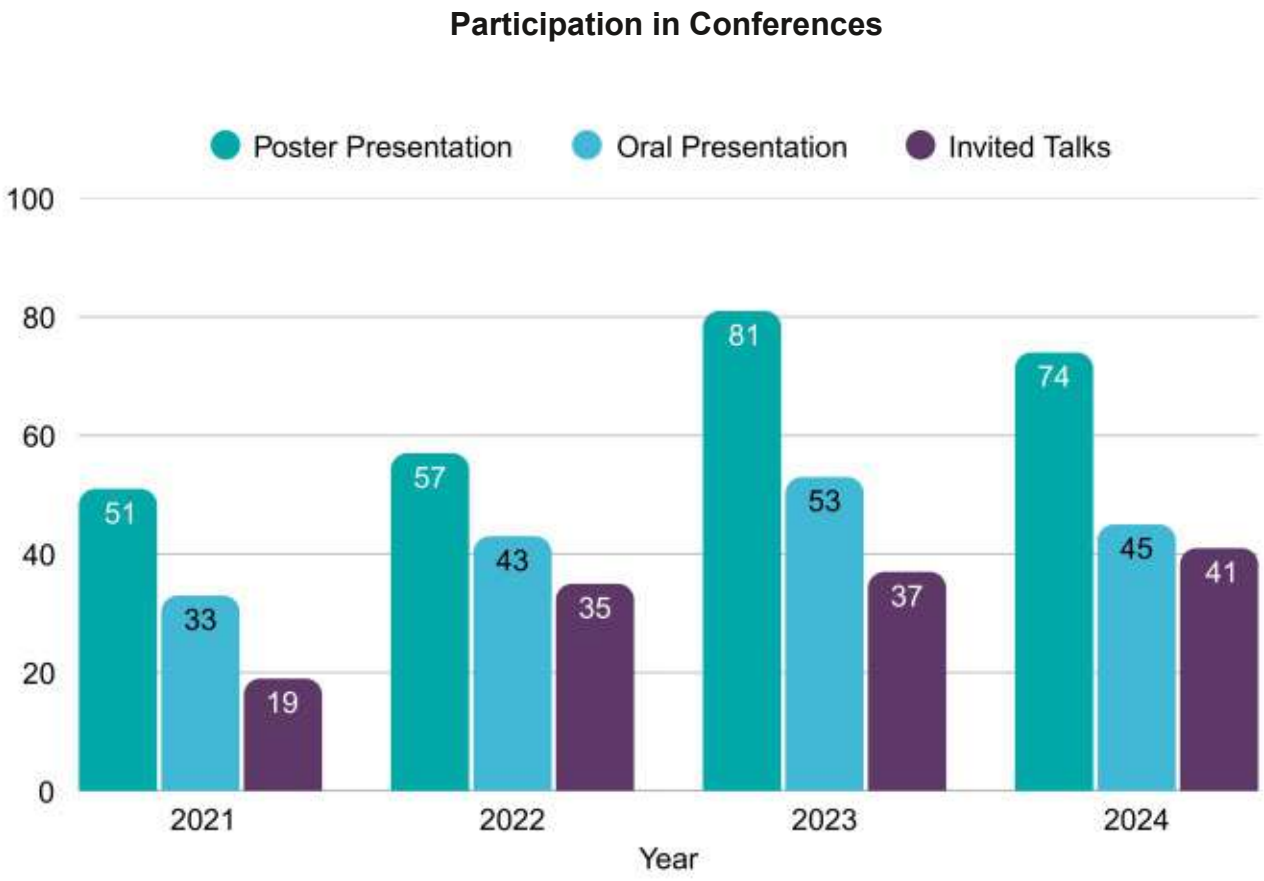
- **Cooperation** with other institutions, professors, and researchers—particularly important in developing countries—through open and shared knowledge.

- **Accreditation of authorship** by making the works available online.

- **Compliance with national and international policies** on mandatory open-access publication of work resulting from publicly funded research.



BCBL papers in ADDI during period 2021-2024


Participation in Conferences
Poster Presentation
Oral Presentation
Invited Talks
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2021
2022
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2024
Year

2021

POSTER PRESENTATIONS

1. Ansorena, X., Carreiras, M., & Mancini, S. (June, 2021). Discourse in aphasia: Sentence Complexity across elicitation methods. Poster presentation at the XV International Symposium of Psycholinguistics. Virtual Conference.

2. Ansorena, X., Mancini, S., & Carreiras, M. (November, 2021). ¿Are sentences pre-planned or incrementally produced by persons with aphasia (PWA)? Poster presentation at the International Workshop on Language Production at the Max Planck Institute for Psycholinguistics, the Netherlands (hosted virtually).

3. Antzaka, A., Jevtović, M., & Martin, C.D. (July, 2021). Learning written words in a first language: Is there an influence of the orthographic system of the second language? Poster presentation at the 28th Annual Meeting of the Society for the Scientific Study of Reading (SSSR2021), Virtual Conference.

4. Antzaka, A., & Lallier, M. (November, 2021). Contribution of alpha-rate visual attentional tracking to reading acquisition. Oral presentation at Words in the World International Conference 2021, (hosted virtually).

5. Arrieta, I., Altuna, X., Betanzos, F.A., Carreiras, M., & Kalashnikova, M. (June, 2021). Predictors of language development in children with Cochlear Implants: Preliminary pre-implantation data. Poster presentation at Summer School ISOLDE: Infant Studies On Language Development in Europe, virtual event.

6. Caffarra, S., Joo, S., Bloom, D., Kruper, J., Rokem, A., & Yeatman. J. D. (June, 2021). Development of the visual pathways mediates development of electrophysiology in visual cortex. Poster presentation at the 27th Organization for Human Brain Mapping (OHBM) annual meeting. Virtual Conference.

7. Caffarra, S., Joo, S., Bloom, D., Kruper, J., Rokem, A., & Yeatman. J. D. (May, 2021). Development of the visual pathways predicts changes in electrophysiological responses in visual cortex. Poster presentation at the VSS virtual conference.

8. Caffarra, S., Joo, S., Bloom, D., Kruper, J., Rokem, A., & Yeatman. J. D. (April, 2021). Maturational changes of the visual pathways mediate development of visual electrophysiological responses. Poster presentation at the 12th Annual Stanford Pediatrics Research Retreat, virtual conference.

9. Carrión-Castillo, A., Paz-Alonso, P.M., &Carreiras, M. (June, 2021). Brain Structure, phenotypic and genetic correlates of reading. Poster presentation at the 27th Organization for Human Brain Mapping (OHBM) annual meeting. Virtual Conference.

10. Charoy, J., & Samuel, A.G. (November, 2021). Exploring lexically-driven perceptual recalibration for substituted phonemes. Poster presentation at the 62nd Annual Meeting of the Psychonomic Society, New Orleans, Louisiana, USA (hosted virtually).

11. Clark, C., Guediche, S., & Lallier, M. (May, 2021). Compensatory cross-modal effects of sentence context on visual word recognition in adults. Poster presentation at the British Dyslexia Association's International Conference, Oxford, UK.

12. Esteban-Peñalba, T., Paz-Alonso, P.M., Navalpotro-Gomez, I., & Rodriguez-Oroz, M.C. (January, 2021). Functional correlates of response inhibition in impulse control disorders in Parkinson's disease. Poster presentation at the SfN Global Connectome, Virtual Conference.

13. Esteban-Peñalba, T., Paz-Alonso, P.M., Navalpotro-Gomez, I., & Rodriguez-Oroz, M.C. (September, 2021). Compensatory functional mechanisms of response inhibition in PD with impulse control disorders. Poster presentation in the Movement Disorders Society Virtual Congress 2021.

14. Fernández-Merino, L., Lizarazu, M., Molinaro, N., & Kalashnikova, M. (June, 2021). Rhythmical cues and neural entrainment in Basque-Spanish bilingual infants. Poster presentation at Summer School ISOLDE: Infant Studies On Language Development in Europe, virtual event.

15. Frances, C., Navarra-Barindelli, E., & Martin, C. (March, 2021). Effect of orthographic and phonological similarity and speaker accent on auditory processing by L2 learners of English. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

16. Fernández-Merino, L., Lizarazu, M., Molinaro, N., & Kalashnikova, M. (October, 2021). Cortical Tracking of Rhythmical Cues in Basque-Spanish Bilingual Adults. Poster presentation at the 2021 symposium on cutting-edge methods for EEG

research, Aix-en-Provence, Marseille, France.

17. Garcia, M., Carreiras, M., Gil-Robles, S., Pomposo, I., & Quiñones, I. (March, 2021). Presurgical assessment protocol for detecting cognitive decline in Diffuse Low-Grade Gliomas. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

18. Gosselin, L., Martin, C.D., Gonzalez Martin, A. & Caffarra, S. (June, 2021). When all errors are the same: Non-native processing of foreign-accented syntactic errors is not modulated by error typicality. Poster presentation at International Symposium on Bilingual and L2 Processing in Adults in Children (ISBPAC), Nijmegen, The Netherlands. Virtual conference.

19. Guediche, S., Navarra-Barindelli, E., & Martin, C.D. (March, 2021). Cognate effects on L2 word recognition are modulated by L1 orthographic neighborhood density. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021). Virtual conference.

20. Gurunandan, K., Carreiras, M., & Paz-Alonso, P.M. (March, 2021). Network interaction dynamics in language production. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), virtual conference.

21. Gurunandan, K., Carreiras, M., & Paz-Alonso, P.M. (June, 2021). Network Dynamics during Speech Production. Poster presentation at the 27th Organization for Human Brain Mapping (OHBM) annual meeting. Virtual Conference.

22. Jevtović, M., Antzaka, A., & Martin, C.D. (July, 2021). Orthographic skeletons: Do we constantly create orthographic representations of newly acquired spoken words? Poster presentation at the 28th Annual Meeting of the Society for the Scientific Study of Reading (SSSR2021), Virtual Conference.

23. Kapnoula, E.C., & Samuel, A.G. (November, 2021). Does sensitivity to acoustic variation within an L1 phoneme category help L2 learning? Poster presentation at the 62nd Annual Meeting of the Psychonomic Society, New Orleans, Louisiana, USA (hosted virtually).

24. Kapnoula, E.C., & Samuel, A.G. (June, 2021). Individual differences in speech perception: Sources and consequences for second language learning. Poster presentation at the XV International Symposium of Psycholinguistics (ISP). Virtual Conference.

25. Klimovich-Gray, A., & Molinaro, N. (March, 2021). Language areas adjust processing strategies to the temporal properties of speech. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

26. Lerma-Usabiaga, G., Le, R., Gafni, C., Ben-Shachar, M., & Wandell, B. (November, 2021). Interpreting sensory and cognitive signals in the cortical reading network. Poster presentation at the 2021 meeting of the Society for Neuroscience (SfN 2021). Chicago, IL, USA.

27. Lerma-Usabiaga, G., Le, R. Gafni, C. Ben-Shachar, M., & Wandell, B. (January, 2021). The gradient of population receptive field stimulus-dependence in ventral visual cortex. Poster presentation at Society for Neuroscience's SfN Global Connectome. Virtual conference.

28. Mancarella, M., Antzaka, A., Bertoni, S., Facoetti, A, & Lallier, M. (February, 2021). Enhanced disengagement of auditory attention and phonological skills in action video gamers. Poster presentation at the European Conference On Digital Psychology, Milan, Italy.

29. Mancini, S., Arellano, K., & Martorell, J. (October, 2021). Agreement processing as a domain-general mechanism? An artificial grammar study. Poster presentation at the Society for the Neurobiology of Language Annual 13th Meeting (SNL 2021), virtual conference.

30. Mancini, S., Carreiras, M., Caballero-Gaudés, C., Termenon, M., & Paz-Alonso, P.M. (October, 2021). Neural correlates of left and right branching. Poster presentation at the Society for the Neurobiology of Language Annual 13th Meeting (SNL 2021), virtual conference.

31. Manso-Ortega, I.L., Quiñones, I., Gil-Robles, S.G., Pomposo, I., & Carreiras, M. (2021). How could we benefit from Bayesian statistics in predicting cognitive outcomes after tumor resection? Poster presentation at 2nd Bayesian Statistical Analyses for the Human, Social and Cognitive Sciences, online summerschool.

32. Manso-Ortega, I. L., Carreiras, M., Pomposo, I., & Gil-Robles, S. (March, 2021). Intracortical stimulation in bilingual left temporal tumour patients: Different cortical representations for L1 and L2. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

33. Martorell, J., Mancini, S., Molinaro, N., & Carreiras, M. (October, 2021). Neural tracking of syntax from a cross-linguistic perspective. Poster presentation at the Society for the Neurobiology of

Language Annual 13th Meeting (SNL 2021), virtual conference.

34. Martorell, J., Morucci, P., Ruzzoli, M., & Molinaro, N. (October, 2021). Tracking hierarchical processing during meaning composition. Poster presentation at Leipzig Lectures on Language Combinatorics, End-of-year Symposium, virtual event.

35. Morucci, P., Martin, C., & Molinaro, N. (October, 2021). Language Experience Affects Predictive Coding during Auditory Rhythm Perception. Poster presentation at the Society for the Neurobiology of Language Annual 13th Meeting (SNL 2021), virtual conference.

36. Morucci, P., Martorell, J., & Molinaro, N. (October, 2021). Tracking Hierarchical Processes in Minimal Linguistic Phrases. Poster presentation at the Society for the Neurobiology of Language Annual 13th Meeting (SNL 2021), virtual conference.

37. Morucci, P., Martorell, J., & Molinaro, N., (July, 2021). Tracking hierarchical processes in minimal linguistic phrases. Poster presentation at Salzburg Mind-Brain Annual Meeting (SAMBA). Online meeting.

38. Navarra-Barindelli, E., Guediche, S., & Martin, C. (June, 2021). Bilingual word recognition in challenging visual contexts: Language co-activation persists but cognate facilitation effect does not. Poster presentation at International Symposium of Psycholinguistics, Madrid, Spain, Virtual Conference.

39. Navarra-Barindelli, E., Guediche, S., & Martin, C. (March, 2021). The cognate effect is modulated by auditory noise: implications for L1 co-activation during L2 auditory word recognition. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

40. Pastureau, R., Lizarazu, M., & Molinaro, N. (October, 2021). How the Entrainment to Gesturing, Lip-Reading and Speech Contribute to Comprehension: A MEG Exploratory Study. Poster presentation at the 2021 Cutting EEG meeting, Marseille, France.

41. Pinet, S., Alario, F.-X., & King, J.-R. (October, 2021). Decoding the neural correlates of typing using MEG. Poster presentation at the 2021 Cutting EEG meeting, Marseille, France.

42. Pinet, S., Liu, M., Martin, C., & Paz-Alonso, P.M. (March, 2021). Functional correlates of oral and written language production.Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

43. Quiñones. I., Menashe, B., Gisbert, S., Pomposo, I., Gil-Robles, S., & Carreiras, M. (March, 2021). Neuroplasticity affects grey matter regions and white-matter tracts: Evidence from brain tumor patients. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

44. Ruzzoli, M., Molinaro, N., Richter, C., Carreiras, M., & Lizarazu, M. (October, 2021). Cortical tracking of speech: a MEG-EEG closed-loop study. Poster presentation at the 2021 Cutting EEG meeting, Marseille, France.

45. Sánchez, A., Carreiras, M., & Paz-Alonso, P.M. (2021). Reading demands modulate brain responses to word frequency: an fMRI study. Poster presentation at the Society for the Neurobiology of Language Annual 13th Meeting (SNL 2021), virtual conference.

46. Thomas, T., Martin, C., & Caffarra, S. (March, 2021). Towards a dynamic model of processing of native, dialectal, and foreign accented speech. Poster presentation at Cognitive Neuroscience Society annual meeting (CNS 2021), Virtual Conference.

47. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (May, 2021). Low-rank and sparse simultaneous blind estimation of global fluctuations and neuronal-related activity from fMRI data. Poster presentation at the 1st ISMRM 29th Annual Meeting & Exhibition, Virtual Conference.

48. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (June, 2021). Simultaneous blind estimation of global fluctuations and neuronal-related activity from fMRI data. Poster presentation at the 1st ISMRM Iberian Chapter annual meeting. Virtual Conference.

49. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (June, 2021). Synthesis-based Paradigm Free Mapping and analysis-based Total Activation are identical for temporal deconvolution of fMRI data. Poster presentation at the 1st ISMRM Iberian Chapter annual meeting. Virtual Conference.

50. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (June, 2021). Simultaneous blind estimation of global fluctuations and neuronal-related activity from fMRI data. Poster presentation at the 27th Organization for Human Brain Mapping (OHBM) annual meeting. Virtual Conference.

51. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (June, 2021). Synthesis-based Paradigm Free

Mapping and analysis-based Total Activation operate identically. Poster presentation at the 27th Organization for Human Brain Mapping (OHBM) annual meeting. Virtual Conference.

ORAL PRESENTATIONS

1. Alemán Bañón, J., & Martín, C.D. (November 2021). The role fo L1-L2 similarity in L2 predictive processing: An ERP study. Oral presentation at Boston University Conference on Language Development (BUCLD), Boston, US. Virtual conference.

2. Antzaka, A., & Martin, C.D. (June, 2021). Orthographic consistency effects in speech perception: Does covert production play a role? Oral presentation at the XV International Symposium of Psycholinguistics (ISP). Virtual Conference.

3. Caffarra, S. (April, 2021). How do we treat formal gender cues when we comprehend sentences? Oral presentation at the SEPEX jornadas virtuales.

4. Arrieta, I., Altuna, X., Carreiras, M., & Kalashnikova, M. (December, 2021). Does cross-modal reorganization depend on hearing experience? Oral presentation at the Asia-Pacific Babylab Constellation (ABC) Conference 2021, Hong Kong, China, online event.

5. Blanco, B., Molnar, M., Arrieta, I., Caballero-Gaudes, C., & Carreiras, M. (October, 2021). Hemodynamic Correlates of Speech Processing Using fNIRS: Assessing the Effect of Bilingualism in Young Infants. Oral presentation at the Society for Functional near-infrared spectroscopy(SfNIRS 2021). Virtual conference.

6. Carrión-Castillo, A., Paz-Alonso, P.M., & Carreiras, M. (October, 2021). Brain Structure, phenotypic and genetic correlates of reading. Oral presentation at the 2021 Virtual World Congress of Psychiatric Genetics. Virtual Conference.

7. Dueme, F., Stoehr, A., & Martin, C.D. (June, 2021). The impact of L2 orthography on the production of L1 speech sounds among French natives living in Spain. Oral presentation at the 30th Conference of the European Second Language Association (EuroSLA 30), Barcelona (virtual conference), Spain.

8. Fernández-Merino, L., Lizarazu, M., Molinaro, N., & Kalashnikova, M. (December, 2021). The influence of brief music exposure on Basque-Spanish Bilingual infants' cortical tracking of speech. Oral presentation at the Asia-Pacific Babylab Constellation (ABC) Conference 2021, Hong Kong, China, online event.

9. Ferrer-Gallardo, V.J., Bolton, T., Delgado, M., Paz-Alonso, P.M., Rodriguez-Oroz, M., & Caballero-Gaudes, C.(May, 2021). Distinct cognitive and anthropometric functional connectivity traits of cognitive decline in Parkinson's disease using partial least squares. Oral presentation at ISMRM 29th Annual Meeting & Exhibition, Virtual Conference.

10. Jevtović, M., Stoehr, A., Klimovich-Gray, A., Antzaka, A., & Martin, C.D. (June, 2021). The impact of phoneme-to-grapheme consistency on the production and perception of speech sounds in early Spanish readers. Oral presentation at the International Child Phonology Conference, Lethbridge, Canada.

11. Kalashnikova, M. (June, 2021). The role of early parent-infant interactions in promoting infants' lexical growth during the COVID-19 pandemic. Oral presentation at the XV International Symposium of Psycholinguistics (ISP). Virtual Conference.

12. Kalashnikova, M., Singh, L., & Learning Tones Authors. (December, 2021). The development of tone discrimination in infancy: A cross-linguistic, multi-lab investigation. Oral presentation at the Asia-Pacific Babylab Constellation (ABC) Conference 2021, Hong Kong, China, online event.

13. Kapnoula, E.C., & McMurray, B. (June, 2021). Individual differences in speech perception: Evidence for gradiency in the face of category-driven perceptual warping. Oral presentation at Acoustics in Focus: The 180th Meeting of the Acoustical Society of America. Virtual meeting.

14. Kapnoula, E.C. & Samuel, A.G. (June, 2021). Effects of immediate versus delayed production on word learning. Oral presentation at the XV International Symposium of Psycholinguistics (ISP). Virtual Conference.

15. Kapnoula, E.C. & Samuel, A.G. (October 2021). Individual differences in L1 speech perception and L2 learning: The role of sensitivity to within-category differences. Oral presentation at Bilingualism Matters Research Symposium 2021 (BMRS21). Virtual meeting.

16. Kartushina, N., Soto, D., & Martin, C. (June, 2021). Self-confidence in perception and production on non-native sound. Oral presentation at the 4th Phonetics and Phonology Conference in Europe. Virtual Conference.

17. Kartushina, N. & Martín, C.D. (June, 2021). Do improvements in production training last? Only when trained with multiple speakers. Oral presentation at International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC), Nijmegen, The Netherlands. Virtual conference.

18. Mei, N., Santana, R., & Soto, D. (December, 2021). Informative neural representations of unseen contents during higher-order processing in human brains and deep artificial networks. Flash talk at Neuromatch conference 4.0. Online event.

19. Mei, N., Santana, R., & Soto, D. (June, 2021). Informative neural representations of unseen objects during higher-order processing in human brains and deep artificial networks. Oral presentation at Association for the Scientific Study of Consciousness, Israel, Virtual Conference.

20. Moia, S. (March, 2021). Introduction to Git(Hub). Oral presentation at workshop at the OpenMR Virtual 2021.

21. Morucci, P. (September, 2021). Linguistic labels affect visual object recognition via the modulation of alpha/beta oscillations. Oral presentation at Embodied and Situated Language Processing (ESLP 2021), virtual conference.

22. Margolles, P., & Soto, D. (December, 2021). Neural dedifferentiation of semantic knowledge representations in healthy ageing. Flash talk at the Neuromatch Conference 4.0, online event.

23. Pinet, S., Alario, F.X., Longcamp, M., Schön, D., & King, J.R. (October, 2021). Decoding Typing from Electro-Encephalography Reveals how the Human Brain Simultaneously Represents Successive Keystrokes. Oral presentation at the Society for the Neurobiology of Language Annual 13th Meeting (SNL 2021), virtual conference.

24. Pinet, S. & Martín, C.D. (June, 2021). The influence of overt spoken and written production on novel word learning. Oral presentation at International Symposium of Psycholinguistics, Madrid, Spain. Virtual Conference.

25. Pinet, S., & Martin, C. (November, 2021. The influence of overt spoken and written production on novel word learning. Oral presentation at the 62nd Annual Meeting of the Psychonomic Society, New Orleans, Louisiana, USA (hosted virtually).

26. Samuel, A.G., Zheng, Y., & Dumay, N. (November, 2021). Selective Adaptation and Lexically-Driven Recalibration: Two Phonetic Boundary Adjustment Processes with very Different Recovery Times. Oral presentation at the 62nd Annual Meeting of the Psychonomic Society, New Orleans, Louisiana, USA (hosted virtually).

27. Stoehr, A., & Martin, C.D. (June, 2021). Does orthography affect speech sound learning in production and perception? Oral presentation at the 2nd International Symposium on Bilingual and L2 Processing in Adults in Children (ISBPAC), Nijmegen, The Netherlands.

28. Stoehr, A., & Martin, C.D. (May, 2021). Orthography modulates speech perception in childhood bilinguals. Oral presentation at Psycholinguistics in Flanders (PiF 2021), Kaiserslautern, Germany.

29. Stoehr, A., & Martin, C.D. (June, 2021). Orthography's influence on speech production and perception: An artificial speech sound learning study. Oral presentation at the 30th Conference of the European Second Language Association (EUROSLA 30), Barcelona (virtual conference), Spain.

30. Taouki, I., Lallier, M., & Soto, D. (January, 2021). Metacognitive Processing in Early Readers: The role of metacognition in monitoring linguistic and non-linguistic performance and regulating students' learning. Oral presentation at ICCSEM 2021: International Conference on Cognitive Science, Education and Metacognition, Zurich, Switzerland, virtual meeting.

31. Taouki, I., Lallier, M., & Soto, D. (June, 2021). The role of metacognition in monitoring performance and regulating learning in early readers. Oral presentation at Association for the Scientific Study of Consciousness, Israel, Virtual Conference.

32. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (May, 2021). fMRI deconvolution with synthesis-based Paradigm Free Mapping and analysis-based Total Activation operate identically. Oral presentation at ISMRM 29th Annual Meeting & Exhibition, Virtual Conference.

33. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (June, 2021). Simultaneous blind estimation of global fluctuations and neuronal-related activity from fMRI data. Oral presentation at the 1st ISMRM Iberian Chapter annual meeting. Virtual Conference.

INVITED TALKS

1. Amoruso, L. (June, 2021). New insights into language plasticity in brain tumor patients: An MEG approach.Invited talk at the Centro de Neurociencias Cognitivas (CNC), Universidad de

San Andrés, Buenos Aires, Argentina.

2. Antzaka, A. (April 2021). How do children learn to read? Invited Talk at the University of Mondragon (Grado en Educación Primaria).

3. Caffarra, S. (February, 2021). Brain changes in audiovisual processing during reading development. Invited talk at the PsychoShorts virtual conference, Ottawa, Canada.

4. Caballero-Gaudes, C. (April, 2021). Advances in fMRI BOLD denoising: A focus on multi-echo and phase-based methods. Invited seminar at Spinoza Center for Neuroimaging, Amsterdam, Netherlands.

5. Kapnoula, E.C. (April, 2021). What's in a word? Insights from novel word learning. Invited talk at the Hull Psychology research colloquia, University of Hull, Hull, UK.

6. Lallier, M. (March, 2021). How the sensitivity to auditory rhythms shapes the reading brain. Invited talk at the MPI for Psycholinguistics colloquium series. (Virtual talk).

7. Lallier, M. (June, 2021). The impact of bilingualism on reading development. Invited talk at School of Psychology Seminar series, Bangor University, Wales, UK. Online talk.

8. Lizarazu, M. (May, 2021). Spatiotemporal dynamics of postoperative functional plasticity in patients with brain tumors in language areas. American Clinical MEG Society (ACMEGS), Virtual MEG Course.

9. Lerma-Usabiaga, G. (Jan, 2021). The gradient of population receptive field stimulus-dependence in ventral visual cortex. Society for Neuroscience's SfN Global Connectome. Virtual Event.

10. Mancini, S. (October, 2021). Feature Combinatorics. Keynote lecturer at Leipzig Lecture on Language Combinatorics, Leipzig, virtual event.

11. Martin, C.D., Antzaka, A., & Jevtovic, M. (October, 2021). Bilinguals learning novel written words: Influence of the orthographic system of the other language. Invited talk at LPNC, University of Grenoble-Alpes, France.

12. Martin, C.D., Gosselin, L., Navarra, E., & Caffarra, S. (April, 2021). Processing of mispronunciations in foreign-accented speech. Invited talk at Symposium at APPE-SEPEX annual meeting, virtual conference.

13. Martin, C.D., & Stoehr, A. (September, 2021). Sound learning in perception and production: Effects of orthography. Invited talk at Current Opinion on Audiovisual Integration and Reading (Co-Air) Webinar, virtual.

14. Molinaro, N. (July, 2021). Top-down components involved in cortical speech tracking.Invited talk at SISSA, online event.

15. Piazza, G. (April, 2021). ¡Habla conmigo! Come parliamo a un straniero? Caratteristiche acustiche e implicazioni cognitive. Invited talk at seminar of Linguistics, University of Padova, Padova, Italy.

16. Pinet, S. (November, 2021). Moving language production experiments online: challenges and solutions. Invited talk at the International Workshop on Language Production, online event.

17. Pinet, S. (June, 2021). Language production through speaking and typing. Invited talk at University of Geneva, Switzerland, online event.

18. Rivolta, C.L., & Costello, B. (September, 2021). Procesamiento de la Lengua de Signos. Invited talk at ASORNA Asociación de Personas Sordas de Navarra, online event.

19. Zugarramurdi, C. (March, 2021). Longitudinal study of reading acquisition in a transparent orthography: a screener and a hypothesis.Invited talk at Haskins Laboratories, New Haven, USA.

2022

POSTER PRESENTATIONS

1. Amoruso, L., Geng, S., Timofeeva, P., Gil-Robles, S., Iñigo Pomposo, I., & Carreiras, M. (May, 2022). Oscillatory dynamics supporting longitudinal plasticity of action semantics across languages: Evidence from bilingual brain tumor patients. Poster presentation at the 2022 International Conference of Cognitive Neuroscience (ICON), Helsinki, Finland.

2. Ansorena, X., Carreiras, M., Hernández, M., Benítez, I., & Mancini, S. (September, 2022). Aphasia Cognitive Screening in Spanish (ACS.esp): a new digital test to assess language in aphasia. Poster presentation at Science of Apahsia 2022, Bordeaux, France.

3. Arellano, K., Soto, D., Freijo, M.M., & Mancini, S. (September, 2022). Domain-general mechanisms and language recovery after stroke: a longitudinal study. Poster presentation at the Science of Aphasia, Bordeaux, France.

4. Arellano-Garcia, K., Soto, D., Freijo, M.M., &

Mancini, S. (October, 2022). Metacognition of language and domain-general abilities after stroke. Poster presentation at the 14th Annual Meeting of the Society for the Neurobiology of Language (SNL), Philadelphia, USA.

5. Arrieta, I., Blanco, B., Caballero-Gaudes, C., Martínez, Z., Altuna, X., Carreiras, M., & Kalashnikova, M. (October, 2022). Brain in plastic, it's fantastic: Cochlear implantation reduces cross-modal neural activity in infants and toddlers with hearing loss. Poster presentation at the conference of 'Society of fNIRS 2022, Boston, USA.

6. Biondo, N., Ivanova, M.V., Pracar, A., Baldo, J., & Dronkers, N.F. (October, 2022). Assessing the role of temporal and frontal regions in syntactic comprehension: Insights from aphasia. Poster presentation at the 14th Annual Meeting of the Society for the Neurobiology of Language (SNL), Philadelphia, USA.

7. Biondo, N., Ivanova, M.V., Mancini, S., & Dronkers, N.F. (October, 2022). A systematic investigation of linguistic and non-linguistic processing of time in people with aphasia. Poster presentation at the 14th Annual Meeting of the Society for the Neurobiology of Language (SNL), Philadelphia, USA.

8. Carrera Arias, F.J., & Paz-Alonso, P.M. (June, 2022). Conditions influencing the choice of functional connectivity method for task-related fMRI designs. Poster presentation at the 2022 meeting of the Society for the Organization for Human Brain Mapping (OHBM), Glasgow, UK.

9. Carrión-Castillo, A., Paz-Alonso, P.M., & Carreiras, M. (July, 2022). Brain Structure, phenotypic and genetic correlates of reading. Poster presentation at the Neurogune 2022 meeting, Pamplona, Spain.

10. Caudrelier, T., Clark, C., Jacobsen, J.,& Martin, C.D. (April, 2022). Can color-cues help learning novel English words when pronunciation is not predictable from spelling? Poster presentation at 10th International Symposium on the Acquisition of Second Language Speech - New Sounds 2022, Barcelona, Spain.

11. Caudrelier, T., Ménard, L., Beausoleil M-M., Samuel, A., & Martin, C.D. (August, 2022). Does speech perception learning transfer across languages in bilinguals? An online experiment. Poster presentation at the 22nd Conference of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

12. Chavarría, I., Vidorreta, M., Fernández-Seara, M., & Caballero-Gaudes C. (June, 2022).Calibrated fMRI with a background-suppressed pCASL/multi-echo BOLD dual-acquisition sequence. Poster presentation at the 2022 meeting of the ISMRM Iberian Chapter, Lisbon, Portugal.

13. Cheimariou, S., & Kapnoula, E.C. (November, 2022). Age effects on lexical competition are external to the mental lexicon: Evidence from eye-movements. Poster presentation at the Psychonomic Society 63rd Annual Meeting, Boston, USA.

14. Clark, C., Guediche, S., & Lallier, M. (September, 2022). Cross-modal semantic context effects in beginner and advanced readers. Poster presentation at 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

15. Costello, B., Giezen, M., & Carreiras, M. (May, 2022). The role of familiarity and iconicity in the LSE lexicon. Poster presentation at Conference of the Portuguese and Spanish Societies for Experimental Psychology (SEPEX), Faro, Portugal.

16. Costello, B., Rivolta, C.L., Sánchez, N., Vera, F., & Giezen, M. (October, 2022). Familiarity and iconicity impact lexical access in LSE (Spanish Sign Language), Poster presentation at the 14th Annual Meeting of the Society for the Neurobiology of Language (SNL), Philadelphia, USA.

17. Dueme, F., Stoehr, A., & Martin, C. D. (June 2022). Late French-Spanish immersed bilinguals produce language-specific prevoiced plosives. Poster presentation at Conference on Laboratory Phonology. (online)

18. Elosegi, P., & Soto, D. (July, 2022). High-precision fMRI decoding reveals unconscious suppression of visual categories with higher-levels of semantic stimulation. Poster presentation at the Association for the Scientific Study of Consciousness, Amsterdam, The Netherlands.

19. Fahey, D., Smith, L., Mancini, S., & Matchin, W. (October, 2022). Systematic review of grammatical deficits in bilingual aphasia: Incongruous data about language separation. Poster presentation at the UIC Bilingualism Forum, Chicago, USA.

20. Ferrer-Gallardo, V.J., Esteban-Peñalba, T., Caballero-Gaudes, C., & Paz-Alonso, P.M. (May, 2022). Thalamic volume and lateralization on Parkinson Disease associated with cognitive and motor deficits. Poster presentation at the annual

meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

21. Ferrer-Gallardo, V.J.,Uruñuela, E. & Caballero-Gaudes, C. (June 2022). Blind estimation of neuronal-related activity in fMRI informed by co-fluctuations of brain regions. Poster presentation at Organization of the human brain mapping society annual meeting (OHBM 2022), Glasgow, United Kingdom

22. Ferrer-Gallardo, V.J., Esteban-Peñalba, T., Caballero-Gaudes, C., & Paz-Alonso, P.M. (Jun, 2022). Thalamic volume and lateralization on Parkinson Disease associated with cognitive and motor deficits. Poster presentation at Organization of the human brain mapping society annual meeting (OHBM 2022), Glasgow, United Kingdom.

23. Furgoni, A., Klimovich-Gray, A., Jensen, M., Højlund, A., Shtyrov, Y., Piazza, G., & Martin, C.D. (September, 2022). Spatio-temporal Investigation of the Orthographic Consistency Effect: An MEG Study.Poster Presentation at AMLaP 2022, York, United Kingdom.

24. Furgoni, A., Klimovich-Gray, A., Piazza, G., & Martin, C. (April, 2022). Time-Course and Brain Correlates of the Orthographic Consistency Effect: a Magnetoencephalography study. Poster presentation at the annual meeting of the Cognitive Neuroscience Society (CNS 2022), San Francisco, CA, USA.

25. Heinzová, P., Goral, M., Carreiras, M., & Mancini, S. (October, 2022). Processing argument structure in bilingual aphasia: a cross-linguistic comparison. Poster presentation at Academy of Aphasia, Philadelphia, USA.

26. Jevtović, M., Stoehr, A., Klimovich-Gray, A., Antzaka, A., & Martin, C.D. (January, 2022). Early readers' knowledge of phoneme-to-grapheme correspondences affects speech sound processing, Poster presentation at the First Interdisciplinary Workshop on Phonology and Dyslexia, San Sebastián, Spain.

27. Kalashnikova, M., & Naranjo, C. (May, 2022). Prosody in bilingual caregiver's infant-directed speech: Cues for infants' acquisition of their languages' intonational structure. Poster presentation at the 2022 Speech Prosody Conference, Lisbon, Portugal.

28. Kapnoula, E.C., & Samuel, A.G. (November, 2022). The role of gradient speech perception in learning non-native speech contrasts. Poster presentation at the Psychonomic Society 63rd Annual Meeting, Boston, USA.

29. Lerma-Usabiaga, G., Liu, M., Clasca, F., & Paz-Alonso, P.M. (February, 2022). Reproducible protocol to obtain and esstimate first-order human white-matter thalamocortical tracts. Poster presentation at Thalamocortical Interactions (GRS) Conference, Lucca (Barga), Italy.

30. Lerma-Usabiaga, G, Carreiras, M., & Paz-Alonso, P.M. (April, 2022). Characterization of the right ventral occipito-temporal reading network. Poster presentation at the annual meeting of the Cognitive Neuroscience Society (CNS 2022), San Francisco, CA, USA.

31. Lerma-Usabiaga, G., Vianna de Almeida, R., Carreiras, M., & Paz-Alonso, P.M. (May, 2022). White-matter connections between ventral occipito-temporal cortex and inferior frontal gyrus. Poster presentation at Conference of the Portuguese and Spanish Societies for Experimental Psychology (SEPEX), Faro, Portugal.

32. Liu, M., Lerma-Usabiaga, G., & Paz-Alonso, P.M. (June, 2022). Differential involvement of first-order thalamic nuclei in human language systems. Poster presentation at the 2022 meeting of the Organization for Human Brain Mapping (OHBM), Glasgow, UK.

33. Liu, M., Lerma-Usabiaga, G., & Paz-Alonso, P.M. (October, 2022). Differential involvement of first-order thalamic nuclei in human language systems. Poster presentation at Thalamocortical Interactions (GRS) Conference, Lucca (Barga), Italy.

34. Mancini,S., Calabria, M., Ciongoli, F, Martin, C., Marques Kiderle, S., Lleo, A., Illan-Gala, & Santos, M. (October, 2022). Morphosyntactic comprehension in primary progressive aphasia: evidence from Spanish. Poster presentation at the 14th Meeting Society for Neurobiology of Language. Philadelphia, USA.

35. Manso-Ortega, L., Carreiras, M., Pomposo, I., Gil-Robles, S., & Quiñones, I. (June, 2022). Spatial dissociation for L1 and L2 in the left temporal lobe of tumour patients and healthy subjects. Poster presentation at the 2022 meeting of the Organization for Human Brain Mapping (OHBM), Glasgow, UK.

36. Manso-Ortega, L., Carreiras, M., Pomposo, I., Gil-Robles, S., & Quiñones, I. (April, 2022). Spatial dissociation for L1 and L2 representations within the left temporal lobe. Evidence from low grade glioma patients and healthy bilingual subjects. Poster presentation at the 29th Annual Meeting of the Cognitive Neuroscience Society (CNS 2022), San Francisco, USA.

37. Martorell, J., Arellano, K., & Mancini, S. (June, 2022) Domain-general mechanisms and agreement learning in an artificial grammar. Poster presentation at Interdisciplinary Advances in Statistical Learning (BCBL), Donostia-San Sebastián, Spain.

38. Moia, S., Bright, M.G., & Caballero-Gaudes, C. (May, 2022). Self organization of breath-hold induced cerebrovascular BOLD fMRI responses reveals physiologically-driven brain parcellation and networks. Poster presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

39. Molinaro, N., Nara, S., & Carreiras, M. (August, 2022). Decoding and cross-decoding languages. Poster presentation at the Biomag 2022, Birmingham, UK.

40. Nara, S., Du Bois, N., Bhushan, B., Rathee, D., Molinaro, N., Bigirimana, A.D., Keenan, M., Yogarajah, P., Gallagher, S., & Prasad, G. (August, 2022). Valence based emotions altered by emotion judgement task: Observer or Expresser effect. Poster presentation at the Biomag 2022, Birmingham, UK.

41. Nara, S., Lizarazu, M., Klimovich-Gray, A., & Molinaro, N. (August, 2022). Expectation Suppression across visual and auditory domain: a MEG study. Poster presentation at the Biomag 2022, Birmingham, UK.

42. Pastureau, R., Lizarazu, M., & Molinaro, N. (July, 2022). The Musician Advantage in Co-Speech Gesture Processing: A MEG Experiment. Poster presentation at the 9th Conference of the International Society for Gesture Studies (ISGS), Chicago, USA.

43. Piazza, G., Furgoni, A., Klimovich-Gray, A., & Martin, C.D. (September, 2022). Eyes that hear: An MEG study on the feedback consistency effect in visual word recognition. Poster presentation at AMLaP 2022, York, United Kingdom.

44. Piazza, G., Kalashnikova, M., Fernandez-Merino, L., & Martin, C.D. (April, 2022). Teaching novel words: Can speech have various didactic functions? Poster presentation at the 10th International Symposium on the Acquisition of Second Language Speech, Barcelona, Spain.

45. Piazza, G., Kartushina, N., Flege, J.E., & Martin, C.D. (November, 2022). Comparison of Acoustic Features in Speech Production Studies Run Online and in the Lab. Poster presentation at the Psychonomic Society 63rd Annual Meeting, Boston, USA.

46. Pinet, S., Alario, F., Zielinski, C., & Longcamp, M. (August, 2022). Typing expertise in a large student population. Poster presentation at 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

47. Pinet, S., & Nozari, N. (June, 2022). Not all language control is the same: insights from EEG data. Poster presentation at the 12th International Workshop on Language Production, Pittsburgh, USA.

48. Pirnia, T., Pinet, S., Nozari, N., & Wehbe, L. (June, 2022). Can machine learning help us better understand cognitive control in language production through EEG data? Poster presentation at the 12th International Workshop on Language Production, Pittsburgh, USA.

49. Połczyńska, M., Manso-Ortega, L., De Frutos, L., Gisbert-Muñoz, S., & Salamon, N., Qiao, J., Walshaw, P., & Quiñones, I. (November, 2022). How does a brain tumor within the language network mediate grey matter volume? Poster presentation at the Society for Neuroscience (SfN), San Diego, USA.

50. Provins, C., Marklewicz, C.J., Ciric, P., Goncalves, M., Caballero-Gaudes, C., Poldrack, R. A., Hagmann, P., & Esteban, O. (May, 2022). Quality control and nuisance regression of fMRI, looking out where signal should not be found. Poster presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

51. Rodríguez-Gonzalo, S., & Paz-Alonso, P. M. (April, 2022). Functional interactions between semantic and episodic memory retrieval in relational binding. Poster presentation at the 29th Annual Meeting of the Cognitive Neuroscience Society (CNS 2022), San Francisco, USA.

52. Rodríguez-San Esteban, P., Chica, A., & Paz-Alonso, P. (May, 2022). Parieto-occipital connectivity during correct and incorrect feature integration.Poster presentation at Conference of the Portuguese and Spanish Societies for Experimental Psychology (SEPEX), Faro, Portugal.

53. Ruzzoli, M. (May, 2022). Post-conflict attention adjustments: A test for proactive mechanisms reflected in frontal-parietal oscillations. Poster presentation at the 14th International Conference of Cognitive Neuroscience, Espoo, Finland.

54. Ruzzoli, M., Fracasso, A., Thut, G., & Veniero, D. (August, 2022). The influence of occipito-parietal alpha phase on motor preparation and

visual processing. Poster presentation at the 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

55. Thomas, T., Llorach, G., Martin, C., & Caffarra, S. (August, 2022). Listening effort across accents: Does it affect memory? Poster presentation at 22nd Conference of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

56. Zjakic, H., Lallier, M., & Kalashnikova, M. (July, 2022). Early Prediction-Based Learning in Monolingual and Bilingual Infants. Poster presentation at the 2022 International Congress of Infant Studies (ICIS), Ottawa, Canada.

57. Zvolanek, K.M., Moia, S., Stickland, R., Caballero-Gaudes, C., & Bright, M.G. (May, 2022). Respiration volume per time (RVT) as a surrogate for end-tidal CO2 to map hemodynamic lag with BOLD fMRI. Poster presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

ORAL PRESENTATIONS

1. Alemán Bañón, J., & Martin, C.D. (October, 2022). Examining lexicosemantic predictions among advanced L1-Swedish learners of English. Oral presentation at Bilingualism Matters Research Symposium (BMRS), Edinburgh, UK.

2. Amoruso, L. (September, 2022). Left and right prefrontal routes to action comprehension.Oral presentation at the Congress of the Italian Society of Psychophysiology (SIPF), Udine, Italy.

3. Arellano-Garcia, K., Freijo, M.M., Soto, D., & Mancini, S. (November, 2022). Recuperación de habilidades de dominio general y lingüísticas después de un evento cerebrovascular: un estudio longitudinal. Oral presentation at 11º Encuentro en Neuropsicología de la Facultad de Psicología, UNAM, Mexico (Online event).

4. Calabria, M., Ciongoli, F., Martin, C., Mancini, S., Marqués Kiderle, S., Sala, I., Zhu, N.,Sánchez-Saudinós, M.B., Fortea, J., Lleó, A., Illán-Gala, I., & Santos-Santos, M.A. (July, 2022). Phonological and Semantic Features of Lexical Retrieval in Primary Progressive Aphasia.Oral presentation at the International Neuopsychological Society, Barcelona, Spain.

5. Carrión-Castillo, A., & Boeckx, C. (September, 2022). The Genetic Architecture of Cerebellar lobules, Their Evolutionary History and Genetic Overlap with Psychiatric Disorders and Cognitive Traits.Oral presentation at the World Congress of Psychiatric Genetics (WCPG), Florence, Italy.

6. Caudrelier, T., Clark, C., Jacobsen, J., & Martin, C. D. (October, 2022). Can color cues help learning novel English words when pronunciation is not predictable from spelling? Oral presentation at the Bilingualism Matters Research Symposium (BMRS), Edinburgh and online, UK.

7. Costello, B., Giezen, M., & Carreiras, M. (May, 2022). The role of familiarity and iconicity in the LSE lexicon. Oral presentation at the APPE-SEPEX meeting, Algarve, Portugal.

8. Costello, B., Rivolta, C. L., Vera, F., Giezen, M., & Carreiras, M. (November, 2022). ¿Icónico = fácil? El papel de la iconicidad en el léxico de la LSE.Oral presentation at the Congreso CNLSE, Madrid, Spain.

9. De Bruin, A., Hoversten, L.J. & Martin, C.D. (November, 2022). Apple, Pomme, or manzana? Language interference and inhibition during trilingual language production. Oral presentation at Psychonomic Society 63rd Annual Meeting, Boston, USA.

10. De Bruin, A., Hoversten, L.J. & Martin, C.D. (November, 2022). Apple, Pomme, or manzana? Language interference and inhibition during trilingual language production.Oral presentation at the ESCoP 2022, Lille, France.

11. Dueme, F., Stoehr, A., & Martin, C.D. (August, 2022). Conflicting grapheme-phoneme mappings lead to the production of hybrid L1/L2 sounds by immersed bilinguals Oral presentation at the 4th International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC 2022), Tromso, Norway.

12. Dueme, F., Martin, C.D., & Stoehr, A. (April, 2022). The presence of orthography during novel sound learning reshapes native speech sound categories. Oral presentation at the 10th International Symposium on the Acquisition of Second Language Speech (New Sounds 2022), Barcelona, Spain.

13. Elosegi, P., & Soto, D. (October, 2022). Semantic evidence accumulation without metacognition and awareness: evidence from psychophysical and decoded fMRI studies. Oral presentation at Scientific Conference about Attention RECA XIII, Granada, Spain.

14. Fernández-Merino, L., Lizarazu, M., Molinaro, N., & Kalashnikova, M. (July, 2022). Follow the rhythm: Basque-Spanish bilingual infants' cortical

tracking of speech after brief exposure to music. Oral presentation at the International Congress of Infant Studies (ICIS 2022), Ottawa, Canada.

15. Fernández-Merino, L., Lizarazu, M., Molinaro, N., Kalashnikova, M. (June, 2022). The rhythm takes it all: A developmental approach to Basque-Spanish bilingual speakers' cortical tracking of speech after brief exposure to music. Oral presentation at the Workshop on Infant Language Development (WILD), Donostia, Spain.

16. Gosselin, L., Martin, C.D., Gonzalez Martin, A., & Caffarra, S. (August 2022). When a non-native accent lets you spot all the errors: Examining the syntactic interlanguage benefit.Oral presentation at the ESCoP 2022, Lille, France.

17. Gurtubay-Antolin, A., Bruña R., Collignon O., & Rodríguez-Fornells, A. (July, 2022). Alpha-band oscillations reflect tactile attention via the engagement of occipital regions in early blindness. Oral presentation at the Neurogune 2022 meeting, Pamplona, Spain.

18. Jevtović, M., Antzaka, A., & Martin, C.D. (August, 2022). How would you spell it? A cross-linguistic investigation of the role of orthography in auditory word learning. Oral presentation at the 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

19. Kalashnikova, M. (July, 2022). Speech perception development in bilingual infants' first year of life. Oral presentation at the International Congress on Infant Studies (ICIS), Ottawa, Canada.

20. Kalashnikova, M., Bevivino, D., & Singh, L. (July, 2022). Attention and labelling in monolingual and bilingual caregiver-infant interactions. Oral presentation at the International Congress on Infant Studies (ICIS), Ottawa, Canada.

21. Kapnoula, E.C., & Samuel, A.G. (January, 2022). Immediate (but not delayed) production hurts word learning. Oral presentation at the Experimental Psychology Society Meeting, London, UK, online event.

22. Kartushina, N., Munoz, L., Martin, C.D., Baart, M. (August, 2002). Transfer of L2 speech sound production training to perception: Insights from the discrimination task and the MMN. Oral presentation at the 4th International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC 2022), Tromso, Norway.

23. Kartushina, N. & Martin, C. (April, 2022). Full story on L2 sound production training: short- and long-term effects and generalization to words and speakers.Oral presentation at the New Sounds 2022, the 10th International Symposium on the Acquisition of Second Language Speech, Barcelona, Spain.

24. Lallier, M., & Antzaka, A. (August, 2022). Contribution of alpha-rate visual attentional tracking to reading acquisition. Oral presentation at the 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

25. Liu, M., Lerma-Usabiaga, G., & Paz-Alonso, P.M. (October, 2022). Differential involvement of first-order thalamic nuclei in human language systems. Oral presentation at the GRS thalamocortical interactions conference, Lucca, Italy.

26. Mei, N., Santana, R., & Soto, D. (October, 2022). Informative neural representations of unseen contents during higher-order processing in human brains and deep artificial networks. Oral presentation at Scientific Conference about Attention RECA XIII, Granada, Spain.

27. Moia, S., Chen, G., Uruñuela, E. Stickland, R., Termenon, M., Caballero-Gaudes, C., & Bright, M.G. (May, 2022). Resting state fluctuations in BOLD fMRI might not systematically reflect measures of cerebrovascular physiology between or within subjects. Oral presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

28. Moscati, V., Biondo, N., & Marini, A. (May, 2022). What a thousand children tell us on grammatical complexity and working memory: a large-scale study on argument dislocation in passives and clitic structures in Italian. Oral presentation at XII Edition of CLASTA Days, Florence, Italy.

29. Quiñones, I. (March, 2022). Language (re)organization in bilingual brain tumor patients: Evidence from fMRI and MEG. Oral presentation at VI International Congress of Clinical Linguistics, Santiago de Compostela, Spain.

30. Ruzzoli, M., Ince, R., Vallesi, A., & Thut, G. (August, 2022). Post-conflict attention adjustments: A test for proactive mechanisms reflected in frontal-parietal oscillations. Oral presentation at the 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

31. Ruzzoli, M., Keitel, C. (May, 2022). Perceptual sampling: a historical perspective. Oral

presentation at Symposium "Rhythms in Cognition: Revisiting the Evidence" at the 14th International Conference of Cognitive Neuroscience to be held on May 18-22, 2022 in Espoo, Finland.

32. Piazza, G., Kalashnikova, M., & Martin, C.D. (September, 2022). Exposure to Foreigner directed speech enhances L2 word learning. Is that true? Oral presentation at the XXX annual meeting of the Association of Italian Psychology (AIP), Padova, Italy.

33. Pinet, S.*, Goddard, K.*, Kartushina, N., Koutsogiannaki, M., & Martin, C (August, 2022). Auditory feedback alteration can help reduce foreign accent in non-native speech production. Oral presentation at the 22nd meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

34. Samuel, A.G. & Dumay, N. (November, 2022). How Active are Sublexical and Lexical Representations, 12 Hours after they Have Been Used to Understand Speech? Oral presentation at the Psychonomic Society 63rd Annual Meeting, Boston, USA.

35. Souganidis, C., Molinaro, N., & Stoehr, A. (April, 2022). Bilinguals speaking two prevoicing languages produce language-specific voice onset time. Oral presentation at the International Symposium on Monolingual and Bilingual Speech (ISMBS 2022), Online/Lafayette, USA.

36. Stoehr, A., Jevtović, M., de Bruin, A., & Martin, C.D. (August, 2022). L3-to-L2 versus L3-to-L1 transfer in Spanish-Basque-English trilinguals: Evidence from phonetics and the lexicon. Oral presentation at the 4th International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC), Tromsø, Norway.

37. Stoehr, A., Jevtović, M.,de Bruin, A., & Martin, C.D. (September, 2022). Regressive phonological transfer in early bilingual Spanish-Basque learners of English. Oral presentation at the 12th international conference on third language acquisition and multilingualism (IAML3), Zagreb, Croatia.

38. Thomas, T., Llorach, G., Martin, C., & Caffarra, S. (September, 2022). Does accented speech affect attention and information retention? Oral presentation at the 4th International Symposium on Applied Phonetics, Lund, Sweden.

39. Tobías, C. (May, 2022). Automatic detection of spatio-temporal patterns of interictal epileptic activity with fMRI. Oral presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

40. Tobias, C., Uruñuela, E., Ferrer-Gallardo, V., Goldberg, H., Engelman, C., Lowe, M., Jones, S., & Caballero-Gaudes, C. (May, 2022). Automatic detection of spatio-temporal patterns of interictal epileptic activity with fMRI. Oral presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

41. Uruñuela, E. (December, 2022). Tedana: Analysis of echo-time dependent fMRI data. Oral presentation at MRI Together 2022, online.

42. Uruñuela, E. (December, 2022). Denoising of multi-echo fMRI data with tedana. Oral presentation at MRI Together 2022, online.

43. Uruñuela, E., Moia, S., & Caballero-Gaudes, C. (May, 2022). A multi-echo low-rank and sparse algorithm that reduces the bias of global fluctuations on the estimation of neuronal signal. Oral presentation at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM 2022), London, United Kingdom.

INVITED TALKS

1. Amoruso, L., Quiñones, I., Gil-Robles, S., Iñigo Pomposo, I., & Carreiras, M. (May, 2022). Beyond language mapping in brain tumor patients: Plastic changes in the MNS as revealed by MEG and fMRI. Invited talk at the Body Lab-University of Udine, Udine, Italy.

2. Caballero-Gaudes, C. (December, 2022). Towards individual cerebrovascular reactivity mapping BOLD fMRI Place. Invited talk at Bulte Lab, Institute of Biomedical Engineering, University of Oxford, Oxford, UK.

3. Carreiras, M. (May, 2022). El cerebro lector. Invited talk at 10 Aniversario BCBL JuniorLab, Carmelitas, Sagrado Corazón, Vitoria, Spain.

4. Carreiras, M. (June, 2022). Neuro desarrollo. Qué son los trastornos del Neurodesarrollo. Importancia de la detección e intervención temprana. Invited talk at Cursos de Verano 2022, UPV/EHU, San Sebastián, Spain.

5. Carreiras, M. (September, 2022). Plasticity in the bilingual brain. Invited talk at Science of Apahsia 2022, Université de Bordeaux, Bordeaux, France.

6. Carreiras, M. (October, 2022). Cerebro y lenguaje. Invited talk at Trabalengua 2022,

Fundación San Millán de la Cogolla, Logroño, Spain.

7. Carreiras, M. (December, 2022). Cognitive Neurosurgery in the bilingual brain.Invited talk at Cognitive Neurosurgery Summit, Barakaldo, Spain.

8. Caudrelier, T. (May, 2022). Altered auditory feedback experiments exploring the grain-size of speech production representations. Invited talk at ZASx Talks: Phonetics & Phonology Series, Leibniz, Germany, online event.

9. Caudrelier, T. (August, 2022). What can be investigated with altered auditory feedback experiments? A review of formants perturbation experiments. Invited talk at the 8th International Conference on Speech Motor Control (SMC), Gröninguen, the Netherlands.

10. Cespón, J. (September, 2022). Behavioural and electrophysiological modulations induced by transcranial direct current stimulation in healthy elderly and Alzheimer's disease. Invited talk at XIX Congreso de Psicogeriatría, Valladolid, Spain.

11. Hernández-Gutiérrez, D. (December, 2022). The social and multimodal nature of human language. Invited talk at Psycholinguistics Coffee, the University of Edinburgh, UK.

12. Kapnoula, E.C. (April, 2022). Individual differences in speech perception gradiency: Sources and consequences. Invited talk at the Language and Brain Lab, University of Connecticut, CT, USA.

13. Kapnoula, E.C. (June, 2022). Word is as word does: A functional definition of word learning. Invited talk at the SCALab - Laboratoire de Sciences Cognitives et Affectives, University of Lille, France.

14. Kapnoula, E.C. (September, 2022). Towards a common framework for L1/L2 novel word learning: Lexicalization as a gradual process towards automaticity. Invited talk in Casalis, S. (chair) L1/L2 novel word learning: Investigating methodological issues and orthographic and semantic aspects. Symposium at the 22nd Meeting of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

15. Kapnoula, E.C. (December, 2022). Examining the links between subphonemic sensitivity and nonnative speech perception. Invited talk in Sarrett, M. & Toscano, J. (chairs) Bilingualism and the Brain. Symposium at the 183rd Meeting of the Acoustical Society of America (ASA), Nashville, USA.

16. Lallier, M. (July, 2022) Heterogeneity of the neurocognitive bases of developmental dyslexia. Invited talk at Franck Ramus's Elman prize Symposium at the 44th Annual Meeting of the Cognitive Science Society. Toronto, Canada.

17. Martin, C.D. (September, 2022). Language comprehension in accented speech. Invited talk at Forum for Clinical linguistics and Language acquisition, University of Oslo, Norway.

18. Martin, C.D. (September,2022). CV improvement and Grant application. Invited talk at Career development workshop, University of Oslo, Norway.

19. Martin, C.D., Branzi, F., Bar, M. (August, 2022). Prediction is Production: The Missing Link between Language Production and Comprehension. Oral presentation at Collaborative Symposium: Linking language perception and production: Latest insights and future directions, at 22nd Conference of the European Society for Cognitive Psychology (ESCoP 2022), Lille, France.

20. Martin, C.D. (May, 2022). Synonyms and Homographs in the Bilingual Brain. Invited talk at Language, Culture and Acculturation workshop, Red ACELERA and the 5th Annual Meeting of the Society for the Cognitive Science of Culture, University of Nebrija, Madrid, Spain.

21. Martin, C.D., Jevtovic, M., & Stoehr, A. (February, 2022). Speech sound perception and production: Influence of orthography. Invited talk at Virtual Psycholinguistics Forum, The Chinese University of Hong Kong.

22. Magnuson, J.S. (March, 2022). Computational thinking: An overview of modeling in the cognitive and neural sciences. Invited talk at EDULANG Workshop, Norwegian National University of Science & Technology, Trondheim, Norway.

23. Mancini, S. (March, 2022). Nuevas perspectivas en la evaluación del lenguaje tras un daño cerebral. Invited talk at jornada "Nuevas Tecnologías en Neurorrehabilitación", Colégio de Médicos de Zaragoza, Zaragoza. Spain.

24. Martorell, J. (January, 2022). Synchronization between brain rhythms and syntax in language comprehension. Invited talk at seminar of GRESIB & LICLE groups, Universitat de les Illes Balears (UIB), online event.

25. Molinaro, N. (July, 2022). Predictive what and when across sensory modalities. Invited talk at TEX2022: Bringing together Predictive Processes and Statistical Learning. Trieste, Italy.

26. Molinaro, N. (November, 2022). Predicting what and when across sensory modalities. Invited talk at University of Aberdeen, Aberdeen, UK.

27. Ruzzoli, M. (July, 2022). Open and reproducible neuroimaging: from study inception to publication. Invited talk at symposium Open Cognitive Neuroscience: new technologies, old questions (Think Open Initiative) at CIMeC, University of Trento, Italy. (Virtual event).

28. Paz-Alonso, P.M. (March, 2022). Functional specialization and plasticity in adult language learners. Invited talk at the Max Planck Institute for Human Development, Berlin, Germany.

29. Paz-Alonso, P.M. (July, 2022). Involvement of magnocellular and parvocellular pathways in reading. Invited talk at the Centro de Investigación en Mente, Cerebro y Comportamiento (CIMCYC) of the University of Granada, Spain.

30. Pinet, S. (May, 2022). Language production through speaking and typing. Invited talk at Laboratoire de Neurosciences Cognitives, Marseille, France.

31. Ruzzoli, M. (April, 2022). Does 10 Hz matter? Recap over 90 years of the alpha rhythm. Invited talk at the Integrative Neuroscience and Cognition Center, Université Paris Cité, Paris, France.

32. Samuel, A.G. (June, 2022). Cognitive Dynamics of Lexical and Phonetic Interactions during Speech Perception. Keynote talk at Interdisciplinary Approaches to the Language Sciences, Nijmegen, Netherlands, online event.

33. Samuel, A.G. (June, 2022). Speech Perception and Speech Production: Friends, Enemies, or Frenemies? Invited talk at Building Linguistic Systems, at York, UK.

34. Souganidis, C. (December, 2022). Phonetic categories in the bilingual mind. Invited talk at the LingLab, Aristotle University of Thessaloniki, Thessaloniki, Greece.

35. Uruñuela, E. (November, 2022). Paradigm Free Mapping: Extending the algorithms that blindly estimate neuronal-related activity from fMRI data. Invited talk at Bulte lab, Institute of Biomedical Engineering, University of Oxford, Oxford, UK.

2023

POSTER PRESENTATIONS

1. Abu El Adas, S., & Lallier, M. (June, 2023). The relationship between speech production and phonological processing in children learning to read. Poster presentation at International Workshop on Reading and Developmental Dyslexia, San Sebastián, Spain.

2. Abu El Adas, S., Yen, I., & Levi., S. (August, 2023). Does talker variability help adults learn novel words? Poster presentation at the 20th International Congress of Phonetic Sciences, Prague, Czech Republic.

3. Abu El Adas, S., Yen, I., & Levi, S. (May, 2023). Influences of talker variability, reading ability, and language ability on word learning. Poster presentation at the Acoustical Society of America, Chicago, USA.

4. Amoruso, L., Moguilner, S., Castillo, E. M., Kleineschay, T., Muñoz, E., Carreiras, M., & Garcia, A. M. (October, 2023). Spatio-temporal signatures of social verb processing in the human brain: An MEG study. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

5. Arellano-Garcia, K., Gorostiola-Oyarzabal, N., Freijo, M.M., Soto, D., & Mancini, S. (October, 2023). Metacognition of language and domain-general abilities after stroke. Poster presentation at the 61st Annual Meeting of the Academy of Aphasia, Reading, UK.

6. Arellano-Garcia, K., Gorostiola-Oyarzabal, N., Freijo, M.M., Soto, D., & Mancini, S. (October, 2023). The role of domain-general abilities in language recovery following acute stroke. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

7. Arrieta, I., Caballero-Gaudes, C., Martinez, Z., Altuna, X., Carreiras, M., & Kalashnikova, M. (October, 2023). Neuro-behavioural correlates of audio-visual speech perception at different speech intelligibility levels. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

8. Biondo, N., Pracar, A.L., Baldo, J., Dronkers N.F., & Ivanova M.V. (October, 2023). Grey and white matter substrates of syntactic comprehension: lesion-symptom mapping and indirect structural disconnection mapping on 130 left-hemisphere stroke survivors. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

9. Biondo, N., Ivanova, M.V., Pracar, A., Baldo, J., & Dronkers, N.F. (March, 2023). Cortical regions supporting syntactic comprehension: A lesion-

symptom mapping study. Poster presentation at the 30th Anniversary Meeting of the Cognitive Neuroscience Society (CNS), San Francisco, USA.

10. Carrión-Castillo, A., Lallier, M., & Carreiras, M. (June, 2023). Cognitive mechanisms underlying reading in Spanish. Poster presentation at International Workshop on Reading and Developmental Dyslexia. San Sebastián, Spain.

11. Carrión-Castillo, A., Lallier, M., & Carreiras, M. (June, 2023). Examining genetic effects on reading related traits through polygenic scores in two independent datasets. Poster presentation at the 2023 Behavior Genetics Association Annual Meeting, Murcia, Spain.

12. Cavaluzzi, R., Abu El Adas, S., & Lallier M. (June, 2023). Acoustic Durations of Speech Production of Children with DLD. Poster presentation at International Workshop on Reading and Developmental Dyslexia. San Sebastián, Spain.

13. Caudrelier, T., Ménard, L., Beausoleil, M-M., Samuel, A., & Martin, C.D. (October 2023). When Jacques isn't Jack: Simultaneous opposite language-specific speech perceptual learning in French-English bilinguals. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

14. Chavarría, I., Vidorreta, M., Fernández-Seara, M., Caballero-Gaudes, C. (July, 2023). Calibrated fMRI with a background-suppressed pCASL/multi-echo BOLD dual-acquisition sequence. Poster presentation at the ISMRM Iberian Chapter Annual meeting 2023, Valladolid, Spain.

15. Chavarría, I., Vidorreta, M., Fernández-Seara, M.A., & Caballero-Gaudes, C. (November, 2023). Calibrated fMRI sequence with a background-suppressed pCASL/multi-echo BOLD dual-acquisition. Poster presentation at ICP Network meeting, Utrecht, The Netherlands.

16. Cieśla, M., Jankowiak, K., Pozdniakov, M., & Kapnoula, E.C. (August, 2023). Comparing L2 word learning using orthography versus visual referents. Poster presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

17. Cieśla, M., Jankowiak, K., Pozdniakov, M., & Kapnoula, E.C. (September, 2023). Comparing L2 word learning using orthography versus visual referents. Poster presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

18. Clark, C., Calabrich, S.L., Lee, T., Guediche, S., Lallier, M., & Jones, M. (June, 2023). The influence of orthographic depth on learning and consolidating novel written words. Poster presentation at International Workshop on Reading and Developmental Dyslexia. San Sebastián, Spain.

19. Comella, C., Quiñones, I., Gil Robles, Pomposo, I. Carreiras, M, & Caballero-Gaudes, C. (July, 2023). Enhancing glioma neurosurgery by mapping cerebrovascular reactivity and vascular lag with multi-echo BOLD fMRI. Poster presentation at ISMRM Iberian Chapter Annual Meeting 2023, Valladolid, Spain.

20. de Frutos-Sagastuy, L., Quiñones, I., Carreiras, M., & Amoruso, L. (May, 2023).Mapping social cognition in the right hemisphere. Intraoperative evidence from glioma patients. Poster presentation at 4th GliMR Annual Meeting 2023, Porto, Portugal.

21. de Frutos-Sagastuy, L., Quiñones, I., Gil-Robles, S., Pomposo, I., Bermúdez, G., Carreiras, M., & Amoruso, L. (October, 2023). Action comprehension assessment during intraoperative mapping in patients with right hemisphere gliomas. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

22. de Frutos-Sagastuy, L., Quiñones, I., Gil-Robles, S., Pomposo, I., Bermúdez, G., Carreiras, M., & Amoruso, L. (June, 2023). Mapeo de la cognicion social en el hemisferio derecho y evidencia intraoperatoria de pacientes con glioma. Poster presentation at JIFFI, Universidad de Granada, Granada, Spain.

23. Elosegi, P., Rahnev, D., & Soto, D. (June, 2023). Think Twice: postdecision deliberation enhances metacognitive sensitivity. Poster presentation at the Association for the Scientific Study of Consciousness, New York University, New York, USA.

24. Ershaid, H., Lizarazu, M., & Lallier, M. (October, 2023). The Impact of Dual-Language Context Exposure on Interhemispheric Connectivity and Reading Development in Bilingual Basque-Spanish Children. Poster presentation at the CuttingGardens - Donostia 2023, San Sebastián, Spain.

25. Ershaid, H., Lizarazu, M., McLaughlin, D.J., Cooke, M., Simantiraki, O., Koutsogiannaki, M., & Lallier, M. (May, 2023). Listening Effort Contributes to Cortical Tracking of Speech in Adverse Listening Conditions. Poster presentation at the XVI International Symposium of Psycholinguistics

(ISP), Vitoria, Spain.

26. Ershaid, H., Lizarazu, M., McLaughlin, D., Koutsogiannaki, M., & Lallier, M. (June, 2023). The contribution of listening effort to cortical tracking of speech and its relation to phonological and reading skills in distinct adverse conditions. Poster presentation at International Workshop on Reading and Developmental Dyslexia. San Sebastián, Spain.

27. Ferrer-Gallardo, V., Delgado-Alvarado, M., Paz-Alonso, P.M., Rodriguez-Oroz, M.C., & Caballero-Gaudes, C. (September, 2023). Innovation Coactivation Patterns Affected in Parkinson`s Disease Mild Cognitive Impairment. Poster presentation at ISMRM 2023 Workshop on Current Issues in Brain Function, Padua, Italy.

28. Ferrer-Gallardo, V., Yendiki, A., Paz-Alonso, P.M., & Caballero-Gaudes, C. (June, 2023). Anterior thalamic radiations changes in Parkinson's disease. Poster presentation at ISMRM Iberian Chapter Annual Meeting 2023, Valladolid, Spain.

29. Ferrer-Gallardo, V., Yendiki, A., Paz-Alonso, P.M., & Caballero-Gaudes, C. (July, 2023). Microstructural changes in anterior thalamic radiations in Parkinson's disease cognitive decline.Poster presentation at the 2023 meeting of the Organization for Human Brain Mapping (OHBM), Montreal, Canada.

30. Flores-Coronado, M.A., Ciria, A., & Lara, B. (May, 2023). Hebbian-learning based predictions during audio-visual processing account for the McGurk effect. Poster presentation at the XVI International Symposium of Psycholinguistics (ISP), Vitoria, Spain.

31. Garcia, A. M, Quiñones, I., Carreiras, M., & Amoruso, L. (October, 2023). Decoding bilingualism: Insights from resting-state oscillatory network organization. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

32. Gür, E., Samuel, A.G., & Kapnoula, E.C. (November, 2023). Phonological Neighborhood Density Effects on Spanish Spoken Word Recognition and Word Learning. Poster presentation at the 64th meeting of the Psychonomic Society, San Francisco, USA.

33. Hernández-Gutiérrez, D., Pastureau, R., Klimovich-Gray, A., Lizarazu, M., & Molinaro, N. (May, 2023). Semantic and syntactic neural tracking in audiovisual discourse processing. Poster presentation at MMSYM: 1st International Multimodal Communication Symposium, Barcelona, Spain.

34. Hernández-Gutiérrez, D., Pastureau, R., Matar, S., Lizarazu, M., & Molinaro, M. (October, 2023). Neural dynamics of high-level linguistic predictions during natural audiovisual discourse processing. Poster presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

35. Ibarbia-Garate, M., & Paz-Alonso, P.M. (October, 2023). A parvocellular-magnocellular functional gradient in human visual cortex. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

36. Kalashnikova, M., Burnham, D., & Goswami, U. (June, 2023). Seeds of literacy: Auditory rise time discrimination in infancy and pre-reading abilities in preschool. Poster presentation at the International Workshop on Reading and Developmental Dyslexia, San Sebastian, Spain.

37. Kalashnikova, M., Fernandez-Merino, L., & Molinaro, N. (October, 2023). Infant-Directed Speech: An Optimal Signal for Early Speech Processing. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

38. Kapnoula, E.C. & Samuel, A.G. (May, 2023). Examining the links between L1 phoneme categorization and non-native phonetic learning. Poster presentation at the XVI International Symposium of Psycholinguistcs, Vitoria-Gasteiz, Spain.

39. Kapnoula, E.C., & Samuel, A.G. (September, 2023). Linking L1 Phoneme Categorization To Non-native Phonetic Learning: The Role Of Gradiency. Poster presentation at the 23rd meeting of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

40. Katsika, K., Tsaroucha, A., & Allen, S.E.M. (September, 2023). Discourse production strategies in English-dominant Greek heritage speakers: a corpus analysis of openings and closings. Poster presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

41. Kim, S., Cortese, A., & Soto, D. (January, 2023). Confidence Prediction Error: A Metacognitive Monitoring and Teaching Signal in a Reward-Based Problem-Solving. Poster presentation at Winter Workshop Mechanism of Brain and Mind, Hokkaido, Japan.

42. La Pietra, M., Martínez Martín, L., Aulestia Padilla, E., Malagón Azpeitia, M., Pello González, D., Campo Jurado, S., Martinez, X. A., Ragua Miranda, N., Vasquez Cedre, A. M., Zabaleta Urrosolo, I., & Ruzzoli, M. (October, 2023). Science, Art, and Technology: Integrating a portable EEG system prototype into an Art Exhibition. Poster presentation at the CuttingGardens - Donostia 2023, Donostia/San Sebastián, Spain.

43. Lallier, M., Perez-Navarro, J., & Ordin, M. (September, 2023). Enhanced reading skills are associated with auditory spatial attentional rebalance induced by the exposure to dual-language contexts. Poster presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

44. Lecca-Villacorta, L., Lerma-Usabiaga, G., & Paz-Alonso, P.M. (October, 2023). Thalamic changes in gray- and white-matter over the lifespan related to language development. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

45. Lei, Y.N., Paz-Alonso P.M., & Lerma-Usabiaga, G. (October, 2023). Quantification of reading circuits in the ventral occipitotemporal cortex. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

46. Li, P., Flege, J., Martin, C.D., & Kartushina, N. (September, 2023). Regressive transfer from L2 to L1 in speech production after a study abroad program. Poster presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

47. Linhardt, D., Windischberger, C., Paz-Alonso, P.M., & Lerma-Usabiaga, G. (May, 2023). Simple, automatized and reproducible pRF analysis. Poster presentation at the Annual Meeting of the Vision Sciences Society (VSS), St. Pete Beach, Florida, USA.

48. Lizarazu, M., Carreiras, M., & Molinaro, N. (April, 2023). The proficiency level in language has an impact on the modulation of theta-gamma phase amplitude coupling in the auditory cortex: an MEG Experiment. Poster presentation at the Brain Rhythms and Cortical Computation (BrhyCoCo) conference, Paris, France.

49. Magnuson, J.S., Saltzman, D., Luthra, S., Crinnion, A.M., Grubb, S., Peraza-Santiago, G., Dalal, P., Daniel, J., & Xie, B. (September, 2023). Neighbors (and Other Factors) -- But Not Cohorts -- Predict Spoken Word Recognition Performance In Decision Tasks. Poster presentation at the 23rd Conference of the European Society for Cognitive Psychology, Porto, Portugal.

50. Malharin, I., & Magnuson, J.S. (October, 2023). Double dissociations emerge in a "flat" attractor network. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

51. Manso-Ortega, L., Gil Robles, S., Pomposo, I., Bermudez, G., Amoruso, L., Carreiras, M., & Quiñones, I. (October, 2023). Structural and functional mechanisms of reorganization for language compensation in patients with diffuse low-grade gliomas in the left hemisphere. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

52. Manso-Ortega, L., Gil Robles, S., Pomposo, I., Bermudez, G., Carreiras, M., & Quiñones, I. (May, 2023). Compensation of language function in patients with diffuse low grade gliomas evidenced by functional and structural reorganization.Poster presentation at 4th GliMR Annual Meeting 2023, Porto, Portugal.

53. Manso-Ortega, I., Gil Robles, S., Pomposo, I., Bermudez, G., Carreiras, M., & Quiñones, I. (August, 2023). Compensation of language function in patients with diffuse low grade gliomas evidenced by functional and structural reorganization. Poster presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

54. Mao, J., Yan, X., Li, W., & Cao, F. (October, 24). Neural Mechanisms of Spanish Speech Imitation in Chinese-English Bilingual Adults. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

55. Martorell, J., Molinaro, N., Di Liberto, G., & Meyer, L. (October, 2023). Temporal prediction and the neural tracking of linguistic structures. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

56. McLaughlin, D.J., & Van Engen, K.J. (August, 2023). American listeners' recognition of sentences unaffected by racial and ethnic primes. Poster presentation at International Congress of Phonetic Sciences, Prague, Czech Republic.

57. Mengxing, L., Lerma-Usabiaga, G., & Paz-

Alonso, P.M. (October, 2023). Involvement of first-order thalamic nuclei in human language systems: Functional and structural correlates. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

58. Mornati, G., Molinaro, N., Lallier, M., Carreiras, M., & Kalashnikova, M. (August, 2023). Cortical Tracking of Native and Non-native Speech by Monolingual and Bilingual Four-month-old Infants. Poster presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

59. Mornati, G., Molinaro, N., Lallier, M., Carreiras, M., & Kalashnikova, M. (October, 2023). Developmental trajectory of cortical tracking of native and non-native speech stimuli in monolingual and bilingual infants.Poster presentation at the 15 meeting of the Society for the Neurobiology of Language (SNL), Marseille, France.

60. Mornati, G., Molinaro, N., Lallier, M., Carreiras, M., & Kalashnikova, M. (October, 2023). Developmental trajectory of cortical tracking of native and non-native speech stimuli in monolingual and bilingual infants. Poster presentation at Cutting Gardens, Donostia-San Sebastian, Spain.

61. Pérez-Navarro, J., Molinaro, N., Piazza, G., Klimovich-Gray, A., Lizarazu, M., & Lallier, M. (October, 2023). The contribution of early language experience to the cortical tracking of speech: evidence from bilingual children. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

62. Pinet, S., Paz-Alonso, P.M, & Martin, C.D. (October 2023). Touch typing changes the way you speak: interactions between modalities of language production. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

63. Pracar, A.L., Biondo, N., Baldo, J., Ivanova, M.V., & Dronkers, N.F. (November, 2023). White Matter Tracts in Language Processing: Insights from Structural Disconnection Mapping. Poster presentation at Neuroscience 2023 annual meeting of the Society for Neuroscience (SfN), Washington D.C., USA.

64. Pracar, A.L., Biondo, N., Ivanova, M.V., & Dronkers, N.F. (October, 2023). Exploring the neural substrate of motor speech: Insights from multiple cases of chronic pure apraxia of speech. Poster presentation at the 61st Annual Meeting of the Academy of Aphasia, Reading, UK.

65. Pracar, A.L., Ivanova, M.V., Llorens, A., Biondo, N., Staveland, B.R., Quiroga-Martinez, D.R., Brunner, P., Knight, R.T., & Dronkers, N.F. (October, 2023). Neural Mechanisms of Song vs Speech Production: Insights from Aphasia and Intracranial Recording. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

66. Rivolta, C.L., Costello, B., Lizarazu, M., & Carreiras, M. (October, 2023). Do the eyes retune the ears? MEG evidence that sign language knowledge affects how we process spoken language. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

67. Rodriguez-Gonzalo, S., & Paz-Alonso, P.M. (July, 2023). Impact of semantic memory on episodic relational binding during healthy aging. Poster presentation at the 2023 meeting of the Organization for Human Brain Mapping (OHBM), Montreal, Canada.

68. Sánchez, A., Paz-Alonso, P.M., & Carreiras, M. (July, 2023). Neural representations of lexico-semantic knowledge: word frequency, familiarity and concreteness. Poster presentation at the 2023 meeting of the Organization for Human Brain Mapping (OHBM), Montreal, Canada.

69. Schüller, A., & Costello, B. (July, 2023). Placing signs on the spectrum of iconicity: A comparison of systems of classifying types of iconicity. Poster presentation at workshop From Icon to Abstraction: How iconicity shapes the lexicon, Birmingham, United Kingdom.

70. Schuller, A., & Costello, B. (July, 2023). Relationship between type and degree of iconicity in Spanish Sign Language (LSE). Poster presentation at workshop From Icon to Abstraction: How iconicity shapes the lexicon, Birmingham, United Kingdom.

71. Stoehr, A., Souganidis, C., Thomas, T., Jacobsen, J., & Martin, C. D. (May, 2023). Phonetic detail in trilinguals' speech production in online testing and testing with face masks. Poster presentation at International Symposium of Psycholinguistics, Vitoria-Gasteiz, Spain.

72. Thomas, T., Takahesu-Tabori, A., Stoehr, A., Varady, C., & Xu, Y. (June, 2023). Does bilingual status influence automatic speech recognition for young Latino children? Poster presentation at International Symposium on Bilingualism, Sydney, NSW, Australia.

73. Uruñuela, E., Sava-Segal, C., Leung, M., Finn, E.S., & Caballero-Gaudes, C. (July, 2023). A Multi-Subject Deconvolution Algorithm for the Analysis of Naturalistic fMRI Data. Poster presentation at ISMRM Iberian Chapter Annual Meeting 2023, Valladolid, Spain.

74. Uruñuela, E., Veganzones, M.A., & Caballero-Gaudes. C. (September, 2023). Exploring Tensor Decomposition as an Alternative to ICA for Denoising Multi-Echo fMRI data. Poster presentation at ISMRM 2023 Workshop on Current Issues in Brain Function, Padua, Italy.

75. Xu, Q., Peng, Y., & Li, P. (July, 2023). Large-scale Network Analyses Reveal Cross-Language Differences in Semantic Structures: A Comparative Study. Poster presentation at the Annual Meeting of the Cognitive Science Society, Sydney, Australia.

76. Xu, Q., Peng, Y., Wu, M., Xiao, F., Chodorow, M., & Li, P. (October, 2023). Multimodal Conceptual Representation: Do ChatGPT/LLMs require embodiment to reach human-level representation? Poster presentation at the Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

77. Xu, Q., Sjuls, G.S., Kalashnikova, M., & Magnuson, J.S. (October, 2023). What's in a word? Raw statistical learning sequences emulate neural entrainment. Poster presentation at the Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

78. Weiss, D., Brown, K., & Magnuson, J.S. (May, 2023). Network models predict distinct phonological and semantic activation in spoken word recognition. Poster presentation at the XVI International Symposium of Psycholinguistics (ISP), Vitoria, Spain.

79. Weiss, D., Samuel, A., & Kapnoula, E. (November, 2023). Does Co-Activating Familiar Words Improve Word Learning? Poster presentation at the 64th meeting of the Psychonomic Society, San Francisco, USA.

80. Wong, B.W.L., Chan, L.Y.H, Huo, S. & Maurer, U. (October, 2023). Adaptation and Mismatch Negativity (MMN) in Dyslexia: Comparing First vs. Subsequent Repetitions in a Roving EEG Paradigm with Minimized Expectations. Poster presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

81. Wong, B.W.L., Samuel, A., & Kapnoula, E. (November, 2023). Individual differences in speech perception gradiency and listeners' recovery from lexical garden paths in L1 and L2. Poster presentation at at the 64th meeting of the Psychonomic Society, San Francisco, USA.

ORAL PRESENTATIONS

1. Aleman Bañon, J., & Martin, C.D. (November, 2023). Using ERP to examine lexicosemantic prediction in L1-Swedish learners of L2 English.Oral presentation at Boston University Conference on Language Development (BUCLD), Boston, USA.

2. Aleman Bañon J., & Martin, C.D. (June, 2023). Using event-related potentials to examine lexicosemantic predictions in native and nonnative speakers of English. Oral presentation at Neurolinguistics in Sweden 2023 conference, Lund University, Sweden.

3. Amoruso, L., Geng, S., Molinaro, N., Gil-Robles, S., Pomposo, I., Bermudez, G., Quiñones, I., & Carreiras, M. (August, 2023). Neural dynamics supporting context-based social perception in health and disease. Oral presentation at the 45th European Conference on Visual Perception (ECVP), Paphos, Cyprus.

4. Amoruso, L., Quiñones, I., de Frutos-Sagastuy, L., Molinaro, N., Gil-Robles, S., Pomposo, I., Bermudez, G., & Carreiras, M. (September, 2023). MEG evidence supporting neural plasticity of the Action Observation Network in brain tumor patients. Oral presentation at the 23rd ESCoP conference, Porto, Portugal.

5. Arrieta-Sagredo, I., Caballero-Gaudes, C., Martinez, Z., Altuna, X., Carreiras, M., & Kalashnikova, M. (August, 2023). Does cross-modal plasticity decrease after cochlear implantation in children? Oral presentation at International Symposium on Auditory and Audiological Research, Nyborg, Denmark.

6. Biondo, N., Pracar, A.L., Baldo, J., Dronkers N.F., & Ivanova M.V. (October, 2023). The neural underpinnings of syntactic comprehension and complexity: Evidence from Lesion Symptom Mapping and indirect structural disconnection mapping. Oral presentation at the 61st Annual Meeting of the Academy of Aphasia, Reading, UK.

7. Caudrelier, T., Martin, C., Beausoleil, M-M., Menard, L., & Samuel, A.G. (November, 2023). When Jack isn't Jacques: Opposite recalibration shifts of phonetic categories in a bilingual's two languages. Oral presentation at the 64th meeting of the Psychonomic Society, San Francisco, USA.

8. Caudrelier, T., Martin, C. Samuel, A., Beausoleil,

M.M., Tiede, M., & Ménard, L. (August, 2023). Speech perception learning transfers across languages in French-English bilinguals: An online experiment. Oral presentation at International Congress of Phonetic Sciences (ICPhS), Prague, Czech Republic.

9. Cheimariou, S., & Kapnoula, E.C. (December, 2023). Using the visual world paradigm (VWP) to track age-related changes in spoken word recognition. Oral presentation at the Eye-tracking and Language Processing Conference (ELPC2023), Athens, Greece.

10. Comella, C., Quiñones, I., Gil Robles, S., Pomposo, I., Carreiras, M., & Caballero-Gaudes, C. (May, 2023). Enhancing precision neurosurgery with cerebrovascular reactivity and vascular lag mapping in glioma patients using multi-echo fMRI with breath-holds. Oral presentation at 4th GliMR Annual Meeting 2023, Porto, Portugal.

11. Comella, C., Quiñones, I., Gil-Robles, S., Pomposo, I., Carreiras, M., & Caballero-Gaudes, C. (November, 2023). Mapping cerebrovascular reactivity and vascular lag in gliomas with multi-echo BOLD fMRI and breath-holding.Oral presentation at ICP Network meeting, Utrecht, The Netherlands.

12. Costello, B., Caffarra, S., Fariña, N., Duñabeitia, J.A., & Carreiras, M. (September, 2023). Orthographic encoding in deaf readers of Spanish: the what matters more than the where. Oral presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

13. Costello, B., Schüller, A., & Giezen, M. (June, 2023). Lexical indices in sign language: familiarity and iconicity do not go hand in hand. Oral presentation at FEAST, Bergen, Norway.

14. Dumay, N., Kenway, S., Kim, D., Kapnoula, E.C., & Samuel, A.G. (November, 2023). Do Subphonemic Mismatch Effects Only Tell Us About Words, How They Are Learnt, and Whether They Need to Sleep? Oral presentation at the 64th meeting of the Psychonomic Society, San Francisco, USA.

15. Dumay, N., Kenway, S., Kim, D., Kapnoula, E.C., & Samuel, A.G. (September, 2023). Do subphonemic mismatch effects only tell us about words, how they are learnt, and whether they need to consolidate? Oral presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

16. Fernández-Merino, L., Lizarazu, M., Molinaro, N., & Kalashnikova, M. (October, 2023). Rhythmic Stimulation of Cortical Tracking of Speech in Basque-Spanish Bilinguals. Oral presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

17. Jevtović, M., Kapnoula, E., & Martin, C.D. (September, 2023). To spell or not to spell? Explicit versus implicit creation of spelling expectations during spoken word learning. Oral presentation at the 23rd meeting of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

18. Jevtović, M., Martin, C.D., & Pinet, S. (July, 2023). Orthographic skeletons: investigating the nature of representations generated during spoken word learning. Oral presentation at Writing Words Workshop 2023, Potsdam, Germany.

19. Kalashnikova, M. (May, 2023). The development of conversational turn-prediction abilities in bilingual toddlers. Oral presentation at the XVI International Symposium of Psycholinguistics, Vitoria - Gasteiz, Spain.

20. Kalashnikova, M., & Fernandez-Merino, L. (June, 2023). Code-Switching Patterns in Basque-Spanish Infant-Directed Speech and Their Effects on Bilingual Infants' Early Word Learning. Oral presentation at the 14 International Symposium on Bilingualism, Sydney, Australia (Hybrid meeting).

21. Kapnoula, E.C., & Samuel, A.G. (November, 2023). Non-Native Phonetic Learning in Listeners with High versus Low Sensitivity to L1 Subphonemic Differences. Oral presentation at the 64th meeting of the Psychonomic Society, San Francisco, USA.

22. Kapnoula, E.C., & Samuel, A.G. (June, 2022). Subphonemic sensitivity facilitates foreign language learning in late (but not early) bilinguals. Oral presentation at the 14 International Symposium on Bilingualism, Sydney, Australia (Hybrid meeting).

23. Li, P., Flege, J., Martin, C.D., & Kartushina, N. (September, 2023). A longitudinal perception study on the establishment of L2 categories. Oral presentation at Pronunciation in Second Language Learning and Teaching (PSLLT) conference, Purdue University, West Lafayette, Indiana, USA.

24. Li, P., Flege, J., Martin, C.D., & Kartushina, N. (August, 2023). Speech sound stability over time: Evidence from Norwegian vowels in spontaneous speech production. Oral presentation at International Congress of Phonetic Sciences (ICPhS), Prague, Czech Republic.

25. Li, P., Martin, C.D., & Kartushina, N. (September, 2023). Language dominance and

code-switching shape vowel production in Basque-Spanish bilinguals. Oral presentation at the 29th AMLaP conference, Architectures and Mechanisms for Language Processing (AMLaP23), Donostia-San Sebastián, Spain.

26. Ma, X., Gao, L., & Xu, Q. (December, 2023). ToMChallenges: A Principle-Guided Dataset and Diverse Evaluation Tasks for Exploring Theory of Mind. Oral presentatiton at the 27th Conference on Computational Natural Language Learning (CoNLL), Singapore.

27. Mancini, S., Arellano, K., Gorostiola, N., Soto, D., & Freijo, M. (March, 2023). Recuperación del lenguaje y funciones cognitiva tras un ictus: un estudio longitudinal.Oral presentation at II Congreso RICORS-Ictus, Madrid, Spain.

28. Martin, C.D., Pastureau, R., Kerr, E., & de Bruin, A. (May, 2023). Processing of synonyms and homographs in bilingual and monolingual speakers. Oral presentation at International Symposium of Psycholinguistics, Vitoria-Gasteiz, Spain.

29. McLaughlin, D.J., Colvett, J.S., Bugg, J.M., & Van Engen, K.J. (May, 2023). Sequence effects and speech processing: Cognitive load for speaker-switching within and across accents. Oral presentation at International Symposium of Psycholinguistics, Vitoria-Gasteiz, Spain.

30. Melguy, Y.V., Martin, C.D., & Samuel, A.G. (November, 2023). The multilingual advantage? Testing the relationship between speech perception and production in third-language sound acquisition. Oral presentation at the Fulbright Mediterranean Research Seminar, Alicante, Spain.

31. Mornati, G., Brusini, P., Cordolcini, L., Guasti, MT., & Cantiani, C. (May, 2023). An ERP study on the processing of gender features in Italian toddlers. Oral presentation at XVI International Symposium of Psycholinguistics, Vitoria, Spain.

32. Onochie-Quintanilla, E., Lallier, M., & Navarro-Guzmán. J. I. (June, 2023). Orthographic Learning: One unitary system or two separate constructs (reading vs. spelling)? Oral presentation at International Workshop on Reading and Developmental Dyslexia. San Sebastián, Spain.

33. Pérez-Navarro, J., & Lallier, M. (June, 2023). The contribution of the amount of linguistic exposure to bilingual language development: Longitudinal evidence from preschool years. Oral presentation at International Symposium on Bilingualism (ISB14), Macquire University, Sydney, Australia.

34. Paz-Alonso, P.M. (October, 2023). A cognitive neuroscience approach to the structure and function of the human thalamus. Invited talk at the IV Symposium Fernando Reinoso Suárez "Unraveling the primate thalamus structure and function". Madrid, Spain.

35. Pinet, S., & Martin, C.D. (September, 2023). The influence of overt spoken and written production on novel word learning. Oral presentation at the 23rd meeting of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

36. Piazza, G., Di Liberto, G., Kalashnikova, M., Perez-Navarro, J., Martin, C.D. (May, 2023). Does non-native directed speech support non-native listeners' cortical tracking? Oral presentation at XVI International Symposium of Psycholinguistics, Vitoria-Gasteiz, Spain.

37. Pinet, S., & Martin, C.D. (July, 2023). The influence of overt spoken and written production on novel word learning. Oral presentation at the 4th International Workshop on Writing Words, Potsdam, Germany.

38. Quiñones, I., Gisbert, S., Amoruso, L., Manso-Ortega, L., Gil Robles, S., Pomposo, I., Bermudeze, G., & Carreiras, M. (September, 2023). Accounting for multilingual profiles during presurgical mapping of glioma patients. Oral presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

39. Quiñones, I., Gisbert, S., Amoruso, L., Manso-Ortega, L., Gil Robles, S., Pomposo, I., Bermudeze, G., & Carreiras, M. (May, 2023). Accounting for multilingual profiles during presurgical mapping of glioma patients. Oral presentation at the 4th GliMR Annual Meeting 2023, Porto, Portugal.

40. Rastelli, S. & Antonicelli, G. (May-June, 2023). Electrophysiological insights on aspectual coercion. Oral presentation at ISP2023 Conference, Vitoria-Gasteiz, Spain.

41. Rastelli, S. & Antonicelli, G. (June, 2023). Electrophysiological insights on aspectual coercion.Oral presentation at NLS2023 Conference, Lund, Sweden.

42. Rivolta, C.L., Costello, B., Lizarazu, M., & Carreiras, M. (September, 2023). A Crossmodal Comparison Of Language-brain Entrainment In Spoken And Signed Languages. Oral presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

43. Rivolta, C.L., Costello, B., Lizarazu, M., & Carreiras, M. (June, 2023). Language-brain entrainment: a crossmodal comparison of spoken and signed languages. Oral presentation at FEAST2023 Conference, Bergen, Norway.

44. Rivolta, C.L., Costello, B., Lizarazu, M., & Carreiras, M. (October, 2023). Neural tracking in the visual domain: the role of different articulators in sign language comprehension. Oral presentation at Society for the Neurobiology of Language (SNL 2023) 15th Annual Meeting, Marseille, France.

45. Samuel, A.G., & Dumay, N. (September, 2023). How Active are Sublexical and Lexical Representations, 12 Hours after they Have Been Used to Understand Speech? Oral presentation at the 23rd Conference of the European Society for Cognitive Psychology (ESCoP), Porto, Portugal.

46. Savic, O., Unger, L., Yim, H., Dennis, S., & Sloutsky, V. (May-Jun, 2023). The shared origins of associative and taxonomic priming effects in infants. Oral presentation at International Symposium of Psycholinguistics, Vitoria-Gasteiz, Spain.

47. Savic, O., Yim, H., De Deyne, S., & Sloutsky, V. (Jun, 2023). Developmental Free Association Norms: Past, Present and Future. Oral presentation at 52nd Annual Meeting of Jean Piaget Society, Madrid, Spain.

48. Savic, O., Unger, L., Yim, H., Dennis, S., & Sloutsky, V. (September, 2023). The Origins of Word Associations in Early Childhood. Oral presentation at the 23rd Conference of the European Society for Cognitive Psychology, Porto, Portugal.

49. Solchaga Erneta, D., Stoehr, A., & Martin, C. D. (May, 2023). Orthographic effects in L1 speech production. Oral presentation at International Symposium of Psycholinguistics, Vitoria-Gasteiz, Spain.

50. Solier, C., & Soum-Favaro, C. (September, 2023). ETAL, the first Computerized Test of Acquired Reading Disorder in French: Validation's preliminary results. Oral presentation at Science of Aphasia Conference, Nice, France.

51. Stoehr, A., Souganidis, C., Thomas, T., & Martin, C. D. (June, 2023). Online testing and testing with face masks are suitable for detecting language-specific VOT production in trilinguals. Oral presentation at International Symposium on Bilingualism, Sydney, NSW, Australia.

52. Uruñuela, E., Sava-Segal C., Leung M., Finn, E.S., Caballero-Gaudes, C. (September, 2023). A Multi-Subject Deconvolution Algorithm to Analyze Naturalistic fMRI Data At The Finest Temporal and Spatial Resolution. Oral presentation at the ISMRM Workshop on Current Issues in Brain Function, Padua, Italy.

53. Vera, F., González-Montesino, R.H., Costello, B., Báez, I.C., & Fernández, A.M. (June, 2023). Aproximación al léxico idiomático de la lengua de signos española.Oral presentation at the XV Congreso International de Lingüística General, Madrid, Spain.

INVITED TALKS

1. Biondo, N. (April, 2023). Bridging theoretical linguistics and cognitive neuroscience: fine-grained linguistic differences do matter during online language comprehension. Invited talk at the Syntax & Semantics Circle, Department of Linguistics, University of California Berkeley, Berkeley, USA.

2. Caballero-Gaudes, C. (November, 2023). Deciphering neuronal-related activity with functional MRI without timing information: Algorithms and applications. Invited talk at TIPTekno 2023 Medical Technologies Conference (virtual event).

3. Caballero-Gaudes, C. (November, 2023). Studying human brain's physiology and function in a naturalistic manner.Invited talk at Spinoza Center for Neuroimaging, Amsterdam, Netherlands.

4. Caballero-Gaudes, C. (September, 2023). De-Emphasizing "Rest" in rsfMRI Methodology. Invited talk at at the ISMRM Workshop on Current Issues in Brain Function,Padua, Italy.

5. Fernández-Merino, L. (May, 2023). The role of rhythm on cortical tracking to speech in bilingual infants at Speech Acquisition and Perception Lab. Invited talk at Universitat Pompeu Fabra, Barcelona, Spain.

6. Gutiérrez, J. (March, 2023). Sistemas de Información en BCBL.Invited talk at Bachelor of Biomedical Engineering, at Mondragon University, Mondragon, Gipuzkoa.

7. Jevtovic, M. (March, 2023). Déjà-lu: The influence of orthography on spoken word learning. Invited talk at Psycholinguistics Coffee, the University of Edinburgh, UK.

8. Kalashnikova, M. (May, 2023). Infant-Directed Speech: An Optimal Signal for Language

Processing in Young Infants. Invited talk at the Research Group Language Cycles, MPI for Human Cognitive and Brain Sciences, Leipzig, Germany.

9. Kalashnikova, M. (April, 2023). Auditory processing abilities as predictors of language and literacy skills in infants and children at family risk for dyslexia. Invited talk at the 30th Congress of the Union of European Phoniatricians, Antalya, Turkey.

10. Lallier, M. (May, 2023). How neural oscillations can inform the theories of reading development. Invited talk at Seminar series of the ExpORL group, Department of Neurosciences, KU Leuven, Leuven, Belgium.

11. Lallier, M. (May, 2023). La sensibilidad al ritmo moldea el cerebro lector: un enfoque de investigación traslacional. Keynote speaker en el Seminario internacional "Neurodiversidad y tecnología emergentes", Burgos, Spain.

12. Lallier, M. (June, 2023). Multifactorial hypotheses of dyslexia: What do they tell us about how to support people with dyslexia. Keynote talk at International Workshop on Reading and Developmental Dyslexia – From theory to Practice. San Sebastián, Spain.

13. Lallier, M. (April, 2023). The role of auditory neural oscillations in reading development: an attentional perspective. Invited talk at International conference on Brain Rhythms and Cortical Computations (BrhyCoCo), Paris, France.

14. Mancini, S. (January, 2023). Modelling agreement comprehension. Plenary talk at Modelling 2023, Vigo, Spain.

15. Mancini, S. (November, 2023). Clinical and Experimental Neurolinguistics. Invited lecture at University of Bolzano, Bolzano, Italy.

16. Martin, C.D. (March, 2023). Flowing into the future. Invited talk at Round table at the Language Testing Services Conference, San Sebastian, Spain.

17. Martin, C.D., de Bruin, A., Stoehr, A., Hoversten, L., & Jevtovic, M. (July, 2023). Crosslinguistic links and interference in trilingual language production. Invited talk at University of Ottawa, Canada.

18. Martin, C.D., de Bruin, A., Stoehr, A., Hoversten, L., & Jevtovic, M. (November, 12023). Crosslinguistic links and interference in trilingual language production. Invited talk at Centre for language learning esearch at the University of Turku, Finland.

19. Molinaro, N. (September, 2023). Neural oscillations and speech, a working model and the available evidence. Invited talk at the IMT School for Advanced Studies Lucca, Lucca, Italy.

20. Paz-Alonso, P.M. (March, 2023). Involvement of magnocellular and parvocellular visual pathways' in visual recognition and reading. Invited talk at Biocruces-Bizkaia Health Research Institute, Bilbao, Spain.

21. Paz-Alonso, P.M. (December, 2023). Involvement of the human thalamus in language and cognitive function. Keynote talk at the cutting-edge perspectives in language and cognitive function, Beijing, China.

22. Paz-Alonso, P.M., & Rodríguez-Gonzalo, S. (June, 2023). Impact of semantic knowledge on episodic relational memory over development. Invited talk at Jean Piaget Society Conference. Madrid, Spain.

23. Piazza, G. (September, 2023). Non-native Directed Speech Supports L2 Learners' Cortical Tracking of Speech. Invited talk at Cognition and Natural Sensory Processing workshop (online event).

24. Ruzzoli M. (Decmber, 2023). The methodology in the Open Science: insight from cognitive neuroscience. Invited talk at University of Brescia, Department of Clinical and Experimental Sciences, Neuroscience, Brescia, Italy.

25. Ruzzoli M. (June, 2023). The influence of occipito-parietal alpha phase on visual processing and motor preparation. Symposium speaker at Symposium "Thalamic and primary visual cortex contributions to early visual processing revealed by the N40 and C1 ERP", 21st World Congress of Psychophysiology, Geneva, Switzerland.

26. Samuel, A.G.(January, 2023). Speech Perception and Speech Production: Friends, Enemies, or Frenemies? Invited colloquium at the University of Ghent, Ghent, Belgium.

27. Samuel, A.G. (April, 2023). Speech Perception and Speech Production: Friends, Enemies, or Frenemies? Invited colloquium talk at University of Toronto, Toronto, Canada.

28. Soto, D. (June, 2023). A framework to unconscious processing in higher-level visual cognition.Invited talk at Workshop on Next Frontiers in Consciousness Research, National Institutes of Health (NIH), Washington DC, USA.

29. Soto, D. (June, 2023). Manipulating semantic representations without awareness by using fMRI-based decoded neurofeedback. Invited talk at the

Association for the Scientific Study of Consciousness, New York University, New York, USA.

30. Stoehr, A. (March, 2023). Early academic careers in Europe. Invited talk at Professional Development Seminar, The Pennsylvania State University [Webinar], USA.

31. Stoehr, A. (November, 2023). The effects of orthography and backward transfer in crosslinguistic influence. Invited talk at the Speech Science Forum of the University College London, UK (virtual event).

32. Uruñuela, E. (April, 2023). Advancing fMRI Data Analysis with Deconvolution Models: Paradigm Free Mapping Revisited. Invited talk at Developmental Cognition and Neuroimaging (DCAN) lab, University of Minnesota, US.

33. Uruñuela, E. (May, 2023). Multi-Subject Paradigm Free Mapping: A Promising Frontier for Analyzing Naturalistic fMRI Data. Invited talk at Cambridge Babylab, University of Cambridge, UK.

34. Xu, Q., Markowska, M., Chodorow, M., & Li, P. (June, 2023). Model Bilingual Lexical Processing Through Code-Switching Speech: A Network Science Approach. Invited talk at the 14th International Symposium on Bilingualism, Sydney, Australia.

35. Xu Q., Peng, Y., & Li, P. (March, 2023). Does human cognition require interactive realities? Insights from large language models. Invited talk at Interactive Realities: Bridging Complex Systems in Artificial and Natural Environments at University of Lisbon, Lisbon, Portugal.

36. Xu, Q. (July, 2023). Language and Language Learning: Insights from Computational Simulations of the Brain and Behavior. Invited talk at the Language Acquisition Research Center, City University of New York, New York, USA.

37. Xu, Q. (July, 2023). Does Conceptual Representation Require Embodiment? Insights from Large Language Models. Invited talk at the Department of Psychological Sciences, University of Connecticut, Connecticut, USA.

2024

POSTER PRESENTATIONS

1. Abu El Adas, S., & Lallier, M. (May, 2024). Speech production variability in children learning to read. Poster presentation at the 13th International Seminar on Speech Production, Autrans, France.

2. Abdennour, N., Margolles, P., & Soto, D. (November, 2024). PyDecNef2.0: PyDecNef2.0: An open-source framework for fMRI-based decoded neurofeedback. Poster presentation at the Real-Time Functional Imaging and Neurofeedback Conference (rtFIN), Heildelberg, Germany.

3. Altuntas, E., Best, C.T., Kalashnikova, M., Götz, A., & Burnham, D. (June, 2024). Acoustic features of vowels in mothers' speech to their infants between 4–13-month infants, in relation to phonological abstraction and receptive vocabulary. Poster presentation at the Workshop on Infant Language Development, Lisbon, Portugal.

4. Antonicelli, G., Arellano, K., & Mancini, S. (October, 2024). Prosody production after stroke: acoustic features analysis on a longitudinal speech corpus. Poster presentation at 16th annual meeting of the Society for the Neurobiology of Language (SNL), Brisbane, Australia.

5. Bautista, A., & Martin, C.D. (June, 2024). Is the availability of the production system critical for lexical prediction in a second language? Poster presentation at the International Workshop on Language Production (IWoLP), Marseille, France.

6. Bautista, A., & Martin, C.D. (June, 2024). Is the availability of the production system critical for lexical prediction in a second language? Poster presentation at the Interdisciplinary Advances in Statistical Learning. Donostia-San Sebastian, Spain.

7. Bautista, A., & Martin, C.D. (September, 2024). Is the availability of the production system critical for lexical prediction in a second language? Poster presentation at the 2024 conference of Architectures and Mechanisms for Language Processing (AMLAP), Edinburgh, UK.

8. Barry, J., Ferrer, E., Lerma-Usabiaga, G., & Paz-Alonso, P. M. (April, 2024). Transient semantic memory retrieval failures: Factors associated with the tip-of-the-tongue phenomenon. Poster presentation at the 2024 meeting of the Cognitive Neuroscience Society (CNS), Toronto, Canada.

9. Biondo, N., Ivanova, M.V., Pracar, A.L., Baldo, J., & Dronkers N.F. (October, 2024). The neural underpinnings of time comprehension: evidence from 85 left-hemisphere stroke survivors. Poster presentation at 16th annual meeting of the Society for the Neurobiology of Language (SNL), Brisbane, Australia.

10. Biondo, N., Ghiraldini, E., Wheatley, V.J., Pracar, A.L., Ivanova, M.V., Mancini, S., & Dronkers, N.F. (October, 2024). Linguistic and non-linguistic time comprehension after stroke. Poster presentation at 16th annual meeting of the Society for the Neurobiology of Language (SNL), Brisbane, Australia.

11. Carrión-Castillo, A., Lallier, M., & Carreiras, M. (June, 2024). Genetic and environmental influences on reading performance. Poster presentation at the 2024 Behavior Genetics Association Annual Meeting, London, UK.

12. Carlson, M.T., Rodríguez-Ordóñez, I., Martin, C.D. (November, 2024). Variable ergative marking in standard and traditional Basque: Sociophonetic variation and processing. Poster presentation at Psychonomic Society's 2024 Annual Meeting, New York, USA.

13. Chavarria, I., Vidorreta, M., Fernandez-Seara, M.A, & Caballero-Gaudes, C. (May, 2024). Calibrated fMRI with a background-suppressed PCASL and multi-echo BOLD dual-acquisition sequence. Poster presentation at the 2024 ISMRM & ISMRT Anual Meeting & Exhibition, Singapore, Singapore.

14. Ciardo, E., González-Pérez, M.F., Paz-Alonso, P.M., Carreiras, M., & Ruzzoli, M. (October, 2024). The neural markers of mild cognitive impairment in breast cancer patients: a multimodal approach to detect, predict and monitor.Poster presentation at Sociedad Española de Psicoñogía Experimental (SEPEX) 2024, Almería, Spain.

15. Comella-Luengo, C., Quiñones, I., Gil-Robles, S., Pomposo, I., Carreiras, M., Caballero-Gaudes, C. (October, 2024). Data-driven cerebrovascular reactivity and vascular lag mapping in gliomas with multi-echo BOLD fMRI. Poster Presentation at the ESMRM Joint Workshop of the Ultra-High Field MR & Brain Function Study Groups Annapolis, Maryland, USA.

16. Comella, C., Quiñones, I., Gil-Robles, S., Pomposo, I., Carreiras, M., & Caballero-Gaudes, C. (May, 2024). Mapping cerebrovascular reactivity and vascular lag in gliomas with multi-echo BOLD fMRI and breath-holding. Poster presentation at 2024 ISMRM & ISMRT Annual Meeting & Exhibition, Singapore, Singapore.

17. Comella-Luengo, C., Quiñones, I., Gil-Robles, S., Pomposo, I., Carreiras, M., & Caballero-Gaudes, C. (October, 2024). Breath-hold induced cerebrovascular reactivity and vascular lag mapping of gliomas with multi-echo fMRI. Poster Presentation at the European Society of Magnetic Resonance in Medicine and Biology (ESMRMB) Anual Meeting, Barcelona, Spain.

18. Comella-Luengo, C., Quiñones, I., Gil-Robles, S., Pomposo, I., Carreiras, M., Caballero-Gaudes, C. (October, 2024). Breath-hold induced cerebrovascular reactivity and vascular lag mapping of gliomas with multi-echo fMRI. Poster Presentation at the BrainModes 2024 Conference, Bilbao, Spain.

19. Ciesla, M., Jankowiak, K., Pozdniakov, M., Gruszeczka, J., & Kapnoula, E.C. (September, 2024). On the role of orthography and images in early foreign language learning: An ERP study. Poster presentation at the 2024 conference of Architectures and Mechanisms for Language Processing (AMLAP), Edinburgh, UK.

20. de Frutos-Sagastuy, L., Quiñones, I., Gil-Robles, S., Pomposo, I., Bermudez,G., Carreiras, M., & Amoruso, L. (June, 2024). Impaired action recognition in brain tumor patients induced by electrical stimulation of the Action Observation Network during awake surgery. Poster presentation in OHBM 2024, Seoul, South Korea.

21. Elosegi, P., Ning, M., Xu, P., & Soto, D. (May, 2024). Modelling the representation of visual ensembles in the human brain. Poster presentation at the 2024 meeting of the Vision Science Society (VSS), St Pete Beach, Florida, USA.

22. Ershaid, H., & Lallier, M. (October, 2024). Effects of Early Bilingualism on Laterality in a Dichotic Listening Task. Poster presentation at the 6th EDA All European Dyslexia Conference, Athens, Greece.

23. Flores-Coronado, M.A., Martin, C., & Caballero-Gaudes, C. (June, 2024). Hydra Nordic: A thermal-noise removal strategy for multi-echo fMRI. Poster presentation at the 2024 OHBM Annual Meeting, Seoul, Korea.

24. Flores-Coronado M.A., Martin C. & Caballero-Gaudes C. (November, 2024) ME-ICA denoising for continuous sampling of overt speech production. Poster presentation at the 2024 BrainModes conference, Bilbao, Spain.

25. Giovannone, N., Kapnoula, E.C., & Toscano, J.C. (November, 2024). Individual differences in speech perception gradiency in the visual analogue scale task: How stable are they? Poster presentation at the 65th meeting of the Psychonomic Society, New York, NY, USA.

26. Gorostiola-Oyarzabal, N., Joya, A., Freijo, M.M., Martín, A., & Mancini, S. (October, 2024). The role of blood-based biomarkers in post-stroke

cognitive impairment. Poster presentation at the 2024 meeting of Academy of Aphasia (AoA), Nara, Japan.

27. Gurtubay-Antolin, A., Merhej, D., Zhai, M., Fischer-Baum, S., & Paz-Alonso, P.M. (April, 2024). Hippocampus: reading beyond the reading network. Poster presentation at the 2024 meeting of the Cognitive Neuroscience Society (CNS), Toronto, Canada.

28. Guturbay-Antolin, A., Merhej, D., Zhai, M., Fischer-Baum, S., & Paz-Alonso, P.M. (April, 2024). Hippocampal involvement in reading. Poster presentation at Cognitive Neuroscience Society (CNS) 2024, Toronto, Canada.

29. Hernández-Gutiérrez, D., Sorrel, M.A., Shanks, D., & Vadillo, M. (July, 2024). Is masked syntactic priming unconscious? Poster presentation at the 2024 meeting of the Cognitive Science Society (COGSCI), Rotterdam, The Netherlands.

30. Ito, A., Bautista, A., & Martin, C.D. (November, 2024). Cognate facilitation on verb-based L2 prediction depends on proficiency. Poster presentation at Psychonomic Society's 2024 Annual Meeting, New York, USA.

31. Kapnoula, E.C., & Samuel, A.G. (November, 2024). Phonological Neighborhood Density Effects on Word Learning: What Happens After Sleep? Poster presentation at the 65th meeting of the Psychonomic Society, New York, NY, USA.

32. Klimovich-Gray, A., Barrena, A., Arrieta, E., Agirre, E., & Molinaro, N. (September, 2024). DyslexNet: neural network for dyslexia classification from cortical activity. Poster presentation at the AMLaP conference, Edimburgh, UK.

33. Kim, S., Bramlage, L., Cortese, A., & Soto, D. (July, 2024). Confidence Prediction Error Predicts Learning and Insight during Problem-Solving. Poster presentation at the Association for the Scientific Study of Consciousness, Tokyo, Japan.

34. Kim, S., Margolles, P., Cortese, A., & Soto, D. (November, 2024). Inducing reward prediction error with decoded neurofeedback to enhance problem-solving. Poster presentation at Real-Time Functional Imaging and Neurofeedback meeting, Heidelberg, Germany.

35. Lallier, M., Zugarramurdi, C., Fernández, L., Valle-Lisboa, J.C., & Carreiras, M. (October, 2024). Early cortical tracking of auditory stimuli predicts reading skills: A one-year longitudinal study. Poster presentation at European Dyslexia Association (EDA), Athens, Greece.

36. La Pietra, M., & Ruzzoli, M. (May, 2024). Exploring the impact of cognitive conflict on subsequent cognitive processes. Poster presentation at the 7th ESCAN meeting (European Society for Cognitive and Affective Neuroscience), Ghent, Belgium.

37. La Pietra, M., & Ruzzoli, M. (October, 2024). Exploring the impact of cognitive conflict on subsequent cognitive processes. Poster presentation at Integrative Perspective on Conflict and Control Symposium, Tübingen, Germany.

38. La Pietra, M., Vives, M.L., Molinaro, N., & Ruzzoli, M. (October, 2024). Exploring people's preferences and emotions towards cognitive conflict. Poster presentation at Integrative Perspective on Conflict and Control Symposium, Tübingen, Germany.

39. La Pietra, M., Vives, M.L., Molinaro, N., & Ruzzoli, M. (May, 2024). Exploring people's preferences towards cognitive conflict. Poster presentation at the 7th ESCAN meeting (European Society for Cognitive and Affective Neuroscience), Ghent, Belgium.

40. Lecca-Villacorta, L., Paz-Alonso, P.M., & Lerma-Usabiaga, G. (May, 2024). Structural dynamics of human thalamocortical projections across the lifespan. Poster presentation at the 2024 Thalamocortical Networks (ThalNet) conference, San-Sebastián, Spain.

41. Lecca-Villacorta, L., Chica, A.B., Lerma-Usabiaga, G., & Paz-Alonso, P.M. (October, 2024). Neural correlates of the pulvinar and mediodorsal thalamus in visual search guided by explicit and implicit cues. Poster presentation at the XIV Conference of the Spanish Society for Experimental Psychology (SEPEX), Almeria, Spain.

42. Lei, Y., Linhardt, D., Paz-Alonso, P.M., & Lerma-Usabiaga, G. (May, 2024). Quantification of reading circuits in the ventral occipitotemporal cortex. Poster presentation at the 2024 meeting of the Vision Science Society(VSS), St. Petersburg, Florida, USA.

43. Lei, Y.N., Linhardt. D., Paz-Alonso P.M., & Lerma-Usabiaga, G. (June, 2024). Quantification of reading circuits in the ventral occipitotemporal cortex. Poster presentation at the 2024 meeting of the Neurogune, Donostia, Spain.

44. Li, P., Flege, J., Martin, C., & Kartushina, N. (June, 2024). Variability and stability in individuals' speech sound production over time. Poster

presentation at the International Workshop on Language Production (IWoLP2024), Marseille, France.

45. Li, P., Loannidou, I., Marazzina, I., Pericacho, P., Reardon, B., & Xing, L. (July, 2024). Exploring the role of personality traits in the imitation abilities of non-native speech in familiar and unfamiliar languages. Poster presentation at Speech Prosody 2024, Leiden, the Netherlands.

46. Li, P., Martin, C., & Kartushina, N. (June, 2024). Vowel systems of early Basque-Spanish bilinguals: The role of language use and code-switching habits in phonetic differentiation. Poster presentation at the International Workshop on Language Production (IWoLP2024), Marseille, France.

47. Linhardt, D., Lei, Y., Paz-Alonso, P.M., Wandell, B., Windischberger, C., & Lerma-Usabiaga, G. (May, 2024). Comparing pRF Mapping Estimates for Words and Checker Patterns. Poster presentation at Vision Science Society Annual Conference, St. Pete Beach, Florida, USA.

48. Malharin, I., Mancini, S., & Magnuson, J.S. (July, 2024). Double Dissociations Emerge in a Flat Attractor Network. Poster presentation at the Cognitive Science Society (CogSci 2024), Rotterdam, Netherlands.

49. Manso-Ortega, L., Gil Robles, S., Pomposo, I., Bermudez, G., Amoruso, L., Rego-García, I., Carreiras, M., & Quiñones, I. (June, 2024). Beyond tumor location: Global neurostructural reshaping in patients with left brain tumors. Poster presentation at the 2014 meeting of the Organization for Human Brain Mapping (2024), Seoul, South Korea.

50. Mancini, S., Hidalgo-Chagoya, J., Jonkers, R., Carrera, M., & Ansorena, X. (October, 2024). Testing different metrics for syntactic complexity in spontaneous speech: a cross-genre comparison. Poster Presentation at 16th annual meeting of the Society for the Neurobiology of Language (SNL), Brisbane, Australia.

51. Matar, S., & Marantz, A. (May, 2024). MEG evidence for predictive and proactive speech segmentation into morphemes. Poster presentation at the 37th Annual Conference on Human Sentence Processing, Ann Arbor, University of Michigan, USA.

52. Matar, S., Wray, S., Bou Dargham, S., Stockall, L., & Marantz, A. (May, 2024). Getting to the 'root' of semantic and syntactic processing of morphologically complex words: MEG evidence from Arabic. Poster presentation at the 37th Annual Conference on Human Sentence Processing, Ann Arbor, University of Michigan, USA.

53. McLaughlin, D., & Samuel, A. (July, 2024). Exposure to second language accent prompts phonemic recalibration. Poster presentation at Experimental Psychology Society (EPS) York, York, United Kingdom.

54. McLaughlin, D.J., & Samuel, A.G. (November, 2024). Exposure to second language accent prompts recalibration of phonemic categories. Poster presentation at the 2024 meeting of the Psychonomic Society, New York City, New York, USA.

55. Melguy, Y.V., Martin, C.D., & Samuel, A.G. (May, 2024). Predicting production: Individual differences and possible sources of cross-linguistic influence in a third language. Poster presentation at the 5th International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC), Swansea, UK.

56. Mornati, G., Brusini, P., Borromini, M., Molteni, M., & Cantiani, C. (May, 2024). The electrophysiological correlates of gender agreement in early language acquisition: influence of age, vocabulary, and gender types (biological and formal). Poster presentation at XIV edizione delle Giornate CLASTA, Milan, Italy.

57. Navarrete-González, A., & Zorzi, G. (August, 2024). New insights on contrast, coordination and subordination in Catalan Sign Language. Poster presentation at the Conference Formal and Experimental Advances in Sign Language Theory (FEAST), Ann Arbor, MI, USA.

58. Paz-Alonso, P.M., Mengxing, L., & Gurtubay-Antolin, A. (April, 2024). Thalamic contributions to working memory. Poster presentation at the Annual conference of the Cognitive Neuroscience Society. Toronto, Canada.

59. Paz-Alonso, P.M., Mengxing, L., & Guturbay-Antolin, A. (April, 2024). Thalamic involvement in working memory. Poster presentation at Cognitive Neuroscience Society (CNS) 2024, Toronto, Canada.

60. Pérez-Navarro, J., Klimovic-Gray, A., Lizarazu, M., Piazza, G., Molinaro., N., & Lallier, M. (May, 2024). Language experience modulates the tradeoff between acoustic-temporal and lexico-semantic cortical tracking of speech. Poster presentation at BabyRhythm ERC Closing Workshop, University of Padova, Italy.

61. Pinet, S. (July, 2024). What are you looking at? Beyond typing speed and formal training for assessing typing expertise. Poster presentation at the Cognitive Science Society (CSS), Rotterdam, The Netherlands.

62. Pracar, A.L., Maboudian, S.A., Biondo, N., Dronkers, N.F., & Weiner, K.S. (October, 2024). Investigating sulcal correlates of language processing. Poster at Neuroscience 2024 annual meeting of the Society for Neuroscience (SfN), Chicago, USA.

63. Pracar, A., Pagnotta, M., Quiroga-Martinez, D.R., He, T., Biondo, N., Ivanova, M., Dastjerdi, M., Lin, J., Willie, J.T., Brunner, P., Dronkers, N.F., & Knight, R.T. (October, 2024). Neural dynamics of singing versus speaking. Poster at Neuroscience 2024 annual meeting of the Society for Neuroscience (SfN), Chicago, USA.

64. Rodríguez-Gonzalo, S., & Paz-Alonso, P.M. (April, 2024). Thalamocortical interactions in episodic relational memory across the lifespan. Poster presentation at the 2024 meeting of the Cognitive Neurosciene Society (CNS), Toronto, Canada.

65. Solier, C., & Martin, C. (June, 2024). The timing of orthographic input presentation at the onset of L2 acquisition. Poster presentation at the IWoLP–2024 International Workshop on Language Production, Marseille, France.

66. Stoehr, A., Souganidis, C., Thomas, T., Jacobsen, J., & Martin, C.D. (May, 2024). The presence of orthography enhances regressive crosslinguistic influence in Spanish-Basque-English trilinguals. Poster presentation at the International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC 2024), Swansea, UK.

67. Thomas, T., Stoehr, A., & Xu, Y. (April, 2024). The role of bilingual proficiency in ASR performance of children's speech. Poster presentation at the Midwest Speech and Language Days Workshop, Ann Arbor, Michigan, USA.

68. Weiss, D., Samuel, A., & Kapnoula, E. (June, 2024). The effect of lexical co-activation on novel word learning. Poster presentation at the Summer 2024 Meeting of the Experimental Psychology Society, York, UK.

69. Weiss, D., McLaughlin, D., Melguy, Y., Simarro, M., & Kapnoula, E. (November, 2024). The role of familiarity in processing across-accent speaker switching. Poster presentation at the 2024 meeting of the Psychonomic Society, New York, USA.

70. Venagli, I., Kupisch, T., Marinis, T., Melloni, C., & Lallier, M. (October, 2024). Learning an opaque second language boosts the visual attention span: Evidence in skilled and dyslexic readers. Poster presentation at the 6th all European Dyslexia Association Conference, Athens, Greece.

71. Wong, B.W.L., Samuel, A., Kapnoula, E., & McLaughlin, D. (November, 2024). Effects of Accent Familiarity and Rhythmic Abilities on Cognitive Load in L2 Listening: An Individual Difference Approach. Poster presentation at Psychonomic Society's 2024 Annual Meeting, New York, USA.

72. Xi, X., & Li, P. (July, 2024). Exploring perceptual development of L2 phonological contrasts during a study abroad program. Poster presentation at the 19th Conference on Laboratory Phonology (LabPhon19), Seoul, South Korea.

73. Yang, S., Martin, C.D., & Stoehr, A. (July, 2024). The role of domain-general auditory processing in L2 speech. Poster presentation at the Annual Conference of the European Second Language Association, Montpellier, France.

74. Zjakic, H., Lallier, M., & Kalashnikova, M. (July, 2024). Anticipatory looking patterns in monolingual and bilingual infants: Does stimulus presentation side matter? Poster presentation at the 2024 International Congress of Infant Studies (ICIS), Glasgow, Scotland.

ORAL PRESENTATIONS

1. Amoruso, L., Quiñones, I., Gil-Robles, S., Pomposo, I., & Carreiras, M. (April, 2024). Mapping social cognition abilities in patients with gliomas: Preoperative and intraoperative insights from fMRI, MEG and direct electrical stimulation. Oral presentation at European Low-Grade Glioma Network 2024 (ELGGN), Heidelberg, Germany.

2. Antonicelli, G., Molinaro, N., & Mancini, S. (May, 2024). Interpreting prosody: acoustic analysis and online rating of speech acts and emotions. Oral presentation at Psycholinguistics in Flanders, Brussels, Belgium.

3. Antonicelli, G., Molinaro, N., de la Riva, P., Laspiur, R., Lopez de Turiso, A., Carrera, M., & Mancini, S. (July, 2024). Cortical tracking of prosody after stroke and in aging: preliminary evidence from magnetoencephalography. Oral presentation at Speech Prosody Conference, Leiden, The Netherlands.

4. Bautista, A., & Martin, C. (May, 2024). On how word predictability in a sentence context varies depending on language and nativeness. Oral presentation at Psycholinguistics in Flanders (PiF), Brussels, Belgium.

5. Bonfiglio, N., Klimovich-Gray, A., & Molinaro, N. (October, 2024). The long-term impact of music experience on cortical tracking of speech and music: a MEG investigation on professional musicians.Oral presentation at Sociedad Española de Psicología Experimental (SEPEX), 2024, Almería, Spain.

6.Cantiani, C., Gervain, J., Menn, K., & Fernández-Merino, L. (July, 2024). Neural mechanisms underlying speech processing in infancy: the role of language experience, rhythm and timing across development. Oral presentation at the International Congress on Infant Studies, Glasgow, Scotland.

7. Carrión-Castillo, A., Lallier, M., Paz-Alonso, P.M., & Carreiras, M. (June, 2024). Genetics of reading correlates. Oral presentation at the British Dyslexia Association International Conference 2024 - Dimensions of Dyslexia: Evidence and Practice, University of Surrey, Guildford, UK.

8. Carrión-Castillo, A., Galparsoro, N., Redondo, M., Carreiras, M., & Lallier, M. (October, 2024). Word And Nonword Reading In Basque, The Creation Of Assessment Instruments. Oral presentation at the 6th all European Dyslexia Association Conference, Athens, Greece.

9. Chavarria, I., Vidorreta, M., Fernandez-Seara, M. A., & Caballero-Gaudes, C. (October, 2024). Calibrated fMRI with a background-suppressed PCASL and multi-echo BOLD dual-acquisition sequence. Oral presentation at ESMRMB 2024, Barcelona, Spain.

10. Ciesla, M., Kapnoula, E.C., Pozdniakov, M., Gruszecka, J., & Jankowiak, K. (November, 2024). On the role of orthography and images in early foreign language learning: An ERP study. Oral presentation at the 23rd Annual Auditory Perception, Cognition, and Action Meeting, New York, NY, USA.

11. Comella, C., Quiñones, I., Gil-Robles, S., Pomposo, I., Carreiras, M., & Caballero-Gaudes, C. (February, 2024). Mapping cerebrovascular reactivity and vascular lag in gliomas with multi-echo BOLD fMRI and breath-holding. Oral presentation at the 5th annual ySMIN meeting 2024, San Sebastian, Spain.

12. Costello, B., & Schüller, A. (October, 2024). The perception of iconicity in a visual language: the LSE lexicon shows more limited use of location for iconicity compared to handshape and movement. Oral presentation at Congress of the Spanish Society for Experimental Psychology (SEPEX), Almería, Spain.

13. De Zuazo, X., Navas, E., Saratxaga, I., Bourguignon, M., & Molinaro, N. (November, 2024). Phone Pair Classification During Speech Production Using MEG Recordings. Oral presentation at the Iberspeech 2024 conference, Aveiro, Portugal.

14. Forsberg Tibblin, S., Miller, R., Moia, S., & Caballero-Gaudes, C. (November, 2024). Vascular RSN-like patterns? Hold your breath. Oral presentation at BrainModes Conference 2024, Bilbao, Spain.

15. Gurtubay-Antolin A., Bruña R., Collignon O., & Rodríguez-Fornells, A. (September, 2024). Alpha-band oscillations reflect tactile expectation via the engagement of occipital regions in early blindness. Oral presentation at 53rd Congress of German Psychological Society (DGPs), Viena, Austria.

16. Hoversten, L., & Martin, C.D. (November, 2024). Bilinguals Suppress a Task-Irrelevant Language at the lexical and semantic levels during comprehension. Oral presentation at the Psychonomic Society's 2024 Annual Meeting, New York, USA.

17. Issa, M.F., Khan, I., Ruzzoli, M., Molinaro, N., & Lizarazu, M. (December, 2024). Enhancing Auditory Component Detection in EEG/MEG Data Using Time-Frequency Deep Networks. Oral presentation at XXXVII Neumann Colloquium, Szeged, Hungary.

18. Ito, A., Bautista, A., & Martin, C.D. (September, 2024). Cognate facilitation on verb-based L2 prediction depends on proficiency. Oral presentation at the 2024 conference of Architectures and Mechanisms for Language Processing (AMLAP), Edinburgh, UK.

19. Jacobsen, J., Pinet, S., & Martin, C. (May, 2024). Elicitation procedure affects Spanish speakers' productions of English vowels. Oral Presentation at 8th International Conference on English Pronunciation: Issues & Practices (EPIP8), Santander, Spain.

20. La Pietra, M., & Ruzzoli, M. (October, 2024). The "sweet spot" of cognitive conflict. Oral presentation at the XIV SEPEX Conference, Almeria, Spain.

21. La Pietra, M., Vives, M.L., Molinaro, N., & Ruzzoli, M. (May, 2024). Finding Enjoyment

through cognitive conflict. Oral presentation at Control Processes conference 2024, Birmingham, UK.

22. Lenc, T. (November, 2024). Measuring self-similarity in empirical signals to understand musical beat perception. Oral presentation at Neuroscience and Music Ontology (NeMO-CAMP) workshop, Carry-le-Rouet, France.

23. Lerma-Usabiaga, G., Lecca, L., & Paz-Alonso, P.M. (October, 2024). Structural dynamics of human cortico-subcortical connections across the lifespan: the case of thalamocortical projections. Oral presentation at the SEPEX Annual meeting, Almeria, Spain.

24. Li, P., & Xi, X. (July, 2024). The perception of Spanish lexical stress by proficient Mandarin learners of Spanish. Oral presentation at Speech Prosody 2024, Leiden, The Netherlands.

25. Matar, S., & Marantz, A. (October, 2024). Neural bases of proactive and predictive processing of meaningful sub-word units in speech comprehension.Oral presentation at Sociedad Española de Psicología Experimental (SEPEX), 2024, Almería, Spain.

26. Martin, C.D., Brouwer, S., Foucart, A., Solchaga Erneta, D., Stoehr, A. (October, 2024). Orthographic effects in L1 speech production. Oral presentation at SEPEX conference, Almeria, Spain.

27. Mornati, G., Molinaro, N., Lallier, M., Carreiras, M., & Kalashnikova, M. (June, 2024). Cortical tracking of native and non-native speech in bilingual and monolingual Spanish/Basque infants at 4 and 7 months. Oral presentation at Workshop on Infants Language Development (WILD), Lisbon, Portugal.

28. Melguy, Y.V., Martin, C.D., & Samuel, A.G. (April, 2024). What's in an accent? Unpacking sources of cross-linguistic influence in third-language speech production. Oral presentation at the Crossing the Strait Seminar, Córdoba, Spain.

29. Melguy, Y.V., Martin, C.D., & Samuel, A.G. (May, 2024). Cross-linguistic interference and the perception-production relationship in L3 sound pronunciation. Oral presentation at the 13th International Seminar on Speech Production, Autrans, France.

30. Ordoñez, J., Giezen, M., & Costello, B. (October, 2024). Postlexical locus of semantic interference: evidence from bimodal bilingual picture-word interference. Oral presentation at Congress of the Spanish Society for Experimental Psychology (SEPEX), Almería, Spain.

31. Pastureau, R., Molinaro, N. (September, 2024). Krajjat: A Python Toolbox for Analysing Body Movement and Investigating its Relationship with Speech. Oral presentation at Symposium Series on Multimodal Communication (MMSYM), Frankfurt, Germany.

32. Paz-Alonso, P.M., Mengxing, L., & Lerma-Usabiaga, G. (October, 2024). Advanced MRI protocols to study subcortical contributions to cognition: The thalamus and language function. Oral presentation at the SEPEX Annual meeting, Almeria, Spain.

33. Pérez-Navarro, J., Olasagasti, I., Gimeno, J.G., Molinaro, N., & Lallier, M. (October, 2024). Neurocognitive adaptation to the syllabic timing: evidence from MEG. Oral presentation at XIV Conference of the Spanish Society for Experimental Psychology(SEPEX), Almería, Spain.

34. Pinet, S. (April, 2024). Everyday touch typists: incidental expertise in typing. Oral presentation at the Sixth Annual Meeting of the Cognitive Society of Culture, Valencia, Spain.

35. Rivolta, C. L., Costello, B., Lizarazu, M., & Carreiras, M. (October, 2024). The role of different articulators in cortical tracking of sign language.Oral presentation at Sociedad Española de Psicoñogía Experimental (SEPEX) 2024, Almería, Spain.

36. Ruzzoli, M. (October, 2024). On the neuro-affective response to violation of expectations. Oral presentation at the XIV SEPEX Conference, Almeria, Spain.

37. Samuel, A.G., Kapnoula, E.C., & Baese-Berk, M.M. (November, 2024). The relationship of speech perception and speech production: It's complicated. Oral presentation at the 65th meeting of the Psychonomic Society, New York, NY, USA.

38. Savic, O. (June, 2024). Seeing Through Language: Structure of the Language Input to a Blind Child. Oral presentation at the Workshop on Infant Language Development (WILD), Lisbon, Portugal. #Silvestri, V., Fernández-Merino, L., Menn, K., Polver, S., & Phillips, E. (July, 2024). Cutting-edge tools in EEG applied to speech processing. Oral presentation at the International Congress on Infant Studies, Glasgow, Scotland.

39. Stoehr, A., Fikkert, P., & van Hell, J. (February, 2024). Perceptual voicing asymmetries in native speakers of English and Dutch. Oral presentatiton at Fonologi i Norden, Stockholm, Sweden.

40. Tabas, A., Hennequin, G., Wolpert, D., & Lengyel, M. (September, 2024). Is an internal notion of context critical to predict context-dependent observations? Oral presentation at the 53rd DGPs Congress/15th ÖGP Conference, Vienna, Austria.

41. Tabas, A., Sönnichsen, H., Kaur, S., & Von Kriegstein, K. (May, 2024). Perceptual inference involves corticothalamic computations. Oral presentation at Thalamocortical Networks Conference, San Sebastian, Spain.

42. Thomas, T., Takahesu-Tabori, A., Stoehr, A., & Xu, Y. (May, 2024). The impact of bilingual language proficiency on automatic speech recognition accuracy in children. Oral presentation at the International Symposium on Bilingual and L2 Processing in in Adults and Children (ISBPAC 2024), Swansea, UK.

43. Xi, X., & Zhou, S., & Li, P. (July, 2024). Duration as a prosodic marker of contextual factors in Mandarin positive polar questions. Oral presentation at Speech Prosody 2024, Leiden, the Netherlands.

44. Zjakic, H., Lallier, M., & Kalashnikova, M. (June, 2024). The role of language-specific cues in predictive behaviours in monolingual and bilingual infants. Oral presentation at the 2024 Workshop on Infant Language Development (WILD), Lisbon, Portugal.

45. Zjakic, H., Lallier, M., & Kalashnikova, M. (July, 2024). Early Prediction Abilities and Executive Function Development in Monolingual and Bilingual Infants. Oral presentation at the 2024 International Congress of Infant Studies (ICIS), Glasgow, Scotland.

INVITED TALKS

1. Abu El Adas, S. (February, 2024). Variability in Language processing. Invited talk at Stony Brook University, New York, USA.

2. Abu El Adas, S. (April, 2024). Speech perception and production distinctness in children. Invited talk at the Laboratoire de Phonétique et Phonologie (Sorbonne Nouvelle & CNRS), Paris, France.

3. Abu El Adas, S. (September, 2024). How production variability manifests in clinical and non-clinical populations. Invited talk at Communication Sciences and Disorder department at Long Island University, New York, USA.

4. Biondo, N. (October, 2024). Bridging the gap: From linguistic theory to psycholinguistics in the assessment of post-stroke comprehension deficits. Invited talk within the symposium “Towards modern, theory-driven approaches to grammar in aphasia”, Society for the Neurobiology of Language 16th Annual Meeting, Brisbane, Australia.

5. Caballero-Gaudes, C. (October 4, 2024). Dynamic brain networks: electrophysiological correlates and impact of baseline physiology. Invited talk at the ESMRMB 40th Annual Scientific Meeting, Barcelona, Spain.

6. Carreiras, M. (July 2024). Neural processing in healthy Spanish-Basque bilinguals and in bilingual patients with low grade gliomas. Invited talk at Highlights in the Language Sciences Conference 2024, Nijmegen, The Netherlands.

7. Carreiras, M. (September, 2024). Lenguaje y lectura. Invited talk at Neurobiología de las dificultades de aprendizaje; modelos educativos y prácticos en dislexia y discalculia, Universidad Internacional Menendez Pelayo, Santander, Spain.

8. Costello, B. (December, 2024). Exploring new spaces in language through languages in space: why we should study sign language. Invited talk at the Faculty of Medieval and Modern Languages, University of Oxford, UK.

9. Fernández-Merino, L. (March, 2024). Temporal structure of music improves neural encoding of speech in infancy. Invited talk at the Language, Attention, Music, and Audition (LAMA) Lab, University of Toronto, Mississauga, Canada.

10. Kalashnikova, M. (July, 2024). Early bilingual experience and cognitive development in the first year of life. Invited talk at the Workshop "Language Acquisition: How we learn our first languages", IKER Research Centre for Basque Language and Texts, Bayonne, France.

11. Kapnoula, E.C. (March, 2024). Individual differences in speech perception gradiency: Current insights and future directions. Invited talk at the Neurolinguistics in Sweden (NLS) guest lecture series, Lund University, Lund, Sweden.

12. Kapnoula, E.C. (May, 2024). Individual differences in speech perception gradiency: What do we know so far? Invited talk at the UConn Individual Differences Workshop, University of Connecticut, Mansfield, USA.

13. Lallier, M. (March 2024). How do new technologies allow for managing neurodiversity in dyslexia in practice? Keynote speaker at the II

International Seminar: Neurodiversity and Emerging Technologies, Burgos, Spain.

14. Li, P. (2024, June). Chinese speakers' acquisition of Spanish lexical stress and intonation [in Chinese: 中国学生的西班牙语重音和句调习得]. Invited talk at the Department of Hispanic Studies, East China Normal University. Online event.

15. Malharin, I. (April, 2024). Hizkuntza, garuna eta elebitasunaren arteko lotura. Invited talk at the San Telmo Museum for the Garuna(k) exhibition, Donostia San-Sebastian, Spain.

16. Mancini, S. (February, 2024). Interplay between language and domain-general functions: evidence from Stroke. Invited talk at University of Siena, Siena, Italy.

17. Martin, C. (May, 2024). How to optimize foreign accent in speech sound and word production. Invited talk at the Department of Developmental Psychology and Socialisation, University of Padova, Padova, Italy.

18. Matar, S. (February, 2024). Neural basis of structure processing in language comprehension. Invited talk at the Linguistics Department at Queen Mary University of London, London, UK.

19. Matar, S. (February, 2024). Processing latent structural information in language comprehension. Invited talk at the Language Group Meeting at the Cognition and Brain Sciences Unit at the University of Cambridge, Cambridge, UK.

20. Matar, S. (February, 2024). Arabic morphology as a window into how the brain processes language. Invited talk at the 37th Arabic Linguistics Symposium (ASAL), New York, USA.

21. Martin, C.D. (June, 2024). Enhancing Novel Speech Sounds and Word Learning in Second Language Acquisition. Keynote speaker at Conference on Multilingualism (COM), Aix-en-Provence, France.

22. Martin, C.D. (May, 2024). How to optimize foreign accent in speech sound and word production. Invited talk at Department of Developmental Psychology and Socialisation, University of Padova, Padova, Italy.

23. Martin, C.D. (October, 2024). How to optimize foreign accent in speech sound and word production. Invited talk at University of Geneva, Switzerland.

24. McLaughlin, D.J. (February, 2024). The psycholinguistics of accented speech. Invited talk at University of California Santa Cruz, CA, USA.

25. McLaughlin, D.J. (April, 2024). Accents, adaptation, and effort. Invited talk at a colloquium at the University of Oregon, Eugene, USA.

26. McLaughlin, D.J. (April, 2024). Perceptual mechanisms that support accent adaptation. Invited talk at the UC Berkeley Phonetics and Phonology Forum, Berkeley, USA.

27. McLaughlin, D.J. (April, 2024). Rapid accommodation of talker and accent variation. Invited colloquium at University of Oregon, Eugene, USA.

28. McLaughlin, D.J. (May, 2024). Perceptual mechanisms that support accent adaptation. Invited talk at the UC Davis Spring Psychology Conference, Davis, USA.

29. McLaughlin, D.J. (April, 2024). Rapid accommodation of talker and accent variation. Invited talk at Phorum, University of California Berkeley, California, USA.

30. McLaughlin, D.J. (May, 2024). Sandwich Builder: Using Gorilla to Create "Gamified" Experiments. Invited talk at Gorilla Presents, online.

31. McLaughlin, D.J. (May, 2024). Rapid accommodation of talker and accent variation. Keynote at 2024 Spring Psychology Conference, University of California Davis, California, USA.

32. Molinaro, N. (October, 2024). Language proficiency is related to the tracking of the speech acoustics. Invited talk at the LMD Conference 2024. Coimbra, Portugal.

33. Molinaro., N. (November 2024). An oscillatory mechanism for segmenting speech into discrete linguistic units. Keynote talk, Meeting of the Mind-Brain College of ULisboa. Lisbon, Portugal.

34. Paz-Alonso, P.M. (October, 2024). Thalamic involvement in language systems using advanced MRI protocols. Keynote presentation at the 3rd Forum on Bridging East and West: Cutting-Edge Perspectives in Language and Cognitive Science. Beijing, China.

35. Paz-Alonso, P.M. (November, 2024). Task-related and resting-state fMRI. Designs and procedures. Univariate and multivariate data analysis. Invited talk at the annual meeting of the Sociedad Española de Neurología (SEN). Valencia, Spain.

36. Pérez-Navarro, J. (May, 2024). Amount of linguistic exposure modulates the cortical tracking of speech in bilingual children. Invited talk at Cognition and language lab (COLab), University of

Padova, Italy.

37. Savic, O. (April, 2024). Seeing Through Language: The Contribution of Co-occurrence Regularities Language to the Development of Semantic Organization. Invited talk at Lisbon Baby Lab, Lisbon, Portugal.

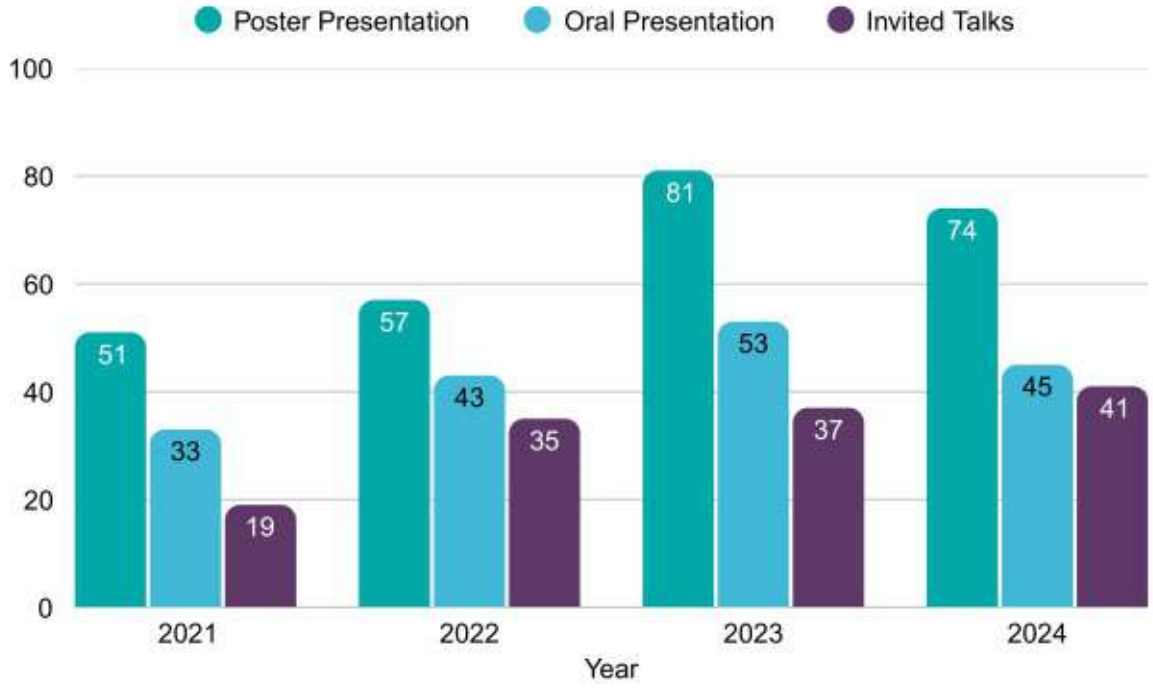
38. Savic, O. (October, 2024). Semantic organisation from a behavioural-developmental perspective. Keynote talk at The International Meeting on Quantifying Semantic-Orthographic Regularities Across Languages (QuaSemO 2024), Munich, Germany.

39. Soto, D. (October, 2024). A framework for unconscious processing. Invited talk at the Consciousness Club, Division of Psychology, University College London, UK.

40. Soto, D., Abdennour, N., & Margolles, P. (November, 2024). Coadaptation enhances decoded neurofeedback training. Invited talk at the Real-Time Functional Imaging and Neurofeedback Conference (rtFIN), Heildelberg, Germany.

41. Stoehr, A. (March, 2024). How can orthography inform bilingual language acquisition and speech processing?Keynote lecture at the Konstanz Linguistics Conference, Konstanz, Germany.

Participation in corferences 2021-2024



The studies and scientific publications carried out by BCBL have been made possible thanks to the voluntary participants, the majority of whom live in Gipuzkoa.
It is necessary to have a comprehensive database to be able to carry out our studies.

The bulk of participants of our website, www.bcbl.eu/participa, is made up of more than 12800 users between the ages of 18 and 85, who, according to their linguistic profile, can enroll in BCBL studies.

Between 2021-2024, the BCBL has completed more than 26,000 experimental sessions involving more than 10,000 participants. These sessions serve as an important grass-roots approach to forming groups within the local community for the purpose of learning about and developing an appreciation for our research, and for scientific research more broadly. Since the BCBL opened, the number of participants has increased, indicating our efforts to interact with the local community and involve them actively in our mission have a very optimistic future trajectory.

In order to carry out all the experiments developed at the BCBL, the active participation of infants, children and adults- ages 18 to 35- and elderly participants is required.

These participants take part in tests using different techniques, such as behavioral techniques, Electroencephalography, Magnetoencephalography, Magnetic Resonance Imaging, and Eye Tracking.

Trends and Key Insights

Increase in Overall Participation: Compared to previous years, the number of participants has steadily increased. The total number of participants in 2024 (6,959) reflects a continuation of this upward trend, following a dip in 2023.

Growth in Online Experiments: Online participation has seen a steady increase, reaching 1,828 in 2024. This highlights the growing acceptance and feasibility of remote testing methodologies.

Steady Engagement in Behavioral and EEG Studies: Behavioral (BEH) studies remain the most popular, consistently drawing high numbers, while EEG participation has also remained stable.

Increased Use of Eye Tracking and FMRI: A notable rise in Eye Tracking (939 in 2024) and FMRI (429 in 2024) suggests an expansion in studies requiring these techniques.

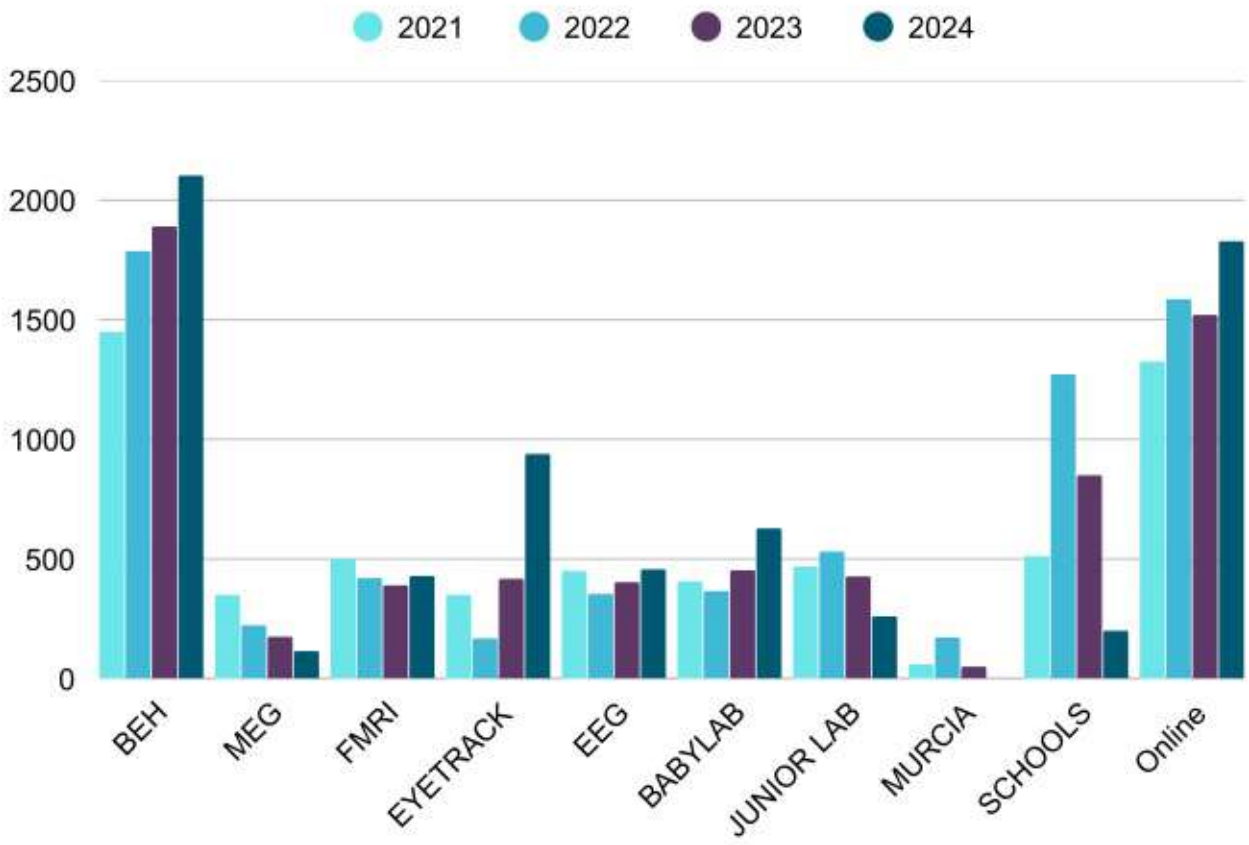
BabyLab and JuniorLab Participation: BabyLab and JuniorLab continue to provide valuable insights, with BabyLab seeing significant growth in 2024 (628 participants) compared to previous years.

The continued expansion of the database, new methodological approaches, and increased engagement across different participant groups indicate that the BCBL remains at the forefront of cognitive neuroscience research. These trends highlight both the resilience of our research infrastructure and the willingness of participants to engage in cutting-edge scientific studies.

These are the main figures regarding adult, children and baby participants and participation in experiments:

	BEH	MEG	FMRI	EYETRACK	EEG	BABYLAB	JUNIORLAB	MURCIA	SCHOOLS	Online	TOTAL
2021	1450	350	500	350	450	407	468	60	512	1325	5872
2022	1787	223	420	168	354	366	531	172	1272	1586	6879
2023	1890	175	390	417	403	453	427	50	850	1520	6575
2024	2103	115	429	939	457	628	260	0	200	1828	6959
TOTAL											**26285**

PARTICIPANTS 2021-2024



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6.A ORGANIZATION OF CONFERENCES & WORKSHOPS
6.B SEMINARS ORGANICED BY BCBL
6.C SCIENCE OUTREACH ACTIVITIES
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SCIENCE OUTREACH AND VISIBILITY

6.A ORGANIZATION OF CONFERENCES & WORKSHOPS

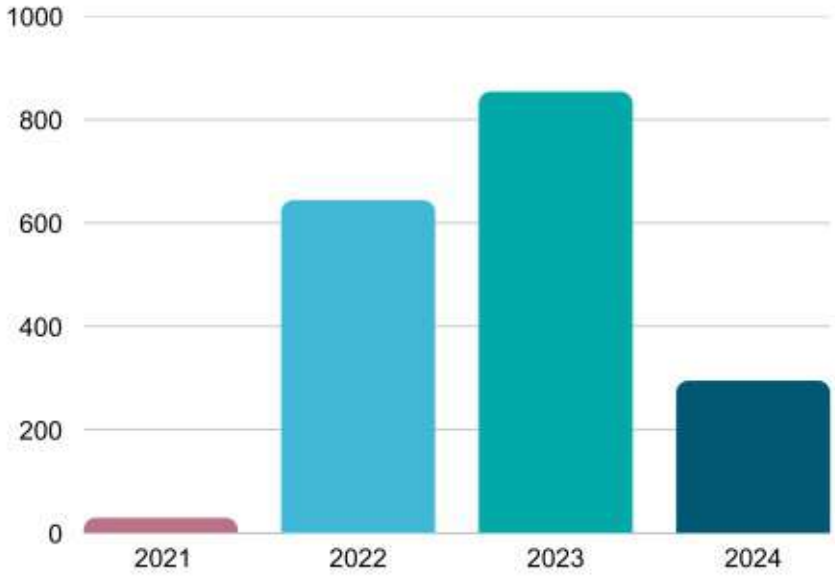
Since its foundation, the BCBL has played a leading role in promoting research in cognitive neuroscience and language through the organization of international conferences and workshops. These events, held annually, attract some of the most influential researchers in the field and serve as key mechanisms for internationalization and networking.

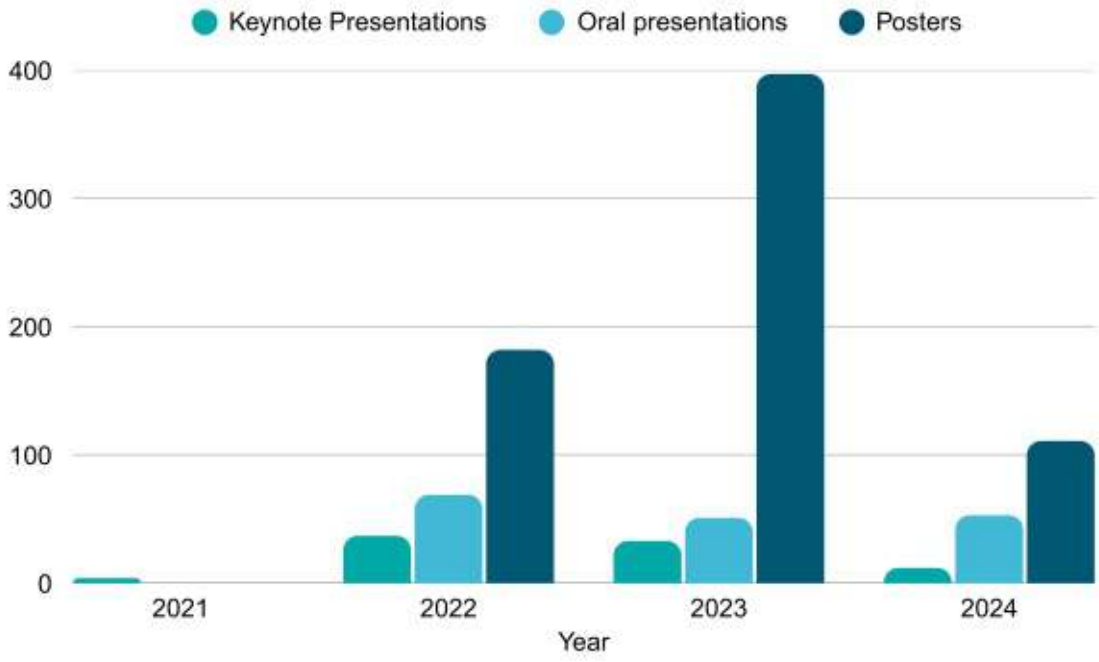
Between 2021 and 2024, the BCBL organized and hosted 15 international conferences and workshops. These events have not only strengthened scientific collaboration but also provided essential opportunities for young researchers to engage with international leaders, attend lectures, share their work, and expand their professional networks.

The BCBL has continued to lead the organization of high-impact scientific events. The thematic diversity of events during this period has promoted interdisciplinary knowledge exchange in cognitive neuroscience, language, and learning. Participation numbers confirm the growing scientific interest in the BCBL's initiatives.

This section offers a detailed overview of the main conferences and workshops hosted from 2021 to 2024, reaffirming the BCBL's commitment to scientific excellence and knowledge dissemination.

Conferences attendees during 2021-2024





2021

- **Brain Hack 2021**
  Online edition (4 keynotes, 0 oral presentations, 0 poster presentations, 30 attendees)

2022

- **Brain Hack Donostia - Online edition**
  (4 keynotes, 0 oral presentations, 0 poster presentations, 34 attendees)
- **Cognitive Neurosurgery Summit**
  (15 keynotes, 0 oral presentations, 0 poster presentations, 67 attendees)
- **Phonology and Dyslexia Workshop**
  (2 keynotes, 9 oral presentations, 25 poster presentations, 106 attendees)
- **International Conference on Interdisciplinary Advances in Statistical Learning**
  (8 keynotes, 31 oral presentations, 76 poster presentations, 172 attendees)
- **Workshop on Infant Language Development (WILD)**
  (3 keynotes, 29 oral presentations, 81 poster presentations, 149 attendees)
- **Language Teaching Workshop – Teacher's Day**
  (5 keynotes, 0 oral presentations, 0 poster presentations, 116 attendees)

2023

- **AMLaP Conference- Architectures and Mechanisms for Language Processing**
  (4 keynotes, 29 oral presentations, 327 poster presentations, 430 attendees)
- **IWORDD 2023 - International Workshop on Reading and Developmental Dyslexia**
  (5 keynotes, 22 oral presentations, 62 poster presentations, 140 attendees)
- **IWORDD 2023 - From Theory to Practice**
  (5 keynotes, 3 oral presentations, 0 poster presentations, 130 attendees)
- **Cutting EEG Donosti Garden 2023**
  (5 keynotes, 7 oral presentations, 15 poster presentations, 47 attendees)
- **Brain Hack 2023**
  (5 keynotes, 0 oral presentations, 0 poster presentations, 30 attendees)

2024

- **Brain Hack 2024**
  (5 keynotes, 0 oral presentations, 0 poster presentations, 45 attendees)
- **Thalamocortical Networks**
  (3 keynotes, 23 oral presentations, 15 poster presentations, 100 attendees)
- **Statistical Learning**
  (4 keynotes, 30 oral presentations, 96 poster presentations, 150 attendees)

2021

BrainHack Donostia 2021

Dates: November 22 – November 24, 2021
Location: Donostia-San Sebastián
Format: 4 Keynotes
Participants: 30
Theme: Neuroscience tools and methodologies.
Speakers: Sam Schwarzkopf, Oscar Esteban, Anabel Forte, Arthur Samuel

In this edition of BrainHack, the focus was on project development sessions.

2022

BrainHack Donostia 2022 - Online Edition

Dates: November 23 - November 25, 2022
Location: Donostia-San Sebastián
Participants: 34
Format: 4 Keynotes
Theme: Open science, neuroimaging, interdisciplinary collaboration.
Speakers: Valentina Borghesani, Fabián Pedregosa, Fidel Alfaro Almagro, Oscar Esteban

Included hands-on tutorials, along with events for project collaboration and social networking.

Cognitive Neurosurgery Summit

Dates: December 2, 2022
Location: Bilbao, Bizkaia
Participants: 67
Format: 15 Keynotes
Theme: Cognitive neuroscience applications in neurosurgical procedures.

Multidisciplinary speakers list including Manuel Carreiras and prominent neurosurgeons.

Phonology and Dyslexia Workshop

Dates: January 26, 2022
Location: Donostia-San Sebastián
Participants: 106
Format: 2 Keynotes, 9 Oral Presentations, 25 Posters
Theme: Bridging theoretical phonology and cognitive dyslexia research.
Speakers: Professor Usha Goswami, Professor Alan C. L. Yu

Held as part of the Old World Conference on Phonology (OCP19)

International Conference on Interdisciplinary Advances in Statistical Learning

Dates: June 1 - June 3, 2022
Location: Donostia- San Sebastián
Participants: 172
Format: 8 Keynotes, 31 Oral Presentations, 76 Posters

Theme: Statistical learning across language, music, perception.
Speakers: Floris de Lange, Adele Goldberg, James Magnuson, Lauren Emberson.

The conference will discuss statistical learning and its underlying mechanisms from behaviour to neuroscience, in various domains such as language, music, vision, and audition, with data from adult participants, development, individual differences, computational modeling, and non-human species.

Workshop on Infant Language Development (WILD)

Dates: June 9 - June 11,2022
Location: Donostia - San Sebastián
Participants: 149
Format: 3 Keynotes, 29 Oral Presentations, 81 Posters

Theme: Language acquisition in infancy.
Speakers: Usha Goswami, Catherine Tamis-LeMonda, Kim Plunkett.

The overarching goal of WILD is to bring together scientists with different perspectives and methodological approaches to the study of early language and cognitive development.

2022

Language Teaching Workshop – Teacher's Day

Dates: October 15, 2022
Location: Donostia-San Sebastián
Participants: 116
Format: 5 Keynotes
Theme: Language teachers.
Speakers: Emma Heyderman, Durk Gorter, Tiphaine Caudrelier, Lucía Manso, Lucía Manso, Efthymia (Effie) Kapnoula

Promote dialogue between cognitive neuroscience researchers and language teachers.

2023

AMLaP Conference
Architectures and Mechanisms for Language Processing

Dates: August 31 - September 2, 2023
Location: Donostia–San Sebastián
Participants: 430
Format: 4 Keynotes, 29 Oral Presentations, 327 Posters
Theme: Cognitive mechanisms underlying language processing.
Speakers: Vitória Piai, Esti Blanco-Elorrieta, Victor Ferreira, James Magnuson

A symposium on *The Bilingual Brain included* a plenary talk by Esti Blanco-Elorrieta and two short oral presentations.

IWORDD 2023 – International Workshop on Reading and Developmental Dyslexia

• Dates: June 7–9, 2023
Location: Donostia–San Sebastián
Participants: 270 (140 scientific session + 130 applied session)

Format: 10 Keynotes, 25 Oral Presentations, 62 Posters
Theme: Understanding the causes of dyslexia and improving diagnostic and remediation protocols
- The first two days were dedicated to scientific sessions featuring invited lectures, symposia, and discussions.
- The third day, titled From Theory to Practice, focused on knowledge transfer between researchers, educators, parents, and clinicians.
- Live interpretation was provided in Spanish, Basque, and English to enhance accessibility.

CuttingEEG Donosti Garden 2023

Dates: October 16–19, 2023
Participants: 47
Format: 5 Keynotes, 7 Oral Presentations, 15 Posters
Theme: Cutting-edge EEG and MEG data analysis methods

- Part of the global CuttingGardens initiative, held simultaneously across multiple locations.
- Focused on neural tracking of environmental stimuli and M/EEG methodological best practices.
- Keynote Speakers: Guiomar Niso, Almudena Capilla, Carmen Vidaurre, Luis Ciria, Ricardo Mutuberria.

Brain Hack Donostia 2023

Dates:
Location: BCBL, Donostia–San Sebastián
Participants: 30
Format: 5 Keynotes, Collaborative Sessions

Theme: Open science, cognitive processes during sleep, functional cortical organization
- Featured hands-on workshops, collaborative project development, and hackathons.
- Designed to build community around neuroimaging tools and computational neuroscience.

2024

Brain Hack Donostia 2024

Dates: November 25–27, 2024
Location: BCBL, Donostia–San Sebastián
Participants: 45
Format: 5 Keynotes, Collaborative Sessions

Theme: Open science, cognitive processes during sleep, functional cortical organization
- Featured hands-on workshops, collaborative project development, and hackathons.
- Designed to build community around neuroimaging tools and computational neuroscience.

Thalamocortical Networks Conference – 1st Edition

Dates: May 16–17, 2024
Location: Palacio Miramar, Donostia–San Sebastián
Participants: 100
Format: 3 Keynotes, 23 Oral Presentations, 15 Posters

Theme: Thalamocortical interactions in cognition and clinical neuroscience
- Keynotes: Michael Halassa, Pieter Roelfsema, Katharina von Kriegstein
- Other featured speakers: Melanie Wilke, Carmen Cavada, Francisco Clascá, László Acsády, Ferenc Mátyás, Mathieu Wolff, Mototaka Suzuki, Pedro M. Paz-Alonso

Statistical Learning 2024

Dates: June 5–7, 2024
Location: Palacio Miramar, Donostia–San Sebastián
Participants: 150
Format: 4 Keynotes, 30 Oral Presentations, 96 Posters

Theme: Interdisciplinary perspectives on statistical learning mechanisms
- Keynotes: William Tecumseh-Fitch (Vienna), Tom Griffiths (Princeton), Rebecca Treiman (Washington University), Anna Schapiro (Penn, Early Career Award Speaker)
- Topics included learning in language, music, vision, and audition, as well as the combinination of behavioral, computational, and neuroimaging approaches.

BCBL organizes research seminars with participation of invited external speakers. All these seminars take place at the BCBL Auditorium and via zoom. The access is free to the scientific community of the area and the announcements are posted at https://www.bcbl.eu/en/conferences
Please find below the list of seminars organized by the BCBL:

2021

1. **Elena Barbieri**. Neural mechanisms of sentence processing and dynamics of its recovery in aphasia: a multimodal neuroimaging perspective. February 25, 2021.
2. **Katarzyna Jednoróg.** Brain networks for speech and reading in typical and atypical readers. April 29, 2021.
3. **Carmen Vidaurre.** Brain-computer interfaces and sensorimotor oscillations. May 14, 2021.
4. **Yamil Vidal.** A general-purpose mechanism of cisual feature association in visual word identification and beyond. May 20, 2021.
5. **Arturo Hernandez.** Sensorimotor plasticity and cognitive flexibility: A Neuroemergentist approach. September 16, 2021.
6. **Jean-Remi King.** Towards a computational model of language processing in the adult human brain. September 23, 2021.
7. **Jim Magnuson.** Breaking the sound barrier: Toward realistic models of human speech recognition. September 30, 2021.
8. **Stéphnie Riès.** Frontal control mechanisms in language production. October 7, 2021.
9. **Adeen Flinker.** Intracranial electrophysiology of speech perception and production. October 10, 2021.
10. **Narly Golestani.** Language processing in the healthy, dysfunctional and expert brain. November 11, 2021.
11. **Saskia Haegens.** Oscillatory building blocks underlying perception & cognition. December 2, 2021.
12. **Yury Shtyrov.** Brain signatures of online word acquisition: functional, structural and neuromodulatory evidence. December 9, 2021.

2022

13. **Emily B. Myers.** Phonetic plasticity at multiple timescales. March, 3, 2022.
14. **Thanassi Protopapas.** There is a big gap in our understanding of reading fluency and the study of serial naming can help address it. March 17, 2022.
15. **Aurelio Cortese.** Metacognitive resources for efficient learning. March 23, 2022.
16. **Patrícia Figueiredo.** Imaging the brain's neuronal (and non-neuronal) physiology using functional MRI (fMRI). March 31, 2022.
17. **Swathi Kiran.** Advances in predicting recovery of language in monolingual and bilingual individuals after stroke: Towards precision rehabilitation. April 07, 2022.
18. **Grant Berry.** Why I left academia... and why I came back. May 05, 2022.
19. Francisco Clascá. Cellular and synaptic diversity of the thalamic output pathways. May 19, 2022.
20. **Charo Rueda.** Emergence of executive control in infancy: brain and behavior markers. May 25, 2022.
21. **Thomas Hannagan.** Challenging the deep learning approach to word recognition with topography and predictive coding. May 26, 2022.
22. **Alexis Hervais-Adelman.** Language in Motion – comprehension, control and reading in action. September 07, 2022.
23. **Maaike Vandermosten.** Testing the role of hippocampus for language learning in developmental dyslexia and stroke-induced aphasia. September 29, 2022.
24. **Fabio Richlan.** From weak to peak: integrating cognitive neuroscience research across various performance domains. October 06, 2022.
25. **Susanne Brouwer.** The Influence of Sub-Optimal Linguistic Contexts on Moral Decision Making. October 20, 2022.

26. **Claudia Männel.** Electrophysiology of early language acquisition. October 27, 2022
27. **Lars Meyer.** Slow rhythms of language comprehension from inside out?. October 28, 2022.
28. **Ben Pitt.** Flexible frameworks for spatial memory and language. November 10, 2022
29. **Yana Fandakova.** Cognitive control contributions to learning and memory: Lifespan development and neural plasticity. November 17, 2022.
30. **Rachel Hayes-Harb.** The influence of written input on phonological and phonolexical development in adult language learners. December 01, 2022.

2023

31. **Iñigo Gabilondo.** The retina as a biomarker of brain diseases. January 26, 2023.
32. **Alejandro Tabas.** Predictive processing as a synergistic cortico-subcortical computation. February 16, 2023.
33. **Gareth Gaskell.** The role of sleep and episodic memory in linguistic interaction. February 23, 2023.
34. **Ram Frost.** Towards a statistical learning theory of proficient reading. February 28, 2023.
35. **Hiromasa Takemura.** Visual white matter tracts and retinotopic organization of the primate visual system. March 13, 2023.
36. **Juan Carlos Gómez-Esteban.** Long-term neurological manifestations following SARS-CoV-2 infection. March 14, 2023.
37. **Milena Rabovsky.** Modeling neural responses during human language comprehension. April 20, 2023.
38. **Marieke Longcamp.** Cognitive and neural correlates of writing acquisition and practice. April 27, 2023.
39. **Emily S. Finn.** “Idiosynchrony”: Using naturalistic stimuli to draw out individual differences in brain and behavior. May 11, 2023.
40. **Joaquin Goñi.** Tangent functional connectomes uncover more unique phenotypic traits. May 29, 2023.
41. International Workshop on Reading and Developmental Dyslexia. June 07, 2023.
42. **René Westerhausen.** Auditory laterality and hemispheric integration: a dichotic-listening perspective. June 15, 2024.
43. **Jiyeon Lee,** Implicit syntactic learning in post-stroke aphasia. June 20, 2023.
44. **Gesa Hartwigsen.** Flexible neural network interactions during language processing – Insights from healthy, aging, and lesioned brains. June 29, 2023.
45. **Margarita Kaushanskaya.** Learning from Dual-Language Input. September 14, 2023.
46. Katherine Rastle. Learning to read. September 28, 2023.
47. **Frank Scharnowski.** Modulating human brain function using closed-loop neurofeedback. November 09, 2023.
48. **Virginia Valian.** Hypothesis: Nothing improves higher cognitive functions. November 20, 2023.
49. **Benedikt Zoefel.** Entrained Brain Rhythms in Speech Processing. Causality, Processing Modes and the Cerebellum. November 27, 2023.
50. **Andrea Alamia.** The role of oscillatory traveling waves in cognition: a predictive coding perspective. November 28, 2023.

2024

51. **Casey Lew-Williams.** Infants’ learning from the dynamics of their natural communicative environments. January 25, 2024.
52. **Boris A. Kleber.** Voice Production: Insights from Singing Research. February 20, 2024.
53. **Chiara Cantiani.** Early electrophysiological markers in language and learning impairment: long-term follow-up from infancy to pre-school age and impact of early training. February 22, 2024.
54. **Bruno Rossion.** How does the human brain recognize faces?.February 29, 2024

55. **Ethan Kutlu.** Can you meet me halfway? Speech perception in linguistically diverse communities. March 14, 2024.
56. **Marc-Lluis Vives.** On the relationship between semantic representations and decision-making. March 15, 2024.
57. **Kate Nation.** 'Book language'and its implications for children's language, literacy, and development. March 21, 2024.
58. **Yee Lee Shing.** Predictive processing and memory across the lifespan. April 11, 2024.
59. Jennifer E. Arnold. Discourse level adaptation: are representations semantically specific?.April 25, 2024.
60. **Marisa Carrasco.** How Voluntary and Involuntary Attention Differentially Shape Perception. May 2, 2024.
61. **Defne Abur.** Sensorimotor control of typical and disordered speech. May 9, 2024.
62. **Txomin Romero.** The DIPC Supercomputing Center services. May 23, 2024.
63. **Arnaud Destrebecqz.** How do we learn statistically: an attempt to compare bracketing and clustering models. June 13, 2024.
64. **Stefano Cappa.** Primary progressive aphasia: another window into brain and language. June 20, 2024.
65. **Swathi Kiran.** Using Machine Learning and AI to predict neuroplasticity and recovery in aphasia: moving towards precision medicine. September 23, 2024.
66. **Mirjam Ernestus.** Rhythm in speech production and in the actual speech signal. October 10, 2024.
67. **Elsje van Bergen.** Gene-environment interplay in reading development. November 14, 2024.
68. **Katja Kornysheva.** Beyond the motor engram: Neural control of skilled actions. November 20, 2024.
69. **Elizabeth Jeffereis.** The neural basis of flexible semantic cognition. December 5, 2024.


Conclusions

From 2021 to 2024, the Basque Center on Cognition, Brain and Language (BCBL) has upheld a deep commitment to science outreach, promoting cognitive neuroscience and language research to a wide audience. Through a blend of in-person and digital formats, BCBL has delivered creative, inclusive, and multilingual initiatives that:

1. Strengthen BCBL's visibility as a reference center in cognitive neuroscience at local, national, and international levels.
2. Make cutting-edge scientific knowledge accessible, engaging, and relevant to society

2021

With the ongoing effects of the COVID-19 pandemic, BCBL adapted its outreach strategy to combine online and in-person activities. This hybrid model allowed the continuation of its mission to make science accessible to all.

BRAIN AWARENESS WEEK 2021

Combined an online scientific fair with in-person children's workshops at Eureka! Zientzia Museoa. The workshops targeted children aged 6–12 and used hands-on activities to explain brain function.

GROUP LEADER VIDEO SERIES

Subtitled videos were produced with research group leaders explaining their projects. These are available on BCBL's YouTube channel and official website.

BURMUINAREN TXOKOA

A joint project with Kutxa Fundazioa to stimulate science vocations through a digital platform offering educational resources in Basque, Spanish, and English. It is a free and modular online platform aimed at the general public and educational community. Its content is adapted to different age groups and available in **Basque, Spanish, and English.**

a) Virtual Lab Tour

A professionally recorded, trilingual tour of BCBL's cutting-edge neuroscience lab, showcasing equipment like **MRI, MEG, EEG** and **eye-tracking** systems. It explains, in simple terms, how research in cognitive neuroscience is conducted.

b) Virtual Children's Workshops

Aimed at **primary school children (ages 6–12)**, these interactive workshops combine **education, games, contests,** and **crafts**. Activities are tailored to three age groups:

- **Ages 6–8**: Brain care, basic anatomy, and neuron structure.
- **Ages 8–10**: Optical illusions, neuron modeling, and an introduction to brain disorders.
- **Ages 10–12**: Brain function and debunking common myths.

2022

BRAIN AWARENESS WEEK 2022

Continued in a hybrid format with interactive adult-oriented online content and in-person children's sessions at Eureka! Zientzia Museoa.

PARTICIPATION IN EMAKUMEAK ZIENTZIAN 2022

BCBL took part in this inter-institutional initiative aimed at promoting the visibility of women in science. The center hosted outreach activities and testimonials designed to inspire young girls and promote scientific careers among women of all ages and backgrounds.

WOMEN SCIENTISTS: Past and Present Event

BCBL researchers Clara Martin and Marina Kalashnikova were invited speakers at this event, where they highlighted the historical contributions of women in science and the importance of promoting present-day role models to foster inclusive scientific environments.

March 8th – International Women's Day

As part of the Women's Day celebrations, three of BCBL's Group Leaders led a workshop for early-career researchers at the center. They shared their career journeys and discussed the challenges and opportunities faced by women in scientific research.

JuniorLab

We celebrated the tenth anniversary of our JuniorLab located within a school in Vitoria, organizing a variety of activities to mark the occasion. These initiatives were further developed to promote early engagement with science among children and families. Activities included hands-on experiments, games, and tailored learning materials, while also contributing to the recruitment of participants for longitudinal developmental studies

2022

BCBL at Pint of Science 2022 – Donostia/San Sebastián (May 9–11)

Over three evenings, researchers from the Basque Center on Cognition, Brain and Language (BCBL) presented their work to the general public in a relaxed and accessible setting at Bar Amuitz. The talks focused on the mysteries of the brain, language, and human behavior, as part of the festival's "Beautiful Mind" theme.

Monday, May 9 – "Letters, Accents and Other Language Troubles"

• **Catherine Clark:** *"Reading: Letters or Words?"*
Explored how we learn to read—whether by processing letters individually or recognizing whole words—and how this differs across languages such as Spanish, French, and English.
• **Trisha Thomas:** *"Beer or Bear? Processing Foreign Accents"*
Discussed how foreign accents affect our understanding of speech and how our expectations shape how we interpret non-native speakers.

Tuesday, May 10 – "Superpowers and the Scientific Method"

• **Garikoitz Lerma-Usabiaga:** *"The Power of Your Gaze"*
Introduced Brain-Computer Interfaces (BCIs) and how eye gaze can be used to interact with technology, showcasing its transformative potential.
• **Svetlana Pinet:** *"Super Typists: How Do They Do It?"*
Investigated the cognitive and motor factors that enable some people to type at exceptional speeds.
• **Teresa Esteban Peñalba:** *"Addictions: What's Happening in My Brain?"*
Explained the role of dopamine in the brain's reward system and how substances can hijack this system, leading to addictive behavior.

Wednesday, May 11 – "Powerful Brain"

• **Karen Arellano-García:** *"Imagine Your World Without Words"*
Addressed how damage to the brain's language network can affect communication, and what strategies exist to support language recovery.
• **Lucía Manso-Ortega:** *"Can We Live Without Half a Brain?"*
Spoke about neuroplasticity and the brain's remarkable ability to reorganize and adapt, even after major structural loss.
• **Marina Kalashnikova:** *"What Do Babies Know About Language Before Speaking?"*
Highlighted how infants begin learning language from birth, and the cognitive and environmental mechanisms behind early language acquisition.

2023

ART & SCIENCE EXHIBITION

In partnership with Medialab Tabakalera's Neurohacking group, BCBL presented 'C. The Right Point of Cognitive Conflict,' an interactive exhibition exploring AI and neuroscience. Participants influenced image-generation software via behavioral tasks.

NEW CORPORATIVE VIDEO

We recorded our new corporate video, **"Decoding the Mind."** This video was produced from a documentary perspective, featuring in-depth interviews with members of the International Scientific Advisory Committee, managers, and researchers from various categories within our center.
The objective of this video is to serve as our introduction, attract international talent, provide a foundational explanation of the current state of neuroscience research, and, of course, demonstrate the rationale behind our investigations. The video is available in English, Spanish, and Basque, with comprehensive efforts made to include subtitles in these three languages, along with a professional adaptation for Spanish Sign Language (LSE). The recording at the Basque Center on Cognition, Brain and Language (BCBL) in San Sebastian was an inspiring journey into the heart of cognitive neuroscience research.

This film showcases the cutting-edge facilities and groundbreaking work conducted at BCBL, highlighting the advanced neuroimaging technologies like fMRI and MEG that allow real-time observation of brain processes. The documentary features insightful interviews, sharing perspectives on what makes BCBL a leader in the field. Through these narratives, viewers gain an understanding of how BCBL's innovative research on language processing, neurodegenerative diseases, and cognitive dysfunctions not only advances scientific knowledge but also improves quality of life. The collaborative spirit and international reach of the center, as well as its strategic location in the bilingual Basque Country, are vividly portrayed, underscoring the unique factors that establish BCBL as a global reference in neuroscience.
Here is the link to the video in English: Decoding the Mind - English. The other versions can be viewed on our channel.

Institutional Photography

The center's imagery was renewed with fresh visuals to support branding and public engagement.

2023

15th Anniversary Events

Celebrated with BCAM and BC3 through three major events: an institutional ceremony with Ikerbasque and the Basque Government, and public science fairs in Bilbao and Donostia-San Sebastián. Morning sessions were school-exclusive; afternoons were open to the public, featuring science booths and talks.

Pint of Science 2023 – Donostia/San Sebastián (May 22–24)

During the 2023 edition of the international Pint of Science festival, the Basque Center on Cognition, Brain and Language (BCBL) took part in three consecutive evenings of science outreach in Donostia/San Sebastián. A total of six BCBL postdoctoral researchers delivered engaging talks at local bars, bringing neuroscience and language research closer to the general public in a casual, relaxed setting.

May 22 – "(Re)learning to Speak"

• **Dasha Shavarina:** *"Speaking Again: How Can Neurolinguistics Help?"*
A presentation on how neurolinguistics supports language recovery in people with aphasia through therapy and brain stimulation techniques.
• **Laura Fernández-Merino:** *"Little Brains: Are Babies Really Like Sponges?"*
Explored how infants learn to speak through neural synchronization, environmental interaction, and early language processing mechanisms.

May 23 – "Environment and Genetics Shape Our Brain"

• **Amaia Carrión Castillo:** *"A Few Words on the Genetics of Speaking"*
Addressed how genetic and environmental factors interact in language development, using examples from animal studies and language disorders.
• **Marie Lallier:** *"Does Being Bilingual Affect Learning to Read?"*
Presented evidence on how bilingualism may influence reading acquisition and potentially offer cognitive advantages during this complex process.

May 24 – "Tips & Tricks for Communication"

• **Mina Jevtovic:** *"Do You Know How to Spell Every Word You Learn?"*
Discussed how visual representations and spelling impact vocabulary learning, especially when words are learned through speech alone.
• **Sandy Abu El Adas:** *"Hear Me Out! The Things We Say with Our Voice"*
Explored how our voice conveys information beyond words, including age, gender, identity, and emotional state, and how we adapt our speech depending on the listener and context.

2023

EMAKUMEAK ZIENTZIAN 2023

Emakumeak Zientzian initiative began in 2017 and has grown and strengthened each year. In 2016, the United Nations General Assembly proclaimed February 11th as the International Day of Women and Girls in Science to achieve full and equal access to and participation in science for women and girls.
In this context, Women in Science emerged with specific goals: To highlight the activities of women in science, break the traditionally male roles attributed to scientific and technical activities, and encourage girls and adolescents to choose scientific careers.
To achieve these goals, a wide program of activities is promoted, organized, developed, presented, and executed around February 11th.
Annually, various representative entities from the Basque Country's science and technology network participate as organizers of the initiative by signing a specific collaboration agreement. The signatory entities share the initiative's goals and commit to organizing actions directed at society as a whole and making a financial contribution to support the project's development.

BRAIN TALK: ELDERLY

In November 2023, the Basque Center on Cognition, Brain and Language (BCBL) hosted a public outreach event at the Aquarium in Donostia/San Sebastián to share findings from a decade-long study on bilingualism and cognitive aging. Researchers presented evidence suggesting that while bilingualism alone may not offer a direct cognitive advantage, it significantly supports healthy brain aging through increased social engagement and cognitive stimulation. The event also served as a call for new volunteers over 65 for a follow-up study aimed at identifying early markers of neurodegenerative diseases through voice analysis. The session included scientific talks by BCBL researchers Ileana Quiñones and Lucía Amoruso, as well as practical advice on brain health from neurologist Iago Rego and professor Jon Andoni Duñabeitia. The initiative highlighted the center's long-standing commitment to public science engagement and aging research.

2023

BURMUINAREN ASTEA

In March 2023, the Basque Center on Cognition, Brain and Language (BCBL), in collaboration with Eureka! Zientzia Museoa, hosted the 8th edition of its Brain Awareness Week in Donostia/San Sebastián. The event, aligned with the international campaign led by the Dana Alliance for Brain Initiatives, aimed to bring neuroscience closer to the public through interactive and educational activities. This year's edition had a special focus on Santiago Ramón y Cajal, commemorating the "Ramón y Cajal Research Year," with all workshops incorporating elements of his groundbreaking work on neurons and brain structure.

Throughout the week (March 13–19), BCBL organized two types of activities: school-targeted sessions on weekdays and family workshops during the weekend. Schoolchildren aged 6 to 12 participated in hands-on sessions exploring topics such as how neurons work, optical illusions, brain anatomy, and attention mechanisms. Weekend sessions included creative activities like building neurons with craft materials, exploring real animal brains, and understanding brain functions through playful experiments. Talks by BCBL researchers, including Laura Fernández-Merino and Ileana Quiñones González, addressed topics like early language development and cognitive "superpowers."

The initiative, led by a scientific committee including BCBL director Manuel Carreiras and doctoral researcher Ana Bautista, was a resounding success, with all sessions fully booked. Content was delivered in Basque, Spanish, and English, ensuring accessibility for diverse audiences. Beyond promoting public understanding of neuroscience, the event also served to showcase the pioneering research carried out at BCBL and to highlight the importance of public investment in cognitive science. The event was widely promoted via BCBL and museum websites, social media, and the press

2024

Throughout 2024, the BCBL intensified its public engagement efforts, hosting an impressive 720 visitors, including over 600 students, across 34 guided visits. These visits offered immersive insights into cognitive neuroscience through laboratory tours, interactive demonstrations, and Q&A sessions with researchers. Among the most notable visits were those of Juan Cruz Cigudosa, Secretary of State for Research, and Jon Bilbaoartetxe, Director of Science for the Basque Government, alongside other representatives from educational and institutional sectors.

NeureSoft Presentation to Clinical Professionals

A dedicated session was held to introduce NeureSoft, a tool designed for evaluation and treatment in clinical settings.

Park Forum – Technology Park Event

An event was organized for vocational and technical training centers with the aim of fostering collaboration between scientific research and technical education.

PINT OF SCIENCE 2024

The BCBL participated in this international science outreach initiative, organizing nine talks on topics related to language and cognition. Some of the speakers and their presentations included:
As part of the festival's 10th anniversary in Spain, BCBL played a key role in Donostia/San Sebastián's program. Over three themed evenings, nine researchers delivered engaging talks covering multisensory communication, multilingualism, and neuroscience methodologies. Events were held in local bars, with content delivered in Basque, Spanish, and sign language—reinforcing accessibility and inclusiveness.

May 13 – Multisensory communication, gesture, and sign language

- **Irene Arrieta Sagredo**: *"Look at the Voice to Hear Better!"*
- **David Hernández-Gutiérrez:** *"Look at Me, I'm Talking to You!"*
- **Anique Schüller & Chiara Luna Rivolta:** *"Hands That Speak: Iconicity in Sign Languages"*

May 14 – Multilingualism and language processing

- **Efthymia Kapnoula:** On word learning and repetition
- **Clara Martin:** On language dominance and retrieval
- **Drew McLaughlin:** On understanding foreign-accented speech

May 15 – Neuroscience research methodologies

- **Ana Joya Villanúa:** On traditional and modern approaches to brain study
- **Giulia Mornati:** On disease development and therapies
- **Manuela Ruzzoli:** On EEG and infant language emergency

2024

JuniorLab 2023/2024 Closing Ceremony

The 2023–2024 JuniorLab program concluded with a formal closing event on May 15, 2024, held at the Carmelitas Sagrado Corazón School in Vitoria-Gasteiz. This ceremony marked the culmination of a year-long educational partnership between the BCBL and local schools, designed to foster scientific curiosity and active engagement in neuroscience research among young students.

The event began with a welcome by the school's director, Nieves Maya, and BCBL director Manuel Carreiras, followed by two keynote talks tailored for a school-age audience and their families. Cognitive neuroscientist David Soto opened with a presentation on "The Role of Metacognition in Learning", explaining how reflecting on our own thinking helps us become more effective learners. Marie Lallier followed with a talk titled "Can We Detect Dyslexia and Reading Difficulties Earlier?", sharing current research on how speech patterns and sound processing might offer earlier diagnostic clues for developmental reading disorders.

The ceremony not only showcased the scientific learning journey of participating students but also served as a platform for strengthening school-science collaboration. It concluded with a reception and informal discussions between researchers, teachers, families, and students, reinforcing the commitment of BCBL to early science education and public engagement.

BBVA Outreach – Reading Rhythms

Researcher Marie Lallier led this outreach project in collaboration with BBVA, focusing on the relationship between rhythm and reading.

Zientziabidea

In partnership with Kutxa Fundazioa, the BCBL is contributing to the development of scientific content for the future science outreach center Zientziabidea, scheduled to open at Tabakalera in 2026.

2024

EMAKUMEAK ZIENTZIAN (Women in Science)

As part of the 8th edition of Emakumeak Zientzian, an inter-institutional initiative held across research centers in the Basque Country, BCBL significantly strengthened its contribution to promoting gender equality in science. The center coordinated and participated in a diverse program of activities designed to engage the public, especially girls and young women, with real-life examples of female scientists and their work.

BCBL hosted several outreach events including hands-on workshops, classroom visits, and public roundtables where its female researchers shared their career journeys, research experiences, and reflections on the gender gap in STEM fields. Activities were conducted in local schools, science museums, and online platforms, reaching more than 300 participants.

One of the highlights was the roundtable discussion titled “Scientific Careers Without Limits”, which brought together senior and early-career female scientists from BCBL to discuss challenges such as work-life balance, implicit bias, and the importance of visible role models. Additionally, BCBL produced audiovisual content for social media, highlighting the daily work of women researchers at the center to promote visibility and inspire future generations.

These efforts reflect BCBL’s institutional commitment to diversity, equity, and inclusion—not just within the organization but as a broader contribution to the scientific and educational ecosystem.


ZIENTZIA BADA NESKEN KONTUA
EMAKUMEAK ZIENTZIAN
LA CIENCIA SÍ ES COSA DE CHICAS
emakumeakzientzian.eus
EMAKUMEAK ZIENTZIAN Gara

The center has continued its qualitative leap in media presence during the 2021-2024 period, further consolidating its role as a reference in cognitive neuroscience, scientific management, and promoter of scientific vocations among young people.

Media Presence and Public Recognition

The BCBL has maintained a consistent presence in local, national, and international media, with a significant increase in visibility. The center has frequently acted as an expert source, offering council to various media outlets, thus reinforcing its public recognition.

During the 2021-2024 period, the BCBL recorded a total of 1,505 media impacts, demonstrating sustained engagement with conventional media channels, including printed press, online media, radio, and television. Some key milestones include:

- **2021:** 420 media appearances
- **2022:** 385 media appearances
- **2023:** 442 media appearances
- **2024:** 351 media appearances

Notable Features

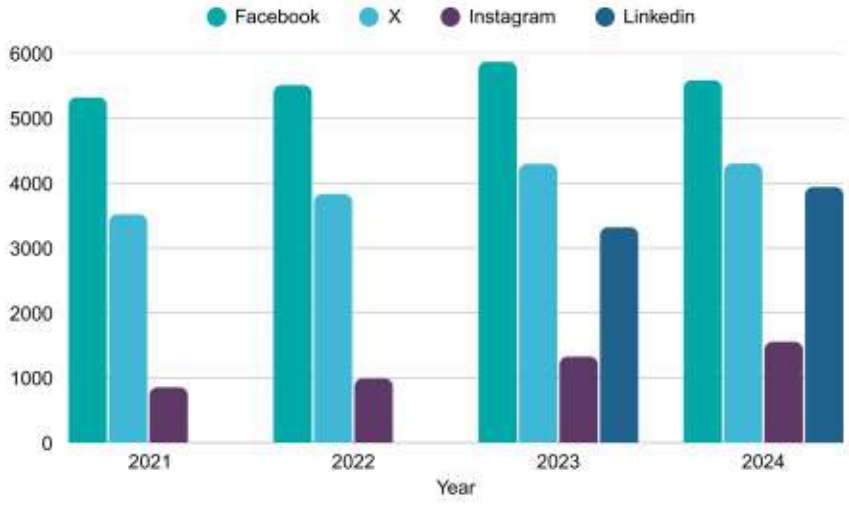
- BCBL was featured in international publications such as New Scientist, Forbes México, Swissinfo, and PsyPost.
- Key national features included El Correo, Diario Vasco, and El Mundo.
- Broadcast appearances in Teknopolis (ETB) and El Intermedio (LaSexta).
- Increased visibility through science-related television and radio programs, particularly on Cadena Ser, Onda Cero, and Radio Euskadi.

Social Media Presence

Social media has played an essential role in BCBL's dissemination strategy. The center has continued expanding its digital community, adapting to emerging trends and maintaining a strong engagement with its audience.

- **Facebook:** 5,584 followers
- **X (Twitter):** 4,301 followers
- **Instagram:** 1,558 followers
- **LinkedIn:** 3,940 followers
- **YouTube:** 527 subscribers
- **New Platform:** Launched a corporate profile on *Bluesky* in late 2024

Followers (2021-2024)



Impact on Public Engagement

Engagement levels across digital platforms have demonstrated a positive trend, particularly on LinkedIn and Instagram, where audience interactions and post impressions have grown significantly. Social media campaigns such as BrainHack Donostia 2024, Pint of Science 2024, and International Symposium of Bilingualism have helped amplify BCBL's reach.

Conclusion

The 2021-2024 period has solidified BCBL's position as a recognized scientific institution within media and public discourse. With continued growth in both traditional and digital media, the center remains committed to disseminating its research and engaging with society to advance cognitive neuroscience understanding.

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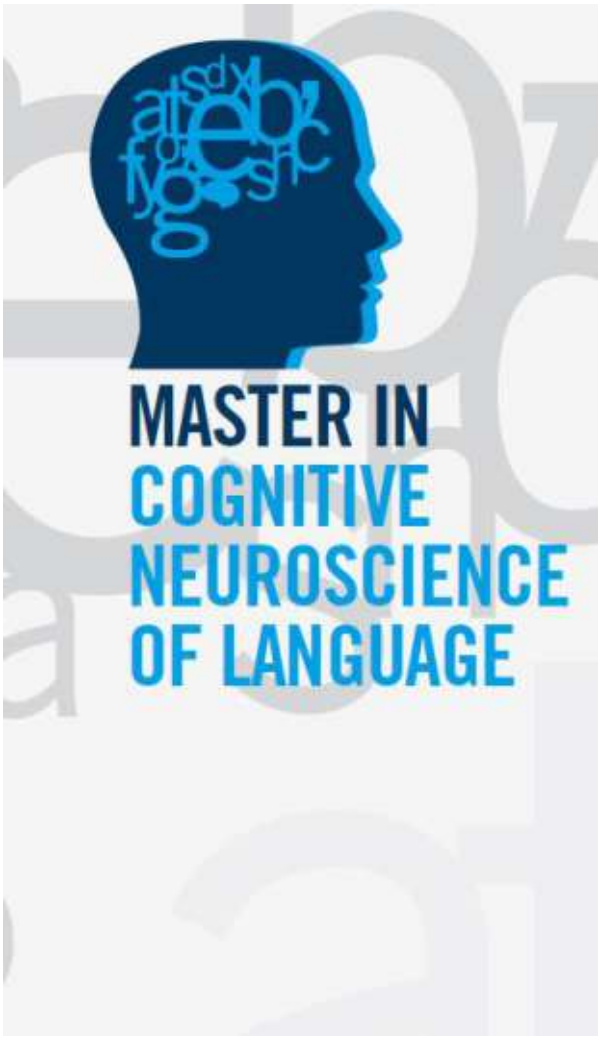
TEACHING AND TALENT

7.A MASTER IN COGNITIVE NEUROSCIENCE OF LANGUAGE

The BCBL seeks to attract the best researchers and is committed to their long-term learning. High-quality training is critical for remaining at the forefront of methodological and theoretical knowledge. We allocate a significant part of our budget to the development, implementation, and organization of training events.

The two major training programs (the Master's and the PhD program) are run in the BCBL facilities and coordinated by BCBL members, in partnership with the UPV/EHU. Other informal training programs (e.g., courses on Matlab, Fieldtrip, etc.) are organized periodically by different members of the BCBL.



The **Master's in Cognitive Neuroscience of Language** has been taught since the 2011-2012 academic year. One of the aims of this graduate program is to train interdisciplinary researchers in the Cognitive Neuroscience of Language to further advance and transfer this knowledge to the areas of Health and Education. The program allows the degree holder to pursue a research career by developing a PhD thesis.

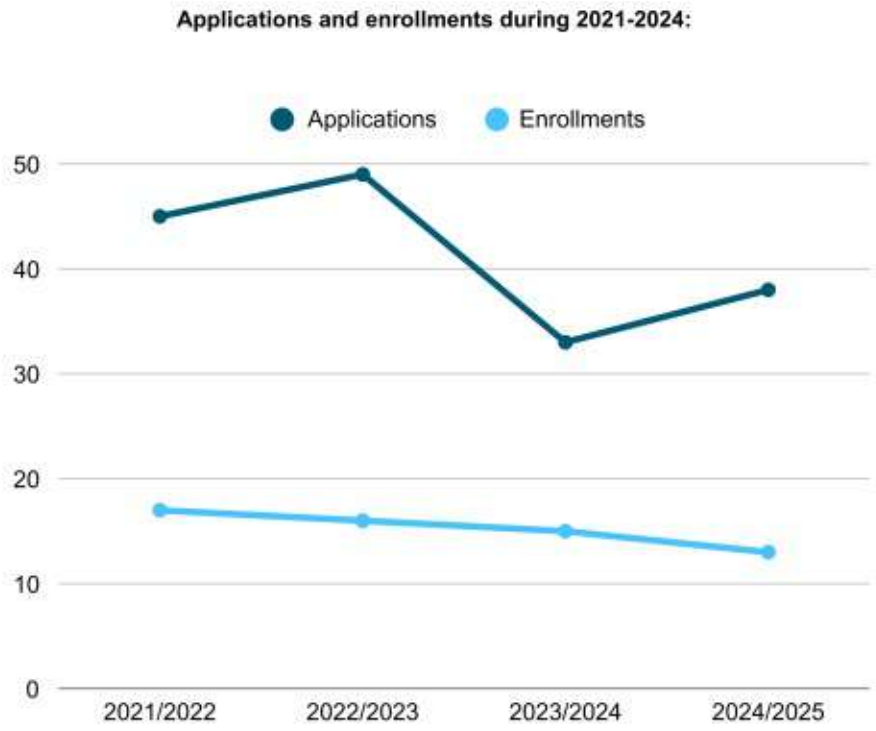
The duration of the program is one academic year, with 60 ECTS credits. The students develop research skills through the mentorship of experts and by completing a Master's Research Project at the end of the program.

Main details:

[Academic director: Manuel Carreiras
[Duration: One academic year, 60 ECTS (European Credits Transfer System)
[Language of instruction: English
[Lecturers: 28 per year approximately
[Subjects: 2 compulsory courses and 13 optional, of which 8 may be chosen by each student. 36 ECTS
[Final Master's Dissertation: 24 ECTS

To date, 180 students have enrolled and 46 have joined our PhD programs. Other graduates have enrolled in prestigious PhD programs at international centers (e.g., New York University, Max Planck, etc.). During the 2021-2024 period, 61 students enrolled and 12 of them joined our PhD program.

The figure below shows the evolution of pre-enrollments and enrollments in the Master's program, in which the interest for the program at international level is reflected. There is always a maximum number of 16 enrollments positions for students with the best academic records, therefore ensuring quality teaching.



The enrollment in the Master's program during the 2021-2024 period was successful, with strong interest and participation. However, in the most recent academic year, 2024-2025, three selected and per-registered students had their student visas denied in their home countries due to unforeseen geopolitical circumstances. Therefore, they were unable to enroll in the Master's program. Despite this setback, we remain optimistic and expect to continue the trend of filling all available spots in the upcoming courses.

To date, the BCBL has launched two PhD programs in collaboration with the UPV/EHU, both of which have been approved by ANECA. The first, the Linguistics program, was launched in September 2013. Following this program the BCBL made efforts toward the development of a program in the field of neuroscience. Once again working in partnership with the UPV/EHU, the BCBL launched the Cognitive Neuroscience program which it has run exclusively since its launch in September 2018. During 2024 the doctoral program has been reaccredited by Unibasq for the 2024-2029 period.

During the 2021-2024 period, 35 doctoral theses were defended. Of these 35 Ph.D. students, 31 were from the University of the Basque Country, one of our main collaborators and partners; and 28 were defended in the Cognitive Neuroscience program and 3 in the Linguistic program. Apart from these 30 Ph.D. students, 4 were supervised by BCBL researchers in international universities, such as 1 in the program of the Universidad de Santiago de Compostela, 1 in Stony Brook University and 2 in Western Sydney University.

All PhD students are required to spend at least three months in another laboratory abroad.

DOCTORAL THESES 2021-2024

1. Student: Iria de Dios Flores
- Supervisors (directores): Carlos Acuña Fariña & Manuel Carreiras
- Defense date: March 23, 2021
- Place: Universidad de Santiago de Compostela
- Title: Processing long-distance dependencies: an experimental investigation of grammatical illusions in English and Spanish
- Type: European or international
- Grade: Summa Cum Laude

2. Student: Jeanne Charoy
- Supervisors (directores): Arthur Samuel & Susan Brennan
- Defense date: May 17, 2021
- Place: Stony Brook University
- Title: Accommodation to non-native accented speech: Is perceptual recalibration involved?
- Type: European or international
- Grade: no grading system

3. Student: Saúl Villameriel
- Supervisors (directores): Brendan Costello & Manuel Carreiras
- Defense date: June 18, 2021
- Place: Faculty of Economics and Business of Donostia, UPV/EHU
- Title: Lexical access in bimodal bilinguals
- Type: European or international
- Grade: Summa Cum Laude

4. Student: Candice Frances
- Supervisors (directores): Jon Andoni Duñabeitia & Clara D. Martin
- Defense date: July 21, 2021
- Place: Faculty of Economics and Business of Donostia, UPV/EHU
- Title: Semantic richness, semantic context, and language learning
- Type: European or international
- Grade: Summa Cum Laude

5. Student: Kshipra Gurunandan
- Supervisors (directores): Pedro M. Paz-Alonso & Manuel Carreiras
- Defense date: September 7, 2021
- Place: Faculty of Economics and Business of Donostia, UPV/EHU
- Title: Neural Plasticity of Language Systems: evidence from fMRI experiments with adult language learners
- Type: European or international
- Grade: Summa Cum Laude

6. Student: Camila Zugarramurdi
- Supervisors (directores): Manuel Carreiras & Juan Carlos Valle Lisboa
- Defense date: September 15, 2021
- Place: online
- Title: Reading acquisition: from digital screening to neurocognitive bases in a transparent orthography
- Type: European or international
- Grade: Summa Cum Laude

7. Student: Piermatteo Morucci
- Supervisors (directores): Nicola Molinaro & Clara D. Martin
- Defense date: November 18, 2021
- Place: Faculty of Economics and Business of Donostia, UPV/EHU & online
- Title: The impact of human language on perceptual categorization: electrophysiological insights
- Type: European or international
- Grade: Summa Cum Laude

8. Student: Jose A. Aguasvivas
- Supervisors (directores): Manuel Carreiras
- Defense date: November 30, 2021
- Place: online
- Title: Tracing the Algorithm of Bilingual Language Learning
- Type: European or international
- Grade: Summa Cum Laude

9. Student: Stefano Moia

- Supervisors (directores): Cesar Caballero-Gaudes & Maite Termenon
- Defense date: December 2, 2021
- Place: Faculty of Economics and Business of Donostia, UPV/EHU
- Title: Advanced spatio-temporal deconvolution algorithms to investigate brain function with functional magnetic resonance imaging (fMRI)
- Type: European or international
- Grade: Summa Cum Laude

10. Student: Ioanna Taouki

- Supervisors (directores): David Soto & Marie Lallier
- Defense date: December 10, 2021
- Place: Faculty of Economics and Business of Donostia, UPV/EHU & Zoom Room 2
- Title: The role of metacognitive monitoring in regulating learning in early readers
- Type: European or international
- Grade: Summa Cum Laude

11. Student: Sanjeev Nara

- Supervisors (directores): Nicola Molinaro & Mathieu Bourguignon
- Defense date: March 29, 2022
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Expectation suppression across sensory modalities: a MEG investigation
- Type: European or international
- Grade: Excellent

12. Student: Eugenia Navarra Barindelli

- Supervisors (directores): Clara Martin & Sara Guediche
- Defense date: April 4, 2022
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Reconocimiento de palabras en una segunda lengua: Efectos interlingüísticos en las modalidades visual y auditiva
- Type: National
- Grade: Summa Cum Laude

13. Student: Teresa Esteban Peñalba

- Supervisors (directores): Pedro M. Paz-Alonso & Mª Cruz Rodriguez-Oroz
- Defense date: May 16, 2022
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Neural correlates of Impulse Control Disorder in Parkinson's Disease: fMRI evidence from motor, inhibition and semantic domains
- Type: National
- Grade: Summa Cum Laude

14. Student: Maddi Ibarbia Garate

- Supervisors (directores): Pedro M. Paz-Alonso & David Soto Blanco
- Defense date: May 23, 2022
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Magnocellular and parvocellular visual pathways' involvement in reading
- Type: National
- Grade: Summa Cum Laude

15. Student: Mengxing Liu

- Supervisors (directores): Pedro M. Paz-Alonso & Garikoitz Lerma-Usabiaga
- Defense date: September 30, 2022
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Human thalamocortical connections and their involvement in language systems
- Type: European or International
- Grade: Summa Cum Laude

16. Student: Alberto Furgoni

- Supervisors (directores): Clara Martin & Antje Stoehr
- Defense date: October 6, 2022
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: The Influence of Literacy on Speech: The Orthographic Consistency Effect in Auditory Language Perception and Production
- Type: European or International
- Grade: Summa Cum Laude

17. Student: Ning Mei
- Supervisors (directores): David Soto & Roberto Santana
- Defense date: November 25, 2022
- Place: Facultad de Psicologia. UPV/EHU
- Title: Assessing the representation of seen and unseen contents in human brains and deep artificial networks
- Type: National
- Grade: Summa Cum Laude

18. Student: Mina Jevtovic
- Supervisors (directores): Clara D. Martin & Efthymia Kapnoula
- Defense date: February 20, 2023
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: The role of orthography in auditory word learning
- Type: International
- Grade: Summa Cum Laude

19. Student: Chiara Luna Rivolta
- Supervisors (directores): Brendan Costello & Manuel Carreiras
- Defense date: March 10, 2023
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Temporal structure in language production and processing: a crossmodal comparison of spoken and sign language
- Type: International
- Grade: Summa Cum Laude

20. Student: Jose J. Pérez Navarro
- Supervisors (directores): Marie Lallier & Nicola Molinaro
- Defense date: March 23, 2023
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: The role of quantity and quality of linguistic exposure on language development during childhood
- Type: International
- Grade: Summa Cum Laude

21. Student: Christoforos Souganidis
- Supervisors (directores): Nicola Molinaro & Antje Stoehr
- Defense date: May 4, 2023
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Phonetic detail of voicing categories in Basque-Spanish bilinguals: Evidence from production and perception
- Type: International
- Grade: Summa Cum Laude

22. Student: Usman Ayub Sheikh
- Supervisors (directores): David Soto & Manuel Carreiras
- Defense date: July 13, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: The Neural Representation of Concepts in Bilinguals: An Evaluation of Factors Influencing Cross-language Overlap Using fMRI-based Multivariate Pattern Analysis
- Type: National
- Grade: Summa Cum Laude

23. Student: Trisha T. Thomas
- Supervisors (directores): Clara Martin & Sendy Caffarra
- Defense date: September 27, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: Exploring the effects of accent on cognitive processes: behavioral and electrophysiological insights
- Type: International
- Grade: Summa Cum Laude

24. Student: Giorgio Piazza
- Supervisors (directores): Clara Martin & Marina Kalashnikova
- Defense date: October 2, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: Foreigner Directed Speech. From Speech Adaptation to Cortical Tracking of the Speech Register Directed to Non-native Listeners
- Type: International
- Grade: Summa Cum Laude

25. Student: Shuang Geng

- Supervisors (directores): Lucía Amoruso & Manuel Carreiras
- Defense date: October 30, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: Neural dynamics underlying object and action naming across languages: Insights from health and disease
- Type: International
- Grade: Summa Cum Laude

26. Student: Polina Timofeeva

- Supervisors (directores): Lucía Amoruso & Manuel Carreiras
- Defense date: October 31, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: Neural and behavioral signatures of language control in highly proficient bilinguals: Evidence from healthy individuals and brain tumor patients
- Type: International
- Grade: Summa Cum Laude

27. Student: Pedro Margolles

- Supervisors (directores): David Soto & Kepa Paz Alonso
- Defense date: November 3th, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: The dynamic nature of conceptual representations in the human brain: insights from aging and decoded neurofeedback
- Type: National
- Grade: Summa Cum Laude

28. Student: Pavlina Heinzova

- Supervisors (directores): Simona Mancini & Manuel Carreiras
- Defense date: December 18th, 2023
- Place: Facultad de Psicologia. UPV/EHU
- Title: Argument structure processing in bilinguals and bilingual speakers with aphasia: A cross-linguistic investigation
- Type: International
- Grade: Excellent

29. Student: Tina Whyte

- Supervisors (directores): Marina Kalashnikova
- Defense date: August 1st, 2023
- Place: Western Sydney University
- Title: The impact of regional accent variation on monolingual and bilingual infants' lexical processing
- Grade: no grading system

30. Student: Catherine Clark

- Supervisors (directores): Marie Lallier & Sara Guediche
- Defense date: March 22, 2024
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Cross-modal semantic context boots optimal reading at different stages of reading development and in different orthographies
- Type: International
- Grade: Summa Cum Laude

31. Student: Eneko Uruñuela

- Supervisors (directores): César Caballero Gaudés & Miguel Angel Veganzones
- Defense date: April 15, 2024
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Unraveling Hidden Patterns of Brain Activity: A Journey Through Hemodynamic Deconvolution in Functional MRI
- Type: International
- Grade: Summa Cum Laude

32. Student: Jordi Martorell

- Supervisors (directores): Nicola Molinaro & Simona Mancini
- Defense date: June 21, 2024
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Understanding neural tracking of syntactic structures
- Type: International
- Grade: Summa Cum Laude

33. Student: Vicente Ferrer

- Supervisors (directores): Cesar Caballero & Pedro M. (Kepa) Paz-Alonso
- Defense date: July 8, 2024
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Multimodal-MRI cognitive and motor components of Parkinson's Disease mild cognitive impairment
- Type: International
- Grade:Summa Cum Laude

34. Student: Abraham Sánchez

- Supervisors (directores): Manuel Carreiras & Pedro M. (Kepa) Paz-Alonso
- Defense date: December 4, 2024
- Place: Facultad de Psicologia. UPV/EHU and Online
- Title: Concepts are built from percepts: Neural mechanisms supporting sub-lexical to lexico-semantic processing
- Type: International
- Grade:Summa Cum Laude

35. Student: Eylem Altunta

- Supervisors (directores): Marina Kalashnikova, Denis Burnham, Catherine Best
- Defense date: October 23, 2024
- Place: Western Sydney University
- Title: The Relationship between Infant-Directed Speech to Infants and Amodal Speech Perception by Infants
- Grade: no grading system

EXCELLENCE IN HUMAN RESOURCES: TALENT RECRUITMENT, DEVELOPMENT AND ENGAGEMENT

Renewal of HRS4R Excellence in Research

In 2023, the BCBL successfully renewed its HRS4R Excellence in Research award, following a rigorous evaluation by the European Assessment Team during a site visit in July. This prestigious recognition remains in place until May 2027, when the next Internal Review for Renewal Assessment will be conducted.

The HRS4R strategy is developed for researchers and with researchers, ensuring their active involvement throughout the process. Thanks to the collaborative efforts of the dedicated Working Group, the BCBL was able to design and implement an ambitious yet feasible Action Plan that aligns with our institutional goals and drives progress.

Key Initiatives and Policies

Between 2021 and 2024, the BCBL introduced and enhanced several policies and initiatives aimed at fostering a safe, equitable, and supportive work environment:

- **Psychosocial Risk Prevention Project:** Implementing comprehensive measures to identify and mitigate workplace stressors.
- **Registration of the Gender Equality Plan in REGCON:** Reinforcing our commitment to equality across all levels of the organization.
- **Update of the Workplace Violence Prevention Plan:** Strengthening policies to ensure a respectful and secure environment.
- **Implementation of the Good Practices Decalogue:** Establishing a framework for integrity, professionalism, and ethical conduct.
- **Biennial Climate and Exit Surveys:** Continuing to gather actionable feedback to improve internal processes, transparency, and staff satisfaction.
- **Hot-desking:** The BCBL has implemented a hot desk system, allowing researchers to use any designated workstation within the BCBL. This system helps address space limitations while promoting dynamic interactions and enhancing remote work through an updated Virtual Desktop Infrastructure (VDI)for all employees.

Inclusion and Diversity

At the BCBL, inclusion and diversity are core values that shape our workplace culture. Over the 2021–2024 period, we have taken targeted measures to support team members with diverse needs and backgrounds, such as:

- **Adapting workspaces, conferences and communication strategies** for employees with hearing impairments, including the provision of assistive technologies and tailored support.
- **Spanish Sign Language Lessons (LSE)**: A deaf research assistant from the Neurobiology of Language group teaches LSE to all BCBL staff. This initiative enhances internal communication, promotes inclusion, and strengthens BCBL's commitment to cognitive neuroscience research on sensory-diverse populations.
- **Promoting an inclusive environment** through training and awareness-raising initiatives that address unconscious bias and cultural sensitivity.

Team-Building and Community Engagement Activities

The BCBL promotes collaboration and community spirit through regular team-building events, such as the Annual Retreat, Summer Picnic, and HR Day. In 2024, the center introduced Family Day for the first time, offering a new opportunity to foster team engagement and celebrate our shared achievements.

Recruitment and Talent Management

The BCBL has made significant advancements in its recruitment and talent management strategies:

- **Update of the OTMR Policy:** Ensuring open, transparent, and merit-based recruitment processes that provide equal opportunities for all candidates.
- **Launch of an E-Recruitment Platform:** Streamlining and formalizing selection processes to enhance efficiency and accuracy.

In line with our mission to attract, develop, and support top talent, the BCBL has continued to promote numerous fellowship programs funded both internally and externally. These efforts underpin our commitment to becoming an international benchmark in cognitive neuroscience research.

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8.A NEURE
8.B OTHER INITIATIVESPROGRAMS

08

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TECHNOLOGY TRANSFER

During the 2021-2024 period, the BCBL placed strong emphasis on knowledge and technology transfer to society, ensuring that fundamental research not only contributed to advancing scientific knowledge but also translated into practical applications with real-world impact through innovative products and services.

A. NEURE CLINIC (www.neure.eu)

The BCBL created NEURE with the idea of bringing part of the scientific developments to society by introducing an evaluation service. The objective of NeureClinic is to provide comprehensive neuropsychological evaluations in the field of language and learning disorders, incorporating the latest advances provided by the BCBL research team. At the same time, the collected data will feed databases that will help advance scientific knowledge of these disorders. The approach is focused on Developmental Language Disorder (SLD) and Dyslexia, although during this time, ADHD has recently been introduced as an additional disorder being studied in depth.

In order to promote interdisciplinary work for the benefit of those treated at the clinic, NeurClinic has open lines of communication with various educational institutions and clinics, as well as collaboration agreements with related institutions such as Gautena (Guipuzcoa Autism Association).

The clinic also participates in the training of professionals in the fields of speech therapy, psychology and education through seminars and courses, as well as training for students and master's students by hosting internships through collaboration agreements with various Basque and state universities. NeureClinic also collaborates with the Associations TEL Euskadi (Association of families and friends of people with Specific Language Disorder of Euskadi) and Dislegi (Dyslexia Association of Gipuzkoa) on different projects and **awareness talks**.

Additionally, as well as collaborating internally in **research projects** carried out at the BCBL, NuereClinic participates in various projects with external research groups such as ELEKIN (Social Engineering and Bioengineering, UPV/EHU) and the Biogipuzkoa Health Research Institute (Osakidetza).

B. NEURESOFT (www.neuresoft.eu)

For use in NeureClinic's own evaluations, and to offer to other clinicians in the field, we are creating specific evaluation instruments for each disorder, both in Basque and Spanish. We are currently working on the NeureHitz instrument (focused on oral language in Basque) and NeureHizki (for reading difficulties in Basque).

Through BCBL projects, and collaboration with the Department of Education of the Basque Government, data has been collected for the NeureHitz and NeureHizki instruments. In 2024, the NeureHizki instrument was presented and made available to all professionals in the field of learning difficulties. This instrument allows for the evaluation of the learning processes of reading in Basque, in a bilingual population (Basque-Spanish) between the 1st year of Primary Education and the 4th year of Compulsory Secondary Education. It allows us to carry out evaluations more adjusted to the linguistic profile of the bilingual population present in our social context, which is fundamental for early detection and initiation of an intervention plan oriented to the specific needs of each child.

A. MAGNETIC RESONANCE METHODS FOR COGNITIVE NEUROSCIENCE

The Basque Center on Cognition, Brain and Language (BCBL) has made significant technological contributions to both the scientific community and society. Our advancements encompass the development of innovative methods, algorithms, software tools, data sharing initiatives, and the creation of experimental materials and databases. These efforts have enhanced research capabilities and facilitated the translation of scientific findings into practical applications.

Methodological Contributions

Our researchers have developed frameworks to enhance the reproducibility and validation of neuroimaging studies. For instance, Lerma-Usabiaga et al. (2019) proposed a framework for translating scientific MRI findings to clinical practice by evaluating replication and generalization, emphasizing reproducibility through containerization. In another study, Lerma-Usabiaga et al. (2020) introduced a validation framework for neuroimaging software using population receptive fields (pRF) methods for fMRI data. Additionally, the RTP2 suite was introduced as a set of flexible and automated methods to analyze anatomical MRI and diffusion-weighted imaging data for reproducible tractography, emphasizing its use in both basic research and clinical practice (Lerma-Usabiaga et al., 2023). Further contributions include the development of a spatiotemporal pRF model to characterize how spatial and temporal information is processed across the human visual cortex, revealing a coupling between spatial and temporal receptive field windows (Kim et al., 2024). Lindhardt et al. (2025) demonstrated that different processing strategies, particularly transitioning from volumetric to surface analysis in pRF mapping, can introduce systematic biases, especially a foveal bias. Moreover, Liu et al. (2023) identified thalamocortical neural tracts between the human mediodorsal thalamic nucleus and prefrontal cortex, providing insights into the pathways involved in cognitive functions. Furthermore, we have developed several novel methods to improve cerebrovascular reactivity and vascular delay mapping with fMRI, showing the relevance of lagged-based general linear models (Moia et al., 2020,) and the advantage of multi-echo fMRI acquisitions. In addition, we have also collaborated on the design of more clinically feasible paradigms and procedures for cerebrovascular reactivity mapping (Stickland et al., 2021; Zvolanek et al., 2023). Finally, we have developed more robust tools for univariate and multivariate hemodynamic deconvolution of fMRI data (Uruñuela et al., 2024) and new metrics to relate changes in the frequency of brain oscillations to specific brain sources for neurofeedback applications in perceptual, motor and cognitive processes (Vidaurre et al., 2023).

Software Tools and Algorithms

Both independently, and in line with previous methodological contributions, the BCBL has developed several open-source software packages to facilitate research in cognitive neuroscience. Notable examples include:

- **pyDecNef:** An open-access platform to perform real-time fMRI studies including decoded neurofeedback (Margolles et al., 2023). https://github.com/pedromargolles/pyDecNef
- **Phys2CVR:** A Python-based tool to generate regressors for and/or estimate cerebrovascular reactivity and vascular delay maps. https://github.com/smoia/phys2cvr
- **pySPFM:** A Python-based package for univariate and multivariate hemodynamic deconvolution of fMRI data. https://github.com/Paradigm-Free-Mapping/pySPFM
- **krajjat:** A Python module designed to handle preprocessing and analysis of motion tracking data and voice recordings. https://krajjat.readthedocs.io/en/latest/general/install.html

• **LexFindR:** An R package that finds various kinds of orthographically or phonemically related words, fundamental for developing well-controlled items in psycholinguistic studies (Li et al., 2021). https://cran.r-project.org/web/packages/LexFindR/index.html
• **Python code** for simulating saccades and fixations in eye tracking studies. https://github.com/comp-cogneuro-lang/vwp-fixator
• **Python code** for the **TISK** (Time-Invariant String Kernel) computational model of human spoken word recognition (Magnuson et al., 2024). https://github.com/comp-cogneuro-lang/TISK_FEEDBACK
These tools are freely available to the scientific community, promoting collaboration and advancing research methodologies.

Data Sharing and Published Datasets

In our commitment to open science, the BCBL has shared valuable datasets with the research community. Lerma-Usabiaga et al. (2020) provided a data-science-ready, multisite human diffusion MRI white-matter-tract statistics dataset. Additionally, we have shared a dense-sampling MRI dataset collected in 10 neurotypical individuals, scanned over 10 sessions, that includes extensive resting-state fMRI data, breath-hold task cerebrovascular reactivity assessments, and continuous physiological recordings. This dataset has been utilized by other research groups for various scientific endeavors, such as developing novel deep learning algorithms to estimate end-tidal CO2 traces from respiration traces (Clements et al., 2024), serving as a control dataset to reveal enlargement of the salience network in individuals with chronic depression (Lynch et al., 2024).

In summary, the BCBL's technological contributions have significantly advanced research in cognitive neuroscience and have facilitated the transfer of knowledge and tools to the broader scientific community and society.

B. COMPUTERIZED SCREENING TOOL FOR APHASIA

We have undertaken the development of Aphasia screening batteries in Basque and Spanish, with the goal of bridging clinical and cognitive neuroscience perspectives in the assessment of language impairment. This tool focuses on language comprehension and production using a variety of tasks extensively used in both psycholinguistic and cognitive neuroscience of language research, and have proved highly reliable for assessing the integrity of expressive and receptive linguistic functions.

During the 2020-2024 period we administered these tools to a large sample of brain-damaged individuals, as well as to neurotypical speakers belonging to different age groups and distinct linguistic, education and socio-economic backgrounds, in order to determine their psychometric validity and reliability. The analysis of these data is currently underway.

C. MULTIMAP: MULTILINGUAL PICTURE NAMING TEST FOR MAPPING ELOQUENT AREAS DURING AWAKE BRAIN SURGERIES

In an ongoing collaboration with the Neurosurgery Department at Cruces University Hospital in Bilbao, the BCBL carries out both preoperative and intraoperative language mapping for patients undergoing awake brain surgery. By closely collaborating with neurosurgeons and Osakidetza, the Basque public healthcare service, we aim to improve patient outcomes while simultaneously advancing basic research on neuroplasticity mechanisms triggered by brain tumors. Picture naming tasks are widely recognized as the gold standard for identifying and preserving language-related areas during awake brain surgery. However, current standard neurolinguistic tests are outdated and fail to accommodate the growing bilingual and multilingual populations worldwide. As a

result, patients are commonly assessed and intraoperatively mapped only in their dominant language, leaving their second language unmapped and at risk of postoperative loss. To address this critical gap, we have developed MULTIMAP, a multilingual picture naming test consisting of 218 standardized color images, designed for use in Spanish, Basque, Catalan, Italian, French, English, German, Mandarin Chinese, and Arabic. This open-source tool provides an up-to-date, standardized set of images in which key linguistic variables—such as frequency, age of acquisition, and name agreement—have been meticulously controlled across multiple languages to ensure both linguistic and cultural relevance. MULTIMAP is freely accessible through our website, and we have established a partnership with the French company Happy Neuron (a subsidiary of SBT Group) to commercialize a premium version of the tool. By leveraging our cutting-edge neuroimaging capabilities and innovative language mapping protocols, we are not only contributing to a deeper understanding of how the brain reorganizes and adapts in response to tumor-related challenges but also making a direct impact on patients' surgical outcomes.

D. NATURAL LANGUAGE MARKERS OF NEURODEGENERATIVE DISEASES

In the next decade, Europe is set to undergo a significant demographic shift, with more than 35% of its population surpassing the age of 65, foreshadowing a dramatic rise in neurodegenerative diseases (NDs) related to aging. Among the most prevalent of these conditions are Alzheimer's disease (AD) and Parkinson's disease (PD), which pose substantial challenges to healthcare systems worldwide. Currently, the diagnosis and monitoring of NDs rely on lengthy, stressful cognitive assessments and expensive neuroimaging procedures, which can be particularly challenging to implement in regions with economic disparities and limited healthcare resources. To address these limitations, we have pioneered an innovative approach based on Natural Language Processing (NLP)—a branch of Artificial Intelligence that automatically extracts linguistic features from patients' spontaneous speech. These features are then analyzed using machine learning algorithms to identify ND-related patterns with clinical utility. Supported by funding from the European Commission (ID: 101025814; H2020, 2021-2024; €224,496), our research has recently identified NLP-derived digital markers that: reliably distinguish ND patients from healthy controls at early disease stages, outperform gold-standard cognitive tests in predicting dementia severity, and correlate with neuroanatomical changes (e.g., hippocampal atrophy in AD) and functional disruptions (e.g., hypo-connectivity in executive control networks in PD). This novel AI-powered approach offers a cost-effective, scalable, and remotely applicable tool for ND screening, making it particularly valuable for healthcare systems.

E. EPICOM: PREDICTING EPILEPTIC SEIZURES USING LARGE LANGUAGE MODELS

Epilepsy is a chronic neurological disorder affecting millions worldwide. For these individuals, the inability to fully prevent seizures poses significant challenges to their daily lives, increasing the risk of injury, cognitive impairment, and reduced quality of life. Nearly one-third of patients are unable to achieve seizure control through standard anti-epileptic medication. In such cases, surgical resection of the epileptogenic region is considered as a therapeutic option, requiring the implantation of intracranial electrodes to monitor EEG brain activity and identify the seizure focus. Patients undergoing this procedure are typically monitored for about a week in the Epileptic Unit, where continuous EEG recordings are obtained to inform surgical planning. Building on our collaboration with the Neurosurgery Department—where we routinely perform

intraoperative language mapping—we will leverage cutting-edge AI-driven large language models (LLMs) to analyze both EEG data and patients' spontaneous speech, captured during interactions with family and clinicians throughout their monitoring period. By integrating neural and linguistic features, this innovative approach seeks to detect subtle changes in speech patterns that may serve as early markers of pre-ictal states preceding seizure onset. Ultimately, this research seeks to develop advanced warning systems that can provide timely alerts to patients and caregivers, improving overall quality of life.

In summary, our program aims to contribute towards excellence in healthcare delivery by unlocking the full potential of new tools, technologies, and digital AI-powered solutions for a healthier society. Our center is committed to advancing knowledge and research methodologies in the Cognitive Neuroscience of Language, while ensuring that fundamental research findings are translated into tangible products and services —such as innovative software and clinical protocols—that directly benefit society in collaboration with key stakeholders. The added value of the BCBL's knowledge transfer lies in its potential to address critical societal challenges outlined by Horizon 2020/Horizon Europe. Specifically, our contributions will support ground-breaking solutions aligned with two of the overarching objectives set for research in the social sciences and humanities: "Health, demographic change, and well-being" and "Europe in a changing world – inclusive, innovative, and reflective societies." By bridging the gap between fundamental research and real-world applications, our efforts will foster innovation, inclusivity, and societal well-being, ensuring that scientific advancements in cognitive neuroscience have a lasting impact on public health and social policies across Europe.

F. TECHNOLOGICAL INNOVATIONS IN SPANISH SIGN LANGUAGE RESEARCH

• **LSE-LEX:** We are developing a large database of Spanish Sign Language (LSE) in collaboration with Fundación CNSE (which has created the most exhaustive LSE dictionary). The database includes detailed information about each sign and serves as an important step in documenting this understudied language. This database will contribute toward developing additional research tools, such as a standard label for annotated LSE corpora and data.
• **SignLAB:** We have created an online platform (in collaboration with the SAIL team at Boston University) to display, manage and collect video data for sign language research. The platform will enable the implementation of different experimental tasks for conducting online studies and will incorporate information from the LSE-LEX database for tagging sign language data so that it is machine readable.
• **Quantifying the sign(al):** We are developing a series of methods to quantify sign language signal. In addition to creating a custom-built motion capture system based on a Kinect camera, we have extensive experience using pose estimation (e.g. Mediapipe) to carry out off-line motion tracking of videos. We have created methods to assess the quality of the resulting data and are devising different measures derived from the motion tracking data to reveal the most relevant aspects of the signal. Additionally, we are collaborating with SignLab at the University of Amsterdam to use motion capture and avatar technology to create controlled stimuli for sign language experiments.

9.A ORIGIN AND EXPENSE DISTRIBUTION

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FUNDING

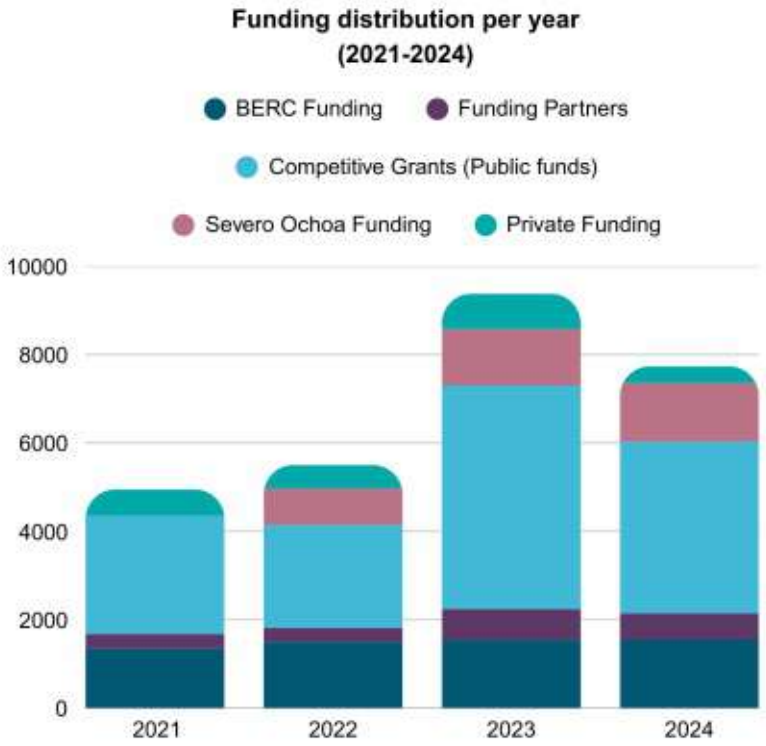
9.A ORIGIN AND EXPENSE DISTRIBUTION

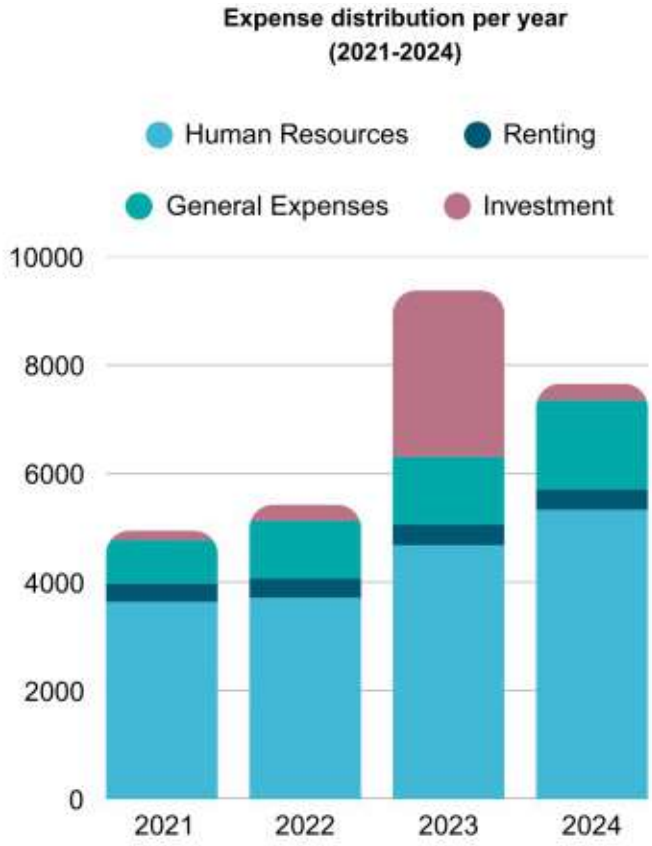
Due to their significance, two of the financing programs are highlighted below:

1. The BCBL was created in the framework of the BERC Initiative (Basque Excellence Research Center). This initiative provides the BCBL with funding base.

2. The “Severo Ochoa” program has been supporting the BCBL’s activity, with a total amount of €4 million for the 2022-2025 period.

Additionally, the BCBL has received competitive financial support derived from research projects (see section 4 Projects), which accounts for a larger percentage of the total annual budget every tax year.


Funding distribution per year
(2021-2024)
BERC Funding
Funding Partners
Competitive Grants (Public funds)
Severo Ochoa Funding
Private Funding
10000
8000
6000
4000
2000
0
2021
2022
2023
2024


Expense distribution per year
(2021-2024)
Human Resources
Renting
General Expenses
Investment
10000
8000
6000
4000
2000
0
2021
2022
2023
2024

10.A INTERNATIONAL LEARDERSHIP
10.B INDICATORS

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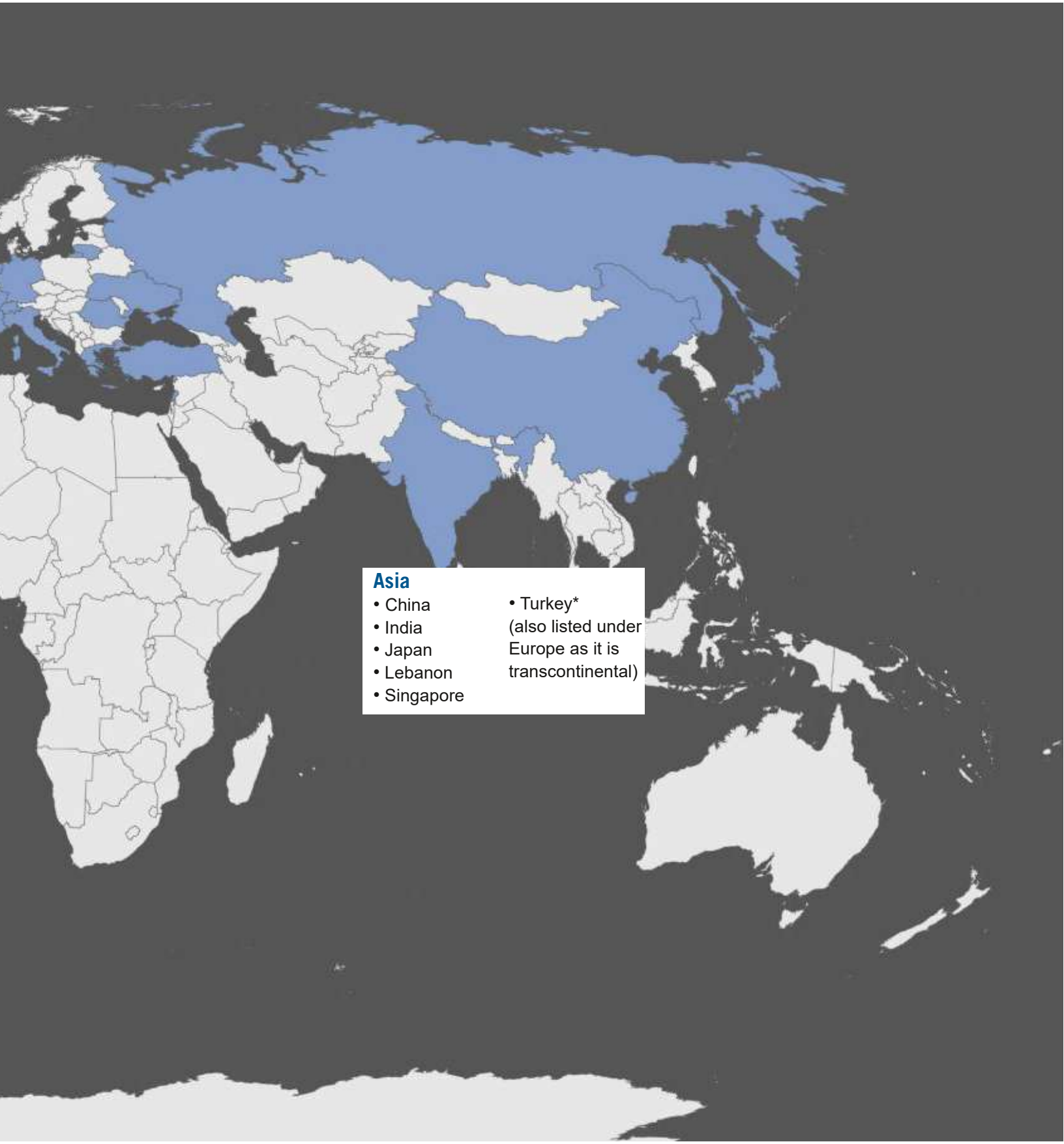
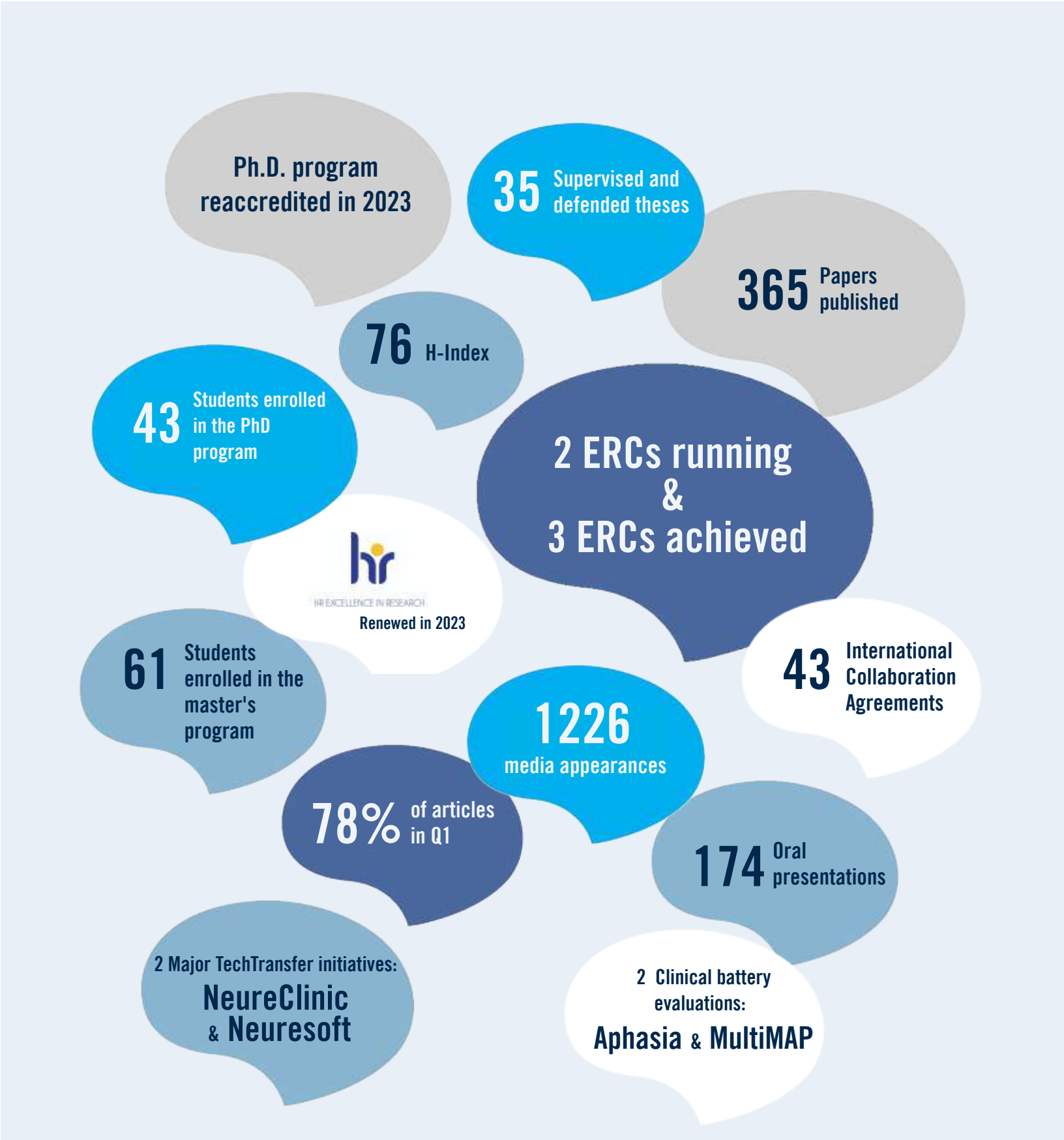
SUMARY OF PERFORMANCE AND INDICATORS

International Collaboration Agreements


Asia
• China
• India
• Japan
• Lebanon
• Singapore
• Turkey*
(also listed under Europe as it is transcontinental)


Ph.D. program reaccredited in 2023
35 Supervised and defended theses
365 Papers published
76 H-Index
43 Students enrolled in the PhD program
2 ERCs running & 3 ERCs achieved
HR EXCELLENCE IN RESEARCH
Renewed in 2023
61 Students enrolled in the master's program
43 International Collaboration Agreements
1226 media appearances
78% of articles in Q1
174 Oral presentations
2 Major TechTransfer initiatives: NeureClinic & Neuresoft
2 Clinical battery evaluations: Aphasia & MultiMAP

7 Software Tools and Algorithms

61 Externally-funded projects

165 Individual fellowships

6 NEURESOFT
evaluation tools developed and published

+27.000
participations in our experiments

EXCELENCIA SEVERO OCHOA
2022-2026

1 set of shared databases: Neuroimaging data (MRI/ diffusion MRI) with open access.

15 International conferences organized with 1746 attendees

More than 100 children diagnosed since NeureClinic's Opening in October 2018

78%
External funding

7%
Private funding

54 Master's theses defended in the COGNITIVE NEUROSCIENCE OF LANGUAGE program

38 Nationalities

Gender Equality Plan registered in REGCON

Activity REPORT 2021-2024

BASQUE CENTER
ON COGNITION, BRAIN
AND LANGUAGE

www.bcbl.eu

Basque Center on Cognition, Brain and Language
Paseo Mikeletegi 69
20009 Donostia · San Sebastián, Spain
Tel. +34 943 309 300

ikerbasque
Basque Foundation for Science

innobasque
Berrikuntzaren Euskal Agentzia
Agencia Vasca de la Innovación

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