IWORDD 2026

International Workshop on Reading and Developmental Dyslexia

October 7th -9th, 2026

DONOSTIA-SAN SEBASTIAN

BASQUE COUNTRY, SPAIN

PROGRAM SUMMARY

Wednesday, October 7th	Thursday, October 8th
08:00 – 08:45 **Registration & Welcome Coffee** **08:45- 09:00** **Welcome** **09:00-10:00** **Keynote 1**: **Nadine Gaab** **10:00 – 11:40** **Oral Session 1** **11:40 – 12:10** Coffee Break **12:10-13:30** **Invited Symposium 1**: *Chair:* Monika Melby-Lervåg **13:30 – 14:50** Lunch break* **14:50 – 15:50** **Poster Session I & Coffee Break** **15:50 – 17:30** **Oral Session 2** **17:30 – 18:30** **Keynote 2: Stanislas Dehaene**	**09:00 – 10:00** **Keynote 3**: **Michelle Luciano** **10:00 – 11:20** **Invited Symposium 2**: *Chair:* Franck Ramus **11:20 – 11:50** Coffee Break **11:50 – 13:10** **Oral Session 3** **13:10 – 14:30** Lunch break* **14:30 – 15:30** **Poster Session II & Coffee Break** **15:30 – 17:10** **Oral Session 4** **17:10 – 18:10** **Keynote 4: Jason Yeatman** **18:10 – 18:30** Closing remarks …… **CONFERENCE DINNER** ** **20:30 GRONX ZURRIOLA Restaurant**

** Lunch on your own at one of the nearby bars or restaurants*

*** For Conference Dinner Attendees ONLY*

WELCOME

Welcome to the fifth edition of the International Workshop on Reading and Developmental Dyslexia in San Sebastián!

iWORDD aims to bring together researchers interested in understanding the causes and manifestations of typical and atypical reading development. This fifth edition of iWORDD aims to foster dialogue between neurobiological and cognitive-behavioural prespectives of research on reading. The ultimate goal is to advance our understanding of the multifactorial mechanisms underlying both causal and compensatory factors associated with reading difficulties, across multiple levels of analysis — including genetics, brain, cognition, and environment.

Important perspectives on developmental dyslexia and reading acquisition will be covered by four keynote speakers, two theme symposiums and several oral presentations. Two additional poster sessions will offer the research community further opportunities to gain a broad overview of the theoretical perspectives currently governing research in the field.

With its focused size, we hope that iWORDD will encourage interactions among researchers and move the field forward while outlining future directions for the investigation of reading acquisition and developmental dyslexia.

Ultimately the aim of iWORDD is twofold: to generate new ideas that advance our field and to highlight innovative thinking that can have a positive impact on clinical practice and education. After two full days of scientific exchange, a third day, open to a broader audience, will be devoted to tackle the important challenge of linking theory to practice.

WELCOME

We would like to express our deep gratitude to the people involved in the organization of iWORDD whose support and expertise have made this event possible: Ana Fernández Arín, Leire Arietaleanizbeascoa, Oihana Vadillo, all members of the BCBL's administrative team, as well as the numerous BCBL scientists, staff and students who have assisted with innumerable aspects of the conference. Finally, we would like to thank our sponsors, whose support is so important for this event.

We hope that you will enjoy the workshop and this opportunity to enjoy local Basque culture and the gastronomy of San Sebastián!

Marie Lallier, Amaia Carrión-Castillo, Manon Jones and Manuel Carreiras

iWORDD organizing committee

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CONFERENCE PROGRAM – WEDNESDAY, OCTOBER 7th

08:00 - 08:45 Registration & Welcome Coffee

08:45 - 09:00 Welcome

09:00 - 10:00 Keynote lecture 1: Nadine Gaag. The typical and atypical reading brain: How a neurobiological framework of early language and reading development can inform educational practice and policy

10:00 – 11:40 Oral Session 1

10:00-10:20 (OS-1.1.) Anatomical Boundary in Occipitotemporal Cortex Segregates Frontal Connectivity Routes. *Siwen Wang, Yongning Lei, Pedro M. Paz-Alonso & Garikoitz Lerma-Usabiaga*

10:20-10:40 (OS-1.2.) The relationship between occipitotemporal sulcal morphology and children's reading ability: a replication study. *Yifan Yang, Kate Nation & Kate Watkins*

10:40-11:00 (OS-1.3.) Neuroanatomical Differences in Children with Dyslexia. *Iria Gutierrez-Schieferl, Alison Schug, Ashley Vanmeter & Guinevere Eden*

11:00-11:20 (OS-1.4.) Auditory Thalamic Predictive Coding Deficits Link to Rapid Automatized Naming of Letters and Numbers in Developmental Dyslexia. *Heidi Järvikylä, Alejandro Tabas & Katharina von Kriegstein*

11:20-11:40 (OS-1.5.) Striatal activity during contextual word learning is influenced by children's reading ability. *Nilgoun Bahar, Desislava Arabadhizskya, Hannah Jones, Sonia Singh, Miykael Davis, Jessie Ricketts, Pablo Ripollés & Saloni Krishnan*

11:40 – 12:10 Coffee break

12:10 - 13:30 Invited symposium 1: Bridging Neurogenetic and Behavioural Research: Possible Implications for Language and Reading Interventions

Chair: **Monica Melby-Lervåg**

12:20 – 12:40 (S-1.1.) What can results from studies using children of twin models and familial control methods tell us about interventions?. *Monica Melby-Lervåg, Arne Lervåg, Elsje van Bergen, Tonje Amland, German Grande, Hans Fredrik Sunde, Caroline Rowland, Fartein Ask Torvik*

12:40 – 13:00 (S-1.2.) Genetic signal in literacy and educational outcomes across development. *Alexandra Starr, Bruno Sauce, & Elsje van Bergen*

13:00 – 13:20 (S-1.3.) What happens in the long run after an early intervention? Example from a large scale RCT. *Arne Lervåg, Åste Hagen, Kristin Rogde and Monica Melby-Lervåg*

13:20 – 13:30 Discussion

13:30 - 14:50 Break (Lunch on your own)

14:50 - 15:50 Coffee and Posters Session 1

15:50 – 17:30 Oral Session 2

15:50 – 16:10 (OS-2.1.) Dyslexia in bilinguals: a prisma systematic review. Irene Balboni, Olga Kepinska, Raphael Berthele & Narly Golestani

16:10 – 16:30 (OS-2.2.) Word reading in English as an additional language for those with and without dyslexia. Catherine McBride, Marta Lockiewicz & Jennifer Schumaker

16:30 – 16:50(OS-2.3.) How learning a L2 modulates visuo-attentional skills and decoding strategies in learners with and without dyslexia. Ilari Venagli

16:50 – 17:10 (OS-2.4) Literacy enhances multimodal print-speech sensitivity in the higher-level visual cortex. Agnieszka Dębska & Chotiga Pattamadilok

17:10 – 17:30 (OS-2.5) Trajectories of non-linguistic audio-visual associative learning in developmental dyslexia. Aaron Cochrane, Angela Pasqualotto, Daphne Bavelier & Irene Altarelli

17:30 - 18:30 Keynote lecture 2: Stanislas Dehaene. The quest for the neural code for written words

CONFERENCE PROGRAM – THURSDAY, OCTOBER 8th

09:00 - 10:00 **Keynote lecture 3: Michelle Luciano.** What has genetics done for reading research lately?

10:00 - 11:20 **Invited Symposium 2: Gene-environment interplay on reading and dyslexia**

Chair: **Franck Ramus**

10:10 – 10:30 (S-2.1.) From familial risk to causal inference: What family-based designs reveal about reading and dyslexia. *Elsje van Bergen*

10:30 – 10:50 (S-2.2.) Towards a cross-linguistic meta-analysis of gene-environment interplay in reading. *Amaia Carrión-Castillo, Marie Lallier, Franck Ramus, for the GenLang consortium*

10:50 – 11:10 (S-2.3) Gene-Environmental Interplay in reading development and in Special Educational Needs: evidence from two independent UK cohorts. *Emanuele Esposito, Camille Williams, Sophie von Stumm, Franck Ramus*

11:10 – 11:20 Discussion

11:20 - 11:50 **Coffee break**

11:50 - 13:10 **Oral session 3**

11:50 – 12:10 (OS-3.1.) The neural dynamics of phonological processing in developmental dyslexia. *Julia Schwarz, Anastasia Klimovich-Gray, Laura Gwilliams, Marie Lallier & Nicola Molinaro*

12:10 – 12:30 (OS-3.2.) Beta oscillations support reading and its improvement in Developmental Dyslexia: a tACS-based intervention. *Giuseppe Di Dona, Denisa Adina Zamfira, Francesco De Benedetto, Chiara Turri, Camilla Venturini, Lisa Venniro, Daniela Perani & Luca Ronconi*

12:30 – 12:50 (OS-3.3.) Towards a Brain-Computer Interface (BCI) for improving phonological processing in developmental dyslexia. *Xuanci Zheng, Joao Araujo, Quentin Busson & Usha Goswami*

12:50 - 13:10 (OS-3.4.) Infant Neural Responses as Early Predictors of Later Reading Development. *Chiara Cantiani, Marco Borromini, Valentina Riva, Caterina Piazza & Chiara Dondena*

CONFERENCE PROGRAM – THURSDAY, OCTOBER 8th

13:10 - 14:30 **Break (Lunch on your own)**

14:30 - 15:30 **Coffee and Posters Session 2**

15:30 - 17:10 **Oral Session 4**

15:30 – 15:50 (OS-4.1.) Bounded rationality shapes neurodevelopmental variation. *Samuel Jones*

15:50 – 16:10 (OS-4.2.) DLD identification battery reveals dissociable markers of dyslexia and oral language ability in adults. *Gabriel Cler, Iris Mendoza Luna & Noelle Abbott*

16:10 – 16:30 (OS-4.3.) Does error monitoring predict future reading skills ? A longitudinal study in French-speaking children. *Matthieu Bignon, Fanny Grisetto, Clémence Roger & Gwendoline Mahé*

16:30 - 16:50 (OS-4.5.) Expectancy effects on reading: Placebo-induced modulation of word and pseudoword processing. *Simone Carbone, Sandro Franceschini, Sara Bertoni, Patrick Pluchino, Anna Panzeri, Giovanni Bruno, Martina Mancarella, Giovanna Puccio, Matteo Lulli, Cristiano Termine, Andrea Spoto, Simone Gori & Andrea Facoetti*

16:50 – 17:10 (OS-4.5) Evaluating a Digital Medical Device as an Adjunct to Speech-Language Therapy in Children with Specific Learning Disorder with Reading Deficit : A Randomized Non-Inferiority Trial. *Charline Grossard, Mélanie Descamps, Jean Xavier & David Cohen*

17:10 - 18:10 **Keynote lecture 4: Jason Yeatman.** Stability and plasticity in the reading circuitry

18:10 - 18:30 **Closing remarks**

20:30 **CONFERENCE DINNER (For Conference Dinner Attendees Only)**

CONFERENCE PROGRAM - POSTER SESSION I

14:50 – 15:50 Wednesday, October 7th

PS.1.1. Automated Individual Subject Functional Parcellation of the Reading Circuitry in the Ventral Occipitotemporal Cortex. *Álvaro Sánchez-Paniagua Ríos, Yongning Lei, Siwen Wang, Bharath Kumar Santhi Rajan, Pedro M. Paz-Alonso & Garikoitz Lerma-Usabiaga*

PS.1.2. Detecting the contribution of V5/MT on reading in children and adolescents with developmental dyslexia. *Giulia Lazzaro, Samy Rima, Elisabetta Urbani, Federica Somma, Gabriele Scozia, Kristina Rainich, Stefano Vicari, Micheal C. Schmid, Katharina von Kriegstein & Deny Menghini*

PS.1.3. Microstructural Alterations in the Ventral Occipitotemporal Cortex in Developmental Dyslexia: A Quantitative MRI Study. *Ane Gurtubay-Antolin, Garikoitz Lerma-Usabiaga, Francisco Carrera-Arias, Abraham Sánchez, Manuel Carreiras & Pedro M. Paz-Alonso*

PS.1.4. Towards precise and reproducible localization of cortical reading circuits with dense-sampled fMRI. *Yongning Lei, Pedro M. Paz-Alonso & Garikoitz Lerma-Usabiaga*

PS.1.5. Words and False Fonts modulate pRF estimates in higher-order visual cortex. *Miguel Martinez-Zaldivar, Yongning Lei & Garikoitz Lerma-Usabiaga*

PS.1.6. The Neurobiology of Reading Disabilities: Molecular and Cellular Studies. *Cathy Barr, Kaitlyn Price, Karen Wigg, Yu Feng, Margaret Wilkinson, Elizabeth Kerr, Sharon Guger, Maureen Lovett, Lisa Strug & Maria Carol Marchetto*

PS.1.7. Behavioral and neurobiological consequences of Dcdc2 deletion across development and adulthood in a DD genetic mouse model. *Matteo Di Segni, Donald Ielpo, Efe Soyman, Chiara Mauri, Tommaso Ciceri, Silvia Pizzetti, Denis Peruzzo, Valentina Lampis, Sara Bertoni, Rossella Ventura, Andrea Facoetti, Sara Mascheretti & Lucy Babicola*

PS.1.8. The magnocellular subdivision of the LGN-V5/MT tract is altered in Developmental Dyslexia (DD) dependent on biological sex. *Christa Müller-Axt, Cornelius Eichner, Toralf Mildner, Alfred Anwander & Katharina von Kriegstein*

PS.1.9. Visual field asymmetries in motion perception in developmental dyslexia. *Kristina Rainich, Giulia Lazarro, Deny Menghini, Elena P Montoyo, Christa Müller-Axt, Samy Rima, Michael C Schmidt & Katharina von Kriegstein*

CONFERENCE PROGRAM - POSTER SESSION I

14:50 – 15:50 Wednesday, October 7th

PS.1.10. The role of the arcuate fasciculus in phonological processing in children with and without dyslexia. *Tatiana Bolgina, Maria Protopova, Irina Buyanova, Svetlana Dorofeeva & Olga Dragoy*

PS.1.11. Lateral geniculate nucleus responses rely on V5/MT integrity. *Lisa Jeschke, Christa Müller-Axt, Alejandro Tabas, Begoña Díaz & Katharina von Kriegstein*

PS.1.12. Functional plasticity of the reading network: Dorsal stream recruitment under perceptual stress in a transparent orthography. *Alice Giubergia, Valentina Lampis, Chiara Mauri, Florian Montano, Giulio Ferrazzi, Marco Castellaro, Alessandra Bertoldo & Denis Peruzzo*

PS.1.13. Neural pathways for audiovisual integration and their reorganization in dyslexia. *Katarzyna Jednoróg, Agnieszka Glica, Artur Marchewka, Pawel J. Matusz & Mirosław Wyczesany*

PS.1.14. Investigating the Interplay of Interhemispheric Connections, Bilingualism, Reading, and Genetics. *Cristina Rius-Manau, Marie Lallier & Amaia Carrión-Castillo*

PS.1.15. Prosodic Modulation of Statistical Learning in Developmental Dyslexia: Evidence from EEG and Behaviour. *Ana Paula Soares, Cláudia Rodrigues, Tatiana Conde e Magro, Helena M. Oliveira, Marcelo Dias & Margarida Vasconcelos*

PS.1.16. An Integrative Study of Neurophysiological, Cognitive, Linguistic, and Psychosocial Factors in the Early Identification of Dyslexia. *Antonina Maria Christodoulou & Victoria Zakopoulou*

PS.1.17. Hidden Special Learning Difficulties in Uganda: Educational Inclusion, Misconceptions, and Implications for Reading Development. *Vincent Barugahare*

PS.1.18. Caregiver-child interactions and their relationship with language and reading development. *Amandine Piret, Klara Spooren, Marie Kolenberg, Olivier Ratenon, Stéphane Dupont, Marie Van Reybroeck, Maaike Vandermosten & Jolijn Vanderauwera*

PS.1.19. PILP, an Early Lexical Identification Test for Italian Children: First Results of a Linguistically Informed Screening. *Valeria Goretti, Giacomo Stella, Claudia Liuzzi, Elisa Silvia Scalamato & Gloria Gagliardi*

CONFERENCE PROGRAM - POSTER SESSION I

14:50 – 15:50 Wednesday, October 7th

PS.1.20. Language Profiles and Early Literacy Outcomes in Children at Risk for Developmental Language Disorder and/or Dyslexia. *Clémence Corriat, Chenyi Ding, Elise de Bree & Jolijn Vanderauwera*

PS.1.21. 15 year follow up study of language, reading and non-verbal IQ in adults with DLD. Nelli Kalnak & Kristiina Tammimies

PS.1.22. Children's home screen exposure and early reading development: A longitudinal study. *Gorka Ibaibarriaga, Joana Acha & Manuel Perea*

PS.1.23. Development of reading-and spelling skills in prematurely born primary school children. *Klara Spooren, Elise Lefèvre, Lisa Gistelinck, Rowena Van den Broeck, Bieke Bollen, Els Ortibus, Gunnar Naulaers, Maaike Vandermosten & Bart Boets*

PS.1.24. Naturalistic assessment of spontaneous speech in Kindergarten and its link to Grade 1 reading skills. *Marie Kolenberg, Klara Spooren, Amandine Piret, Pol Ghesquière, Jolijn Vanderauwera, Elise Lefèvre & Maaike Vandermosten*

PS.1.25. Development of inhibitory processes and reading in primary school children. *Gorka Vergara, Teresa Civera, Stephanie Massol, Marta Vergara & Joana Acha*

PS.1.26. Schooling shapes the brain: neural specialization for words and numbers in early childhood. *Floor Vandecruys, Maaike Vandermosten & Bert De Smedt*

PS.1.27. Beyond Dyslexia: A Screening Questionnaire Capturing Cross-Domain Specific Learning Disorders Profiles in Primary School Children. *Martina Mancarella, Stefania Fontolan, Sandro Franceschini, Sara Bertoni, Gerardo Pellegrino, Eleonora Pizzigallo, Ilaria Salmaso, Loriana Simeoni, Andrea Facoetti & Cristiano Termine*

PS.1.28. Does growth in oral language predict early reading and spelling beyond the big three?. *Bjarte Furnes, Øistein Anmarkrud, Frøydis Morken, Junyi Yang, Natallia Bahdanovich Hanssen, Janaina Hartveit Lie, Hilde Lowell Gunnerud & Monica Melby-Lervåg*

PS.1.29. Infants' Sensitivity to Native Vowels: Effects of Familial Dyslexia Risk and Bilingual Exposure. *Kateřina Cook, Monika Kučerová, Daniel Kopecký & Kateřina Chládková*

CONFERENCE PROGRAM - POSTER SESSION I

14:50 – 15:50 Wednesday, October 7th

PS.1.30. Early neural synchronization in toddlers and preschoolers at familial risk for dyslexia. *Ana B. Carbajal Chavez, Maaike Smit, Marlies Gillis, Melissa Martens, Pol Ghèsquiere, Maaike Vandermosten & Jan Wouters*

PS.1.31. Time- and pitch-based auditory processing in Cantonese-speaking children with developmental dyslexia. *Yuhong Zhu, William Choi & Caicai Zhang*

PS.1.32. Early correlates of reading development: preliminary findings with ongoing EEG analyses. *Anaam Qureshi, Giussepina Santo, Marina Kalashnikova, Nicola Molinaro, Giulia MornatI, Verónica Nuñez, Arantza Campollo Urkiza & Marie Lallier*

PS.1.33. Neural entrainment to rhythmic speech in adults with developmental dyslexia. *Manon Couvignou, Mahmoud Keshavarzi & Usha Goswami*

PS.1.34. Neural Phoneme Processing in Children with and without Dyslexia. *Marlies Gillis, Jill Kries, Jan Wouters, Laura Gwilliams & Maaike Vandermosten*

PS.1.35. Lexical brain responses in 10-year-old children are impaired in dyslexia: an FPVS-EEG study. *Claire Gigleux, Alice van de Walle de Ghelcke, Christine Schiltz, Bruno Rossion & Aliette Lochy*

PS.1.36. Linking microsaccades and N400 to predictive sentence reading. *Marta Battistutta, Giuseppe Di Dona, Michele Scaltritti & Luca Ronconi*

PS.1.37. ERP correlates of phonological processing in children with typical and atypical reading skills. *Svetlana V. Dorofeeva, Mariia Diachkova, Tatiana Eremicheva, Valeria Lelik, Daria Morozova & Olga Dragoy*

PS.1.38. Altered Intrinsic Oscillatory Patterns in Children with Developmental *Dyslexia. Jiaqi Mao, Nicola Molinaro & Mikel Lizarazu*

PS.1.39. Neural tracking of Speech in Pre-Readers and Toddlers at Familial Risk for Dyslexia. *Maaike Smit, Ana B. Carbajal Chavez, Marlies Gillis , Maaike Vandermosten, Pol Ghesquière & Jan Wouters*

CONFERENCE PROGRAM - POSTER SESSION II

14:30 – 15:30 Thursday, October 8th

PS.2.1. Neuro-Affective Integrity in Reading Development and Challenges: An Integrative Framework Connecting Brain-Based and Cognitive-Behavioural Perspectives. *Rachel Arnold*

PS.2.2. Lateralisation Moderates the Contribution of Short-Term Memory to Reading in Early Readers. *Ziyuan Li, Camila Zugarramurdi, Carrión-Castillo & Marie Lallier*

PS.2.3. The processing of dynamic texts in typical and atypical readers. *Ilaria Venagli*

PS.2.4. The Contribution of Eye Movements to Auditory Processing Across Reading Abilities. *Kaja Benz, Hadeel Ershaid, Mikel Lizarazu, Maria Koutsogiannaki & Marie Lallier*

PS.2.5. Disentangling pathways to language and literacy in children at familial risk: The role of rise time detection. *Jolijn Vanderauwera, Clémence Corriat & Jan Wouters*

PS.2.6. Comparing Auditory and Visual Processing Abilities in Children At-Risk for Dyslexia Before and After Formal Reading Instruction: A Longitudinal Study. *Melissa Martens, Silke Kellens, Maïté Lejeune, Elise Lefèvre, Maaike Vandermosten, Jan Wouters & Pol Ghesquière*

PS.2.7. Feasibility and Acceptability of a Prosodic Training Program for Children with Dyslexia. *Tânia Carneiro, Sónia Frota & Marisa Filipe*

PS.2.8. Same Intervention, Different Results: Unpacking Individual Differences in Reading Comprehension Gains. *Line Walquist-Sørli, Oddgeir Friborg, Monica Melby-Lervåg, Bjarte Furnes & Trude Nergård-Nilssen*

PS.2.9. Effects of a flickering light device on reading performance in children with developmental dyslexia. *Aikaterini Premeti, Simona Caldani & Maria Pia Bucci*

PS.2.10. A Use Case for Proprioceptive Intervention in Chaotic Functioning of the Perception-Action Coupling: Developmental Dyslexia. *Luc Virle, Laurent Sparrow, Cedrick Bonnet, Patrick Berquin & Jose Barela*

PS.2.11. From Decoding to Speech Production in Students with Specific Learning Disabilities. *Maria Drossinou-Korea & Artemis Kalamari*

CONFERENCE PROGRAM - POSTER SESSION II

14:30 – 15:30 Thursday, October 8th

PS.2.12. Action video games as an enhancement tool for early literacy skills: Evidence from an ongoing, longitudinal prevention study. *Chiara Mauri, Sara Bertoni, Valentina Lampis, Matteo Di Segni, Chiara Filotto, Lucy Babicola, Donald Ielpo, Denis Peruzzo, Tommaso Ciceri, Rossella Ventura, Andrea Facoetti & Sara Mascheretti*

PS.2.13. Flickering Lens in Children with Developmental Dyslexia and Young Adults with Reading Impairment: Placebo and Active Effects. *Giovanna Puccio, Simona Carbone, Sandro Franceschini, Sara Bertoni, Sara Mascheretti, Andrea Cappellini, Simone Gori & Andrea Facoetti*

PS.2.14. Supporting Monolingual and Bilingual Children with Reading Comprehension Difficulties: A Pilot Study. *Léa Leuthold & Katrin Skoruppa*

~~**PS.2.15.** From Cognitive Predictors to Intervention: The Role of Visual Attention and Letter Knowledge in Arabic Reading Acquisition. *Alaa Ghandour, Emmanuel Trouche, Dominique Guillo & Sylviane Valdois*~~

PS.2.16. Evaluating the validity of cognitive and reading tests for Russian-speaking adolescents at risk of dyslexia using ROC-curve analysis. *Tatiana Eremicheva & Svetlana Alexeeva*

PS.2.17. Longitudinal study of literacy development across Hiragana, Kanji, and English: I. Early prediction from preschool literacy skills. *Yasuko Okumura, Yosuke Kita, Yuka Shirakawa & Nina Morohoshi*

PS.2.18. Longitudinal study of literacy development across Hiragana, Kanji, and English: II. Emergence of difficulties in later-acquired scripts. *Yosuke Kita, Yasuko Okumura, Yuka Shirakawa & Nina Morohoshi*

PS.2.19. Statistical Learning of Graphotactic Patterns in Spanish: Evidence from Primary School to University. *Angélica Mateus-Moreno, Daniel Adrover-Roig, Eva Aguilar-Mediavilla & Gracia Jiménez-Fernández*

PS.2.20. Cross-language transfer in bilingual children with reading difficulties: effects of a literacy intervention on word reading. *Cadi Sion, Gwennant Evans-Jones, Tesni Huws, Catherine Clark, Charles Hulme, Cameron Downing & Manon Jones*

PS.2.21. Decoding Across Orthographies: Grapheme-Phoneme Processing in Adult Dyslexic Learners of EFL. *Hanna Karina Flores Enriquez*

CONFERENCE PROGRAM - POSTER SESSION II

14:30 – 15:30 Thursday, October 8th

PS.2.22. Dichotic listening reveals distinct hemispheric dominance pathways to strong phonological skills: The role of overall task performance in bilingual pre-readers. *Eneko Anton, Katya Martín, Hadeel Ershaid & Marie Lallier*

PS.2.23. Hearing Word Boundaries: Prosodic Cue Weighting in Dyslexic vs. Neurotypical Listeners. *Mar Cordero-Rull, Fanny Meunier & Léo Varnet*

PS.2.24. Lost in (French) Sound? Dyslexia and L2 Speech Perception in Basque Bilinguals. *Mar Cordero-Rull & Minerva Rojas*

PS.2.25. Hemispheric lateralisation for speech in Basque-Spanish multilingual children: associations with multilingual experience and literacy. *Hadeel Ershaid, Mikel Lizarazu, Amaia Carrión-Castillo & Marie Lallier*

PS.2.26. Identification of dyslexia in Learners of French as a second language. *Laurine Dalle*

PS.2.27. How event nominalizations impact reading comprehension in monolingual children with and without dyslexia, and in bilingual children with a migrant background. *Ilaria Venagli, Andrea Nardon, Chiara Melloni, Serena Dal Maso, Sabrina Piccinin & Maria Vender*

PS.2.28. Cross-linguistic transfer in bilingual spelling: Evidence from Welsh- and English-language literacy interventions. *Cameron Downing, Catherine Clark, Tesni Huws, Gwennant Evans-Jones, Joseph Smith & Manon Jones*

PS.2.29. Development of a digital screening tool for the detection of reading difficulties in university students. *Beatriz Martín-del-Campo, Adriana Lostao & Patricia López-Resa*

PS.2.30. Examining the effect of professional development on teachers' knowledge and self-efficacy for dyslexia evaluation referrals for black students experiencing reading difficulties. *Danielle Olivier*

PS.2.31. Early predictors of grammatical spelling in French: Shared or distinct from lexical spelling? A longitudinal study from kindergarten to second grade. *Lara Daher, Corentin Gonthier, Dylan Sizun, Zinaida Tamiatto, Carole El Akiki, Pauline Quémart, Julie Launay, Marta Manenti, Lucie Macchi, Gwendoline Mahé, Layla Berbain, Sandrine Ferré & Racha Zebib*

CONFERENCE PROGRAM - POSTER SESSION II

14:30 – 15:30 Thursday, October 8th

PS.2.32. Children's Perception of Dyslexia and Developmental Language Disorder (DLD): Impact on Mental Health and Educational Trajectory - Pilot Study. *Nicole Agrela, Rita Teixeira, Bárbara Marques, Ana Rita Valente, Tiago Proença dos Santos, Cátia Catita & Gonçalo Leal*

PS.2.32. Experiences of students with dyslexia in higher education in Ireland: A mixed-methods study. *Casey Cowan, Kiana Carragher, Caoimhe O'Malley & Ciara Egan*

PS.2.34. Visual Span and Reading in Dyslexia: Converging Evidence from Laboratory and Online Measures. *Nilsu Atilgan, Ben D. Sawyer & Gordon E. Legge*

PS.2.35. Adaptive information sampling through childhood: Eye-tracking evidence from a reading dual-task. *Freya Losvik & Samuel David Jones*

PS.2.36. The methodological use of the Children's Communication Checklist 2 (CCC-2) in research. *Malin Dalby Silkstone, Frøydis Morken, Courtenay F. Norbury & Bjarte Furnes*

PS.2.37. Developing an EEG-Neurofeedback to boost Interhemispheric Connectivity in a Phonological Task. *Irtisha Chakraborty, Lakshya Singh, Mikel Lizarazu & Marie Lallier*

PS.2.38. Integrating Eye-Tracking Technology into Reading Assessment and Intervention: Perspectives of Future Speech and Language Therapists. *Vasiliki Peklari, Victoria Zakopoulou & Eugenia I. Toki*

ABSTRACTS

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[K-1]

The typical and atypical reading brain: How a neurobiological framework of early language and reading development can inform educational practice and policy

Nadine Gaab [1]

[1] Harvard Graduate School of Education, Harvard University

Learning trajectories are shaped by the dynamic interplay between nature and nurture, starting in utero and continuing throughout the lifespan. Learning differences/disabilities are often not identified until childhood or adolescence, but divergent trajectories of brain development may be present as early as the prenatal period. Furthermore, children's experiences and their interactions with their environment have long-lasting influences on cognitive and brain development and future academic outcomes. This talk will focus on learning differences in reading acquisition within a learning disability framework. It will present results from our longitudinal behavioral and neuroimaging studies that characterize differences in learning to read as a complex outcome of cumulative risk and protective factors interacting within and across genetic, neurobiological, cognitive, and environmental levels from infancy to adulthood. Results are discussed within an early multifactorial framework of learning differences, emphasizing screening in educational and community settings, early identification, preventative strategies, and a research-to-practice tool development pipeline. Finally, using a global lens, the implications of these findings for contemporary challenges in educational, clinical, and policy practice are discussed

[K-2]

The quest for the neural code for written words

Stanislas Dehaene [1]

[1] Collège de France

Thanks to a series of in-silico, behavioral, brain-imaging and electrophysiological experiments, we begin to understand what happens in the brain during the acquisition of reading. Recent computational modeling studies suggest a new hypothesis about the neural code for invariant recognition of written words: with training, neurons that we call "space bigrams" become tuned to a letter at a fixed approximate position relative to the beginning or the end of the word. I will present new brain-imaging data, as well as single-cell recordings in humans and even in monkeys, which supports the existence of such a neural code in the visual word form area of left ventral inferotemporal cortex. I will then describe how those findings shed new light on the various types of dyslexias and their diagnosis. I will end with a discussion of how this scientific understanding of reading can be applied in the classroom, as we do with our non-profit reading method Kalulu (https://kalulu.excellolab.org/).

[K-3]

What has genetics done for reading research lately?

Michelle Luciano [1]

[1] The Universit of Edinburgh

Tremendous progress has been made in the last decade in identifying genetic variants and biological pathways involved in reading development and dyslexia. In this talk, I will summarise the most recent key findings from genome-wide association studies which are centred on common genetic variants in the population. I will then outline the ways in which these findings can be used to inform our understanding of genetic overlap among cognitive processes assumed to underlie reading skill and among traits that tend to co-occur with dyslexia. This will include some of our recent findings using genomicSEM and polygenic prediction methods, and notably, a study that triangulates data from genetics, brain imaging, and reading behavioural phenotypes (highlighting the way in which genetics can bridge to behaviour). To end, I will discuss current directions in complex trait genetics and where this might lead reading research.

[K-4]

Stability and plasticity in the reading circuitry

Jason D. Yeatman [1]

[1] Stanford Graduate School of Education

Educational interventions offer a powerful tool to understand how a child's environment shapes the development of specialized brain circuits for new cognitive functions such as literacy. I will first present a series of intervention studies that highlight the dynamic interplay between white matter plasticity, functional properties of the reading circuitry, and the process of learning to read. Specifically, I will discuss findings demonstrating that while structural pathways undergo rapid, intensive-instruction-dependent remodeling, some aspects of the underlying functional architecture of the visual system remain remarkably stable. By examining the long-term effects of intervention programs in children with dyslexia, I will present a new framework for considering the balance between stability and plasticity in the developing brain and its implications for learning disabilities like dyslexia.

[S-1]

Bridging Neurogenetic and Behavioural Research: Possible Implications for Language and Reading Interventions.

Chair: **Monica Melby-Lervåg**

[S-1.1]

What can results from studies using children of twin models and familial control methods tell us about interventions?

Monica Melby-Lervåg [1], Arne Lervåg [1], Elsje van Bergen [2], Tonje Amland [1], German Grande [3], Hans Fredrik Sunde [4], Caroline Rowland [5] & Fartein Ask Torvik [1 4]

[1] University of Oslo

[2] University of Amsterdam

[3] Oslo Metropolitan University

[4] Norwegian Institute of Public Health

[5] Max Planck Institute for Psycholinguistics

This talk presents findings from two studies using genetically sensitive designs to disentangle genetic and environmental influences on children's educational outcomes.

The first study examined the association between parents' education and children's academic achievement using Norwegian register data from 569,035 children aged 10–14 linked to the Norwegian Twin Registry. Parental education correlated .31 with children's school achievement, with genetic factors accounting for approximately 68% of this association. These findings indicate that similarities in educational outcomes reflect a combination of genetic transmission, environmental effects of parental education, and influences shared within the extended family.

The second study investigated associations between the home literacy environment (HLE) and children's word reading while accounting for genetic confounding. Using data from 242 children and their parents, children's Grade 3 reading was predicted by literacy resources and mothers' reading engagement, even after controlling for parental reading ability. Together, the studies highlight the importance of accounting for genetic confounding while identifying meaningful environmental influences, and implications from this for intervention will be discussed.

[S-1.2]

Genetic signal in literacy and educational outcomes across development

Alexandra Starr [1], Bruno Sauce [1] & Elsje van Bergen [1]

[1] Department of Biological Psychology, Vrije Universiteit Amsterdam, The Netherlands

Individual differences in literacy, numeracy, and broader educational achievement emerge early in development that persist into adulthood. Twin studies consistently demonstrate substantial heritability of these skills and considerable genetic overlap across learning domains. However, less is known about how measured genomic variation maps onto domain-general versus domain-specific genetic effects, and how these genetic factors unfold across long develop-mental periods.

Here, we combine different genetically informative approaches to examine genetic prediction and stability of educational outcomes from childhood into adulthood. In Netherlands Twin Register data (N = 15,669), we compared predictions from three polygenic scores (PGSs) – for years of education, dyslexia, and reading skills – across children's literacy, numeracy, and academic achievement (age M=12.3 years), as well as adults' educational attainment (age M= 42.5 years). Across outcomes, the broad years-of-education PGS substantially outperformed domain-specific literacy-related PGSs, explaining up to 10.7% of variance in childhood academic achievement and 13.2% in adult educational attainment.

We further benchmarked genetic predictions against parental socioeconomic status, indicated by maternal and paternal highest educational qualification. Parental education explained approximately 6–10% of variance in children's educational outcomes, closely matching the predictive power of the PGSs. This pattern suggests that large-scale, well-powered PGSs can act as suitable predictors of educational outcomes in developmental research and to account for potential genetic confounding.

Additionally, in a longitudinal subsample (N = 2,248), we disentangle genetic and environmental contributions to the association between educational achievement at age 12 and adult edu-cational attainment, using a bivariate twin model. Findings will be discussed in terms of improving our understanding of the stability of genetic influences on educational development.

[S-1.3]

What happens in the long run after an early intervention? Example from a large scale RCT

Arne Lervåg [1], Åste Hagen [1], Kristin Rogde [1] & Monica Melby-Lervåg [1]

[1] University of Oslo

Childhood language interventions appear promising for improving children's lives and yielding economic returns. However, few studies have evaluated long-term effects of these interventions. Our study did this using a large, cluster-randomized trial of a preschool intervention for Norwegian children aged 4 to 5 years whose vocabulary was more limited than that of their peers. Results showed that effects on expressive language were maintained at the 7-month follow-up when the children were in first grade and that those with the weakest language skills initially had the largest and most persistent effects. However, 4 years after the intervention, the differences between the intervention and control groups were negligible. Thus, although effects from the preschool language intervention lasted into the first year of elementary school, effects eventually faded and were completely absent in fourth grade. Our findings suggest the need for a sustained approach to language and literacy support, focusing on persistent interventions and high-quality adapted instruction.

[S-2]

Gene-environment interplay on reading and dyslexia.

Chair: **Franck Ramus**

[S-2.1]

From familial risk to causal inference: What family-based designs reveal about reading and dyslexia.

Elsje van Bergen [1 2 3]

[1] Vrije Universiteit Amsterdam

[2] University of Oslo

[3] Karolinska Institutet

Why do reading difficulties run in families? Parents and children share both genes and environments, making conventional family correlations difficult to interpret causally. This talk shows how triangulation across family-based designs can help separate these pathways.

Adoption and twin–parent studies indicate that intergenerational resemblance in reading is predominantly consistent with genetic transmission. The Familial Control Method translates this insight into a practical approach for studies without measured DNA: parental reading skill is used to account for familial liability when testing associations between the home literacy environment and children's reading. Results suggest that commonly reported environmental associations partly reflect familial confounding, while leaving room for genuine environmental effects.

Polygenic-score designs distinguish direct genetic transmission from genetic nurture by using parental alleles that were not transmitted to the child. Ongoing reading-specific work applies this approach to test whether parental (heritable) traits influence children's reading through environmental pathways. A further perspective comes from population registers, where an extended-family model uses parents, aunts, uncles, and cousins to distinguish genetic transmission from parental and wider-family contributions to reading comprehension.

Stronger causal inference can identify more credible environmental targets, reduce simplistic blame of families, and explain why substantial heritability remains fully compatible with meaningful benefits from intervention.

[S-2.2]

Towards a cross-linguistic meta-analysis of gene-environment interplay in reading

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Reading ability is an evolutionarily recent cultural skill that was not directly selected for. Nevertheless, genetic factors explain substantial variability beyond socioeconomic status (SES) and other environmental factors. Using a US-based sample, we first evaluated associations between four reading-related polygenic scores (PGS), as well as socioeconomic (income, parental education) and linguistic factors (bilingualism, first language). In univariate analyses, all predictors except first language significantly predicted reading performance, with similar ranges of variance explained by PGS and environmental factors (maximum adjusted R^2 7%). Combining multiple PGS improved the proportion of variance explained to 10%, though the PGS-specific contribution decreased when adjusting for SES and linguistic factors, consistent with gene-environment correlations.

Building on these findings, we will present results from a cross-linguistic meta-analysis combining the previous sample with additional cohorts from the GenLang Consortium (total N≈8,000-27,000), spanning five writing systems (English, French, Dutch, Spanish and Mandarin Chinese) across seven countries and multiple developmental stages. We present i) correlations between multiple PGSs and environmental factors (SES, bilingualism, first language), ii) additive and interaction effects through cohort-level univariate and multivariate regressions. The robustness of effects will be evaluated via meta-analyses, gaining power to detect GxE effects. Moderation of the main PGS effects across orthographic transparency, educational equity, and country-level SES will be explored through meta-regression. As reading environments vary systematically across language systems, this cross-linguistic approach provides a powerful means to test the generalisability and context-dependence of genetic effects on reading. We hypothesise transparent orthographies and equitable educational systems may enhance PGS effects.

[S-2.3]

Gene-Environmental Interplay in reading development and in Special Educational Needs: evidence from two independent UK cohorts

Emanuele Esposito [1], Camille Williams [1], Sophie von Stumm [2] & Franck Ramus [1 3]

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Reading ability is a complex trait with significant individual variability and is influenced by both genetic and environmental factors. Many studies approached this phenomenon and revealed a genetic contribution by running a twin design. However, only a handful of studies used direct molecular genetic measures. In these studies we explored the extent to which genetic and environmental factors are confounded, and act additively or non-additively in explaining reading outcomes and Special Educational Needs. Genetic factors were accounted for by using individual polygenic scores (PGS) for IQ and educational outcomes.

Particularly, two projects will be presented:

1. In the TEDS cohort, we studied the influence of the Home Literacy Environment (HLE) on reading acquisition and tested GxHLE interactions after controlling for Socio-economic status.

2. In the Born in Bradford cohort, we studied the effects of perinatal risk factors (preterm or low-weight birth, maternal BMI), in the prediction of Special Educational Needs, and their interactions with genetic factors

[OS-1.1]

Anatomical Boundary in Occipitotemporal Cortex Segregates Frontal Connectivity Routes

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The ventral occipito-temporal cortex (VOTC) and inferior frontal gyrus (IFG) are critical cortical regions for reading. Direct structural connectivity between these regions has been previously demonstrated. However, the fine-grained connectivity between their functionally specialized subregions remains unclear, particularly regarding whether these subregions are connected ventrally (primarily through the inferior fronto-occipital fasciculus) and/or dorsally (primarily through the arcuate fasciculus). Using a high-quality diffusion MRI test-retest dataset (N = 63), we systematically examined the structural connectivity between VOTC and IFG subregions. The results revealed that the VOTC-IFG connectivity is strongly dependent on subregions and follows a clear topological organization. Specifically, the VOTC is connected exclusively ventrally to the IFG pars orbitalis. The posterior-medial subregions of the VOTC are connected ventrally to the IFG pars triangularis, but the anterior-lateral VOTC subregions are connected dorsally. A similar pattern emerged for the IFG pars opercularis, but with an overall larger proportion of VOTC subregions connecting dorsally. These findings delineate an anatomical boundary within the VOTC that segregates dorsal and ventral structural connectivity pathways to the IFG. The implications of this topographically organized connectivity pattern are discussed in relation to current neurocognitive models of reading.

[OS-1.2]

The relationship between occipitotemporal sulcal morphology and children's reading ability: a replication study

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Reading recruits visual regions in the ventral occipito-temporal cortex and highlights the interplay between early brain development, learning, and neuroplasticity. Previous studies suggest that an interruption in the left posterior occipitotemporal sulcus (pOTS) is a prenatally determined predictor of better reading ability. However, inconsistent results and methodological differences among studies make it difficult to draw conclusions. To test and extend previous findings, we conducted a pre-registered replication in a larger and well-characterised sample (N = 153) of children and adolescents aged 10–16 years with a range of reading and language abilities, including 80 children with a history of speech and language problems and 73 age-matched typically developing children. We manually delineated the pOTS and interruptions in FreeSurfer and examined differences in sulcal morphology in relation to behavioural measures of reading and reading predictors. Across the whole sample, left pOTS interruption was significantly associated with better reading ability and conferred the largest advantage in reading compared with reading predictors. Although the effect of sulcal anatomy on reading performance was successfully replicated, the effect size was very small ($\Delta R2 = 2.80\%$). Further analyses will explore whether the location of the sulcal interruption is the best predictor of reading ability.

[OS-1.3]

Neuroanatomical Differences in Children with Dyslexia

Iria Gutierrez-Schieferl [1], Alison Schug [1], Ashley Vanmeter [1] & Guinevere Eden [1]

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Neuroanatomical studies of dyslexia have mostly used structural measures that can change as a function of experience, and cross-sectional designs, making attribution of causality impossible. Further, there are no studies comparing dyslexics and controls of lower IQ to tests if they share the same neuroanatomical differences as those with average (or above) IQ. We compared sulcal depth (SD), which reflects prenatal neurodevelopment, as well as cortical thickness (CT), which can be shaped by experience, between dyslexics and controls (average age 9.5 years, drawn from the Adolescent Brain Cognitive Development Study) in those with average or above (>85) nonverbal IQ (N=579,) and separately in those with lower (<85 and >70) nonverbal IQ (N=324). For both studies, the dyslexics (reading ability <85) and controls (reading ability >90) were matched on socioeconomic status and nonverbal reasoning. Both studies revealed relatively shallower sulci in dyslexia in bilateral insula and left anterior cingulate sulcus, and thinner cortex within small subsets of these regions. We then combined all four groups (N = 903) and found that regions exhibiting differences in dyslexia for SD, but not CT, predicted future reading gains, cementing the role of SD in these regions as the prenatal, causal neuroanatomical bases of dyslexia.

[OS-1.4]

Auditory Thalamic Predictive Coding Deficits Link to Rapid Automatized Naming of Letters and Numbers in Developmental Dyslexia

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Developmental dyslexia is associated with alterations in the sensory thalami, i.e., structures transmitting sensory information from the eyes and ears to the cerebral cortex. Postmortem studies have shown alterations in the left auditory (medial geniculate body, MGB) and visual (lateral geniculate nucleus, LGN) thalami. These alterations have since been confirmed in-vivo, but their behavioural implications are currently unclear. Overall, the auditory cortico-thalamic system functions as a predictive coding system. Therefore, we hypothesized there would be altered predictive coding in the sensory thalami in dyslexia.

We used a functional magnetic resonance imaging (fMRI) paradigm designed to investigate predictive coding in the left MGB and tested three preregistered hypotheses. The results confirmed them. First, there was impaired predictive coding in the left MGB in dyslexia. Second, this impairment was specific to the left MGB while the right MGB, as well as brainstem structures (inferior colliculi, IC) did not differ in predictive coding from typically reading controls. Third, the atypical responses in left MGB were associated with performance in Rapid Automatized Naming (RAN) of letters and numbers.

These findings suggest that dyslexia involves a subcortical disruption of auditory predictive processing, positioning the left MGB as a key locus of dysfunction in the disorder.

[OS-1.5]

Striatal activity during contextual word learning is influenced by children's reading ability

Nilgoun Bahar [2 3], Desislava Arabadhizskya [2], Hannah Jones [1 2], Sonia Singh [1 2], Miykael Davis [2], Jessie Ricketts [2], Pablo Ripollés [4] & Saloni Krishnan [1 2]

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Contextual word-learning is a critical mechanism for vocabulary acquisition during childhood. In adults, successful inference of word meaning from context is associated with activity in reward processing regions such as the ventral striatum, suggesting such learning is inherently rewarding. We investigated whether similar reward mechanisms support word learning in children aged 11-13, and whether they are altered in dyslexia. Neurotypical readers exhibited enhanced fMRI activation in core reward-related regions (i.e., the ventral striatum) when successfully learning the meaning of new words, while those with dyslexia did not show this increase in reward activity. This effect was specific to word learning: both groups showed similar levels of ventral striatal activity during a non-linguistic reward-related gambling task. In an independent behavioural sample from a large registered report, stronger reading skills were associated with greater enjoyment of successful word learning. This suggests that interaction between reward and language systems during contextual word-learning is influenced by reader knowledge and skills. Differences in intrinsic reward response may have implications for the design of more engaging and effective reading interventions.

[OS-2.1]

Dyslexia in bilinguals: a prisma systematic review

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Bilingualism and dyslexia are both prevalent conditions within the population, and due to their incidence, they are likely to co-occur. However, very little is known about bilinguals with dyslexia because the research in these two fields have proceeded separately. This systematic review examines the intersection of bilingualism and dyslexia by analysing 40 studies involving bilingual dyslexic readers (DRs). The goal is to identify dyslexia characteristics that are independent of bilingual experience and determine the appropriate tests for bilinguals. Findings indicate that rapid naming and reading impairments remain prevalent in bilingual DRs while phonological awareness appears to be more variably impaired in bilinguals. Differences between monolinguals and bilinguals, reflecting a potential bilingual (dis)advantage, are more present in DRs than typical readers (TRs), suggesting that bilingual experience might play a more substantial role in populations with deficits. Results from predictive studies do not allow for evidence-based recommendations due to their variability. Overall, findings suggest that some diagnostic tools retain cross-linguistic validity, while others' prognostic potential may be modulated by bilingual experience. The results highlight the need for comprehensive assessments which take into consideration linguistic profiles. Future research should adopt standardised definitions and tests, larger samples, and collaborative methods to improve diagnostic accuracy.

[OS-2.2]

Word reading in English as an additional language for those with and without dyslexia

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[3] Purdue University

Researchers have examined how dyslexia affects reading in additional languages, particularly English, the most widely learned second language worldwide. This study reports findings from two investigations of English word reading in individuals with and without dyslexia.

The first study included 144 Chinese children in Grades 2–3 (71 with dyslexia, 73 controls) 64 from Beijing (40 boys) and 80 from Hong Kong (40 boys). The second study included 127 Polish adults (15 with dyslexia) with an average of 12.71 years of instruction in English. Across both studies, English word reading was assessed using WordSword, administered in paper format for children and electronically for adults. WordSword has strong psychometric properties.

In both samples, compared to control participants, individuals with dyslexia showed significantly poorer performance on WordSword, along with some other cognitive-linguistic skills in their native language.

Thus, dyslexia in different languages is associated with persistent challenges in reading English as a foreign language. WordSword, which has been used for more than 5,000 participants across several countries worldwide, provides a brief, practical tool for assessing English word reading in both typical and reading-impaired populations.

[OS-2.3]

How learning a L2 modulates visuo-attentional skills and decoding strategies in learners with and without dyslexia

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We present two studies testing Lallier and Carreiras' (2018) Grain Size Accommodation Hypothesis (GSAH) in L2 learners with and without developmental dyslexia (DD). Study 1 examined whether learning to read English, an opaque L2, modulates the visual attention span (VAS) in Italian native speakers, whose L1 is transparent. Participants completed a visual-1-back task: after viewing a five-letter consonant string for 200ms, they were asked to indicate whether a target consonant had appeared in the preceding string. Target position was manipulated to test whether leftmost consonants were identified more accurately than rightmost consonants, and whether increasing L2 proficiency enhanced VAS. We also predicted weaker effects in participants with DD, due to possible VAS deficits (Valdois, 2022). These predictions were confirmed by modelling accuracy with mixed-effects models. Study 2 tested whether these effects extend to L1 and L2 (pseudo)word decoding. Using a sentence-reading eye-tracking paradigm (Egan et al., 2019), we analysed first-pass fixations (FPF) as a function of L2 proficiency and dyslexia. We predicted that higher L2 reading skills would be associated with fewer FPF, indicating larger-grain processing, with reduced effects in DD. Results confirmed these predictions, suggesting that the GSAH extends to late bilinguals, though less strongly in DD learners.

[OS-2.4]

Literacy enhances multimodal print-speech sensitivity in the higher-level visual cortex

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Reading acquisition requires integrating print with spoken language. While multimodal print–speech activity is known in speech brain regions, it is unclear whether comparable sensitivity develops within the left ventral occipitotemporal cortex (lvOT), a region strongly engaged by visual word forms. Although skilled readers can show lvOT responses during spoken-word processing, it remains unclear when lvOT develops joint sensitivity to print and speech.

We addressed this question in a longitudinal fMRI study of 68 children scanned at the onset of formal reading instruction (T1; M= 6.9 yo.) and two years later (T2). Children observed written and spoken words and non-linguistic control stimuli. Within an lvOT mask, voxel-level responses were assessed using print, speech and control contrasts. Voxels were classified as print-specific, speech-specific, jointly print–speech specific (positive for both), or non-specific.

Across development, lvOT showed an increase in jointly print–speech specific voxels, largely driven by voxels that were print-specific at T1 adopting a joint profile at T2. Already at T1, higher reading ability was associated with more jointly specific voxels and fewer non-specific. Together, these results indicate that early literacy is accompanied by increasing print–speech sensitivity within lvOT, and that reflects early individual differences in reading skill.

[OS-2.5]

Trajectories of non-linguistic audio-visual associative learning in developmental dyslexia

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Audio-visual (AV) associations are central to many learning processes, including reading acquisition. Previous research on AV associative learning has predominantly used paradigms involving linguistic stimuli, leaving non-linguistic AV learning relatively underexplored. To address this gap, we developed a paradigm utilizing non-linguistic auditory signals paired with novel visual shapes, enabling us to isolate AV learning processes from verbal or phonological influences.

We evaluated the learning performance of 52 Italian-speaking children with developmental dyslexia (10-13 years old), comparing their progress with that of age-matched (N=54) and younger, reading-matched (N=51, 8-10 years old) typically developing peers. We used continuous-time nonlinear trajectory modeling with Bayesian generalized hierarchical models to characterize individual differences in trial-to-trial performance gains (i.e., improvement) on the AV learning task. Using this unified modeling approach we also contrasted the averaged groups' trajectories.

While all groups demonstrated improvement (i.e., learning) in audiovisual associations over time, children with developmental dyslexia showed significantly reduced learning rates, even compared to younger, reading-matched peers.

Weaknesses in AV associative learning may thus characterize individuals with developmental dyslexia, above and beyond any specific difficulties with verbal materials or phonological processing. Further investigation into the developmental implications of this result will be discussed.

[OS-3.1]

The neural dynamics of phonological processing in developmental dyslexia

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Phonological deficits are the most frequently observed indicator of developmental dyslexia. Yet, the neural underpinnings of this deficit are not clear. To address this, we investigated how adults with dyslexia neurally encode and maintain phonetic feature representations. We hypothesized that phonetic features are encoded less accurately in dyslexia and that predictive semantic information could be used as a compensatory strategy to achieve normal comprehension.

Eighteen right-handed adults with dyslexia and 18 controls listened to 160 Spanish sentences while MEG was recorded. Half of the sentences were semantically predictable (i.e. highly constrained with low surprisal), and half were semantically unpredictable. To elucidate the neural dynamics of processing phonological information in these conditions, we applied temporal decoding and generalisation (logistic regression) of phonetic features (e.g. voiced/voiceless). This revealed when phonetic features were actively encoded by the brain and how neural patterns pertaining to this information dynamically evolved over time.

Dyslexics encoded phonetic features less accurately in unpredictable sentences compared to controls 232-262ms after phoneme onset. Furthermore, dyslexics' phonetic representations at a given time point generalised less to preceding and subsequent time points in predictable sentences. This could mean that dyslexic listeners anticipate and maintain phonological information less if they can probabilistically preactivate upcoming content instead.

[OS-3.2]

Beta oscillations support reading and its improvement in Developmental Dyslexia: a tACS-based intervention

Giuseppe Di Dona [1 2 3], Denisa Adina Zamfira [4 2 3], Francesco De Benedetto [5 2], Chiara Turri [6 2], Camilla Venturini [7 2], Lisa Venniro [3], Daniela Perani [2 3] & Luca Ronconi [1 2 3]

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Developmental Dyslexia (DD) is associated with suboptimal letters/words segregation and oculomotor control, likely stemming from dysfunctions of the magnocellular dorsal (M-D) stream. Mounting evidence linked specific functions of the M-D stream to beta oscillations in the parietal cortex. We combined a reading acceleration training with transcranial alternating current stimulation (tACS) to increase reading speed in adults with DD. 3 groups of participants underwent a 12-session training protocol. Vis-tACS and Vis-Sham groups performed a reading acceleration training; Phon-Sham group performed a phonological training. During the training, Vis-tACS received beta-tACS over bilateral parietal sensors; the other groups received sham stimulation. RS-EEG was recorded before and after each session and gaze was recorded during training. All groups equally improved overt reading skills but only beta-tACS induced faster and larger improvements in covert reading speed, and exclusive improvements in oculomotor control and working memory. These outcomes were accompanied by plastic changes in stimulated networks, indexed by modulations of beta-band activity in RS-EEG. Machine-learning analyses on pre-training RS-EEG showed that beta power and frequency were the clearest predictors of training outcomes irrespective of training type. These results suggest that parietal beta oscillations govern several reading subprocesses in DD and shape the associated improvement possibilities.

[OS-3.3]

Towards a Brain-Computer Interface (BCI) for improving phonological processing in developmental dyslexia

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Neurofeedback has the potential to enhance automatic features of neural processing. The aim of our BCI was to enhance the neural processing of phonological information during natural speech listening in dyslexia. An operant learning paradigm using mobile EEG was designed to help participants enhance their theta-delta oscillatory ratio, a neural metric previously shown to be sub-optimal during natural speech listening for dyslexic children. Low-frequency oscillatory neural networks are important in encoding syllable stress patterns. Participants were adults with and without dyslexia, who were pre- and post-tested with phonological awareness and reading tasks. Two methods of EEG data analysis were applied to measure BCI learning, real-time and off-line. A significant improvement in the theta-delta ratio from session 1 to 16, as reflected in each participant's T-score, was the measure of BCI learning.The majority of participants learned the BCI in both groups (dyslexic, control). The off-line BCI learning score was significantly related to improvements in nonword reading, phonological awareness and amplitude rise time discrimination in participants with dyslexia. Accordingly, the theta-delta ratio may be a promising neural metric for the development of BCIs for children with developmental dyslexia, targeting the core phonological deficit.

[OS-3.4]

Infant Neural Responses as Early Predictors of Later Reading Development

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Early auditory processing skills are fundamental for speech perception, language development, and reading acquisition. Infants with a family history of language and learning impairments (LLI) often show early deficits in these processes, reflected in atypical electrophysiological responses such as the MisMatch Response (MMR). Longitudinal research highlights these early neural markers as strong predictors of later language and reading outcomes. We report results from an Italian longitudinal study involving 150 infants with and without familial LLI risk. At 6 months, infants completed an electrophysiological multi-feature oddball paradigm with rapidly presented non-speech stimuli. Follow-up assessments evaluated language at 20, 24, and 36 months; pre-reading abilities at 4.5 and 5.5 years; and reading at 8 years. The MMR at 6 months was significantly associated with later language development, phonological awareness, and reading skills. Early auditory processing explained 38.5% of the variance in reading time, and adding phonological awareness measured between ages 3 and 6 increased predictive power by 39.2%. Path analyses revealed both direct effects of early auditory processing on reading and indirect effects mediated by phonological awareness. These findings demonstrate that early acoustic discrimination robustly predicts reading eight years later, supporting developmental models that identify diverse trajectories in typical and at-risk populations.

[OS-4.1]

Bounded rationality shapes neurodevelopmental variation.

Samuel Jones [1]

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Although multidirectional feedback between brain and behaviour is a cornerstone of probabilistic epigenesis, contemporary theories of individual differences in human development characteristically focus on unidirectional structure-function cascades. In this talk, I will present a new programme of work that aims to complement this view by detailing the behavioural origins of individual differences in human development. I describe a new formal model of adaptive restricted search and satisficing that incorporates reciprocal influences on development and learning, and integrate key contemporary empirical literature in support of this model. This work supports the thesis that bounded rational decision-making involving heuristics – cognitive shortcuts that simplify decision-making under uncertainty – contributes unique variance to neurodevelopmental differences over and above the fundamental genetic and neurobiological factors that promote this behaviour. This talk will draw on a rich history of work in economics and cognitive psychology on bounded rationality, adaptive search, and satisficing, and its implications for neurocognitive development and learning, aligning closely with iWORDD's 2026 focus on theories spanning brain and behaviour.

[OS-4.2]

DLD identification battery reveals dissociable markers of dyslexia and oral language ability in adults

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Developmental language disorder (DLD) and dyslexia are common neurodevelopmental conditions affecting oral language and literacy. This study examined whether measures used for DLD identification (following spoken directions, spelling irregular words, word definitions; Fidler et al., 2011) captured dissociable dimensions of language-literacy impairment in a sample of 556 adults enriched for language difficulties.

A logistic regression predicting self-reported dyslexia showed that spelling irregular words was a strong predictor (β_std=-1.37, p<.001), whereas following spoken directions contributed no unique variance (β_std=-0.36, p=.132). This dissociation held across participants with higher and lower oral language ability (i.e., following directions score). Word definitions did not independently predict dyslexia diagnosis beyond oral language ability.

These results suggest that spelling irregular words and following directions tap dissociable dimensions of adult language-literacy impairment with direct implications for differential identification of DLD, dyslexia, and co-occurring profiles in adulthood. Interestingly, irregular word spelling is thought to index print exposure, which is reduced in both conditions; this suggests disruption of orthographic lexicon development is a distinct feature of dyslexia beyond reduced print exposure alone. However, only 20 participants (3.6%) reported a dyslexia diagnosis, suggesting that the true prevalence of dyslexia and its co-occurrence with DLD remain substantially underestimated in this university population.

[OS-4.3]

Does error monitoring predict future reading skills ? A longitudinal study in French-speaking children.

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The aim of the present study was to determine if error monitoring is important for reading acquisition. Recent literature has shown that dyslexic children have difficulties to detect their errors during lexical decision tasks and non-linguistic tasks. This suggest that a deficit in error monitoring is a risk factor for dyslexia as accounted for by “the broken monitor” hypothesis. The aim of the present longitudinal study was to test this hypothesis in a sample of 90 French children. We assessed a set of reading predictors as well as error monitoring abilities through a Simon task with electromyographical recordings, in kindergarten (i.e. before formal reading instruction). We examined their relationship with various reading outcomes in Grades 1 and 2. Results revealed that the ability to detect and correct online errors was correlated with decoding skills in Grade 1. Interestingly, it was also found to be correlated, although marginally, with reading comprehension performance in Grade 2, even after controlling for phonological and linguistic factors. These findings suggest that there is a causal link between the error monitoring and reading acquisition, in accordance with the “broken monitor” hypothesis. These results provide new insights into supporting reading acquisition.

[OS-4.4]

Expectancy effects on reading: Placebo-induced modulation of word and pseudoword processing

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Understanding how top-down mechanisms shape reading performance is central to bridging cognitive and brain-based accounts of reading and developmental dyslexia. Within this framework, expectancy effects—such as placebo and nocebo—represent a powerful yet underexplored source of modulation.

In a within-subject cross-over study, 102 young adults performed computerized word and pseudoword reading tasks while wearing sham glasses presented as capable of enhancing or impairing reading via frequency modulation. Expectations were induced through explicit verbal instructions and implicit feedback-based learning. Behavioral (reaction times, accuracy), subjective, personality (Big Five), and physiological (pupil size, heart rate) measures were collected.

Results showed that positive expectations significantly enhanced reading speed for both words and pseudowords compared to baseline and nocebo conditions. No effects emerged on accuracy, physiological indices, or personality, and conditioning did not amplify expectancy effects beyond explicit instructions.

These findings demonstrate that placebo effects extend to complex processes such as reading, likely via top-down attentional and predictive mechanisms. Expectations may bias attentional allocation and decision thresholds during reading. These results highlight the need to control expectancy effects in reading interventions and suggest they may be leveraged to enhance training outcomes in individuals with reading difficulties.

[OS-4.5]

Evaluating a Digital Medical Device as an Adjunct to Speech-Language Therapy in Children with Specific Learning Disorder with Reading Deficit : A Randomized Non-Inferiority Trial.

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Introduction and Objectives The French College of Speech-Language Pathology recommends high-intensity training for the rehabilitation of children with specific learning disorder with reading deficit (SLD-reading), only achievable through home-based sessions. However, little evidence is available on adherence to, and effectiveness of such training alongside speech therapy. This study evaluates the addition of a digital medical device (DMD) — a serious game used at home — to speech-language therapy.

Methodology This multicenter, randomized, controlled, single-blind non-inferiority trial included 306 children with SLD-reading aged 7–11, assigned either to the experimental group (Poppins DMD plus bimonthly speech therapy) or the control group (one weekly speech therapy session). The DMD delivers rhythmic and graphophonological training in 5 weekly 20-minute sessions, with pre- and post-tests after 12 weeks.

Results Children in the experimental arm showed better reading fluency ($p=0.008$) and non-inferior reading speed compared with controls.

Conclusion The study demonstrates the effectiveness of combining speech-language therapy with the home-based Poppins DMD in the treatment of SLD-reading.

[PS-1.1]

Automated Individual Subject Functional Parcellation of the Reading Circuitry in the Ventral Occipitotemporal Cortex

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Mapping the computational architecture of reading requires precise, subject-specific localization within the ventral occipitotemporal cortex (vOTC). However, establishing a reliable topography is currently hindered by a lack of standardized delineation criteria, the use of disparate functional localizers across different laboratories, considerable individual differences in cortical anatomy, inter-session variability, signal dropout, and group-level averaging that blurs functional boundaries. To overcome these limitations, we operate on the premise that despite the variability, functional organization exhibits fundamental invariabilities anchored to structural geometry (e.g. V2 always posterior to V1). Leveraging dense fMRI sampling (10 subjects; 100 sessions), we introduce an automated framework to delineate functional regions of interest (ROIs) in individual space. Our approach extracts candidate clusters on the native cortical surface and establishes cross-subject correspondence using the Fused Gromov-Wasserstein (FGW) distance, jointly aligning geometry and functional profiles. By assembling these couplings into a global graph and applying community detection, we isolate maximally consistent subregions. Applied to the vOTC, our method reveals distinct, reproducible functional communities organized along the posterior-to-anterior axis, conserving spatial relationships despite individual anatomical differences. Bypassing rigid template registration, this framework provides a robust, mathematically grounded solution for subject-specific mapping of human functional architecture.

[PS-1.2]

Detecting the contribution of V5/MT on reading in children and adolescents with developmental dyslexia

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Beyond language-related dysfunctions, Developmental Dyslexia (DD) has also been associated with abnormalities in early sensory pathways, especially in visual thalamic nuclei and their connectivity with higher-order sensory cortices. In particular, atypical left LGN–V5/MT connectivity has been implicated in reading-related processing. However, motion-sensitive visual areas have been largely overlooked in non-invasive brain stimulation studies in children with DD.

Our study aimed to modulate left V5/MT activity with High-Definition transcranial Direct Current Stimulation (HD-tDCS) to impact reading and reading-related processes in 24 children and adolescents with DD (aged 8–13). Using a triple-blind, within-subjects design, participants underwent three conditions: active HD-tDCS over V5/MT, active HD-tDCS over V1 (control-site), and sham stimulation, each combined with a reading task.

Reading (text, word lists, nonwords) and reading-related processes (motion perception, RAN, phoneme blending) were assessed before and after each session.

HD-tDCS over V5/MT significantly reduced error rates for word lists (a mean reduction of 36.8%), improved phoneme blending performance (of 35.1%) and motion perception in the right visual hemifield (a threshold reduction of 7.5%) compared to baseline.

These findings suggest that targeting motion-sensitive visual areas may induce plastic changes in reading-related processes and inform neurobiologically grounded interventions for children and adolescents with DD.

[PS-1.3]

Microstructural Alterations in the Ventral Occipitotemporal Cortex in Developmental Dyslexia: A Quantitative MRI Study

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Developmental dyslexia (DD) is a neurodevelopmental disorder characterized by persistent reading difficulties despite adequate intelligence and education. While prior neuroimaging studies have identified functional alterations within the reading network, the underlying cortical microstructural properties remain poorly understood. Here, we used quantitative MRI (qMRI) to investigate differences in cortical T1-relaxation values between children with DD and typically developing (TD) readers. 121 participants (56 DD, 65 TD), underwent high-resolution structural and quantitative T1 mapping. Behavioral assessments covered reading accuracy, pseudoword reading accuracy, decoding, phonological processing, and naming speed. Whole-brain analyses revealed significantly shorter T1-relaxation values in DD readers in the ventral occipitotemporal cortex (vOTC). Region-of-interest analyses further demonstrated distinct relationships between T1-relaxation values and reading-related behavioral measures. Notably, interactions between group and behavioral performance were observed in occipitotemporal regions, indicating different microstructure-behavior associations in readers with DD relative to TD readers. For instance, longer T1-relaxation values were associated with improved pseudoword reading and naming speed in controls but showed the opposite pattern in readers with DD. Our findings provide evidence of altered cortical microstructure in DD using qMRI, suggesting that microstructural differences in the vOTC may contribute to reading impairments, and highlighting qMRI as a relevant proxy for understanding DD's neurobiology.

[PS-1.4]

Towards precise and reproducible localization of cortical reading circuits with dense-sampled fMRI

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Reading is a culturally acquired cognitive process supported by distributed cortical networks, with a crucial hub in the ventral occipitotemporal cortex (VOTC). Previous studies suggest at least two subregions supporting distinct computations during visual word recognition. Despite decades of research, both the functional roles and precise anatomical boundaries of these subregions remain debated. Functional localizers vary widely across laboratories in stimulus design, contrast definitions, and ROI delineation procedures, introducing variability in reported coordinates and limiting reproducibility.

To address these challenges, we designed a dense-sampling high-resolution MRI study (10 sessions per participant, N=10) enabling precise, individual-level characterization of VOTC reading circuits. We conducted a comprehensive review of recent literature regarding category-selective ROI delineation in the VOTC. This synthesis reveals a consistent set of five reading-related ROIs that are repeatedly reported but not yet explicitly consolidated. Our results demonstrate reliable individual-level localization of these five subregions. Furthermore, we establish a power analysis framework to optimize localizer design. This work provides a detailed and reproducible delineation of VOTC reading circuits, along with practical experimental recommendations for MRI acquisition, and a robust framework for individual-level localization, thereby advancing methodological rigor in reading research.

[PS-1.5]

Words and False Fonts modulate pRF estimates in higher-order visual cortex

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Population receptive field (pRF) modeling characterizes the aggregate spatial tuning of neuronal populations within a voxel. However, these estimates depend on the specific neural subpopulations recruited by stimulus carrier textures. In the context of reading, visual inputs such as words and non-meaningful analogues (false fonts) may differentially engage high-level visual regions. This study systematically investigates how carrier patterns (words, false fonts, checkerboards), element sizes, and flickering frequencies modulate pRF estimates in the visual cortex. Using a dense-sampling fMRI protocol (N=10, 10 sessions each), we performed retinotopic mapping using 8-bar apertures whose carrier content, element size, and refresh frequency were systematically varied across sessions. Results demonstrate high consistency across sessions, confirming measurement reliability. However, recovered pRF estimates were significantly modulated by stimulus properties: carrier content shifted eccentricity, while element size and frequency further altered pRF parameters. These shifts were minimal in the early visual cortex but larger in higher-order regions. Notably, we observed substantial inter-subject variability, with participants showing distinct patterns of carrier-dependent modulation. These findings suggest that pRF parameters are dynamic measures dependent on the neural subpopulations recruited by specific stimulus features. Quantifying these effects explains inconsistencies in prior literature and provides practical constraints for future visual mapping studies.

[PS-1.6]

The Neurobiology of Reading Disabilities: Molecular and Cellular Studies

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Despite advances in genome-wide association studies (GWAS) of reading disabilities (RD), it remains unclear how risk variants affect gene function and cumulatively alter neural cell biology. We are using multiple approaches to address this gap (molecular, cellular).

An understudied mechanism in genetic risk is alternative splicing. GWAS of word reading identified variants in the DOCK7 gene correlated with an alternative, truncated isoform. DOCK7 is essential for axon formation, cortical neurogenesis and development of interneurons. We confirmed this in genotyped postmortem human hippocampus and prefrontal cortex samples, where individuals carrying risk genotypes showed increased expression of the truncated isoform (P=4.05E-6).

To study the cumulative effects of genetic risk on neural cell function, we generated induced pluripotent stem cells (iPSCs) from two children with severe RD and their unaffected siblings. Neural precursor cells (NPCs) derived from RD cases exhibited significantly faster outgrowth in the neurosphere assay, consistent with altered migration. Transcriptomic analyses of neurons and NPCs identified 44 genes differentially expressed in both cell types. Among these, OTX2—a transcription factor involved in brain development and sensitive periods—may regulate 11 of the identified genes.

These studies are a first step to understanding the cellular and molecular mechanisms underlying genetic risk.

[PS-1.7]

Behavioral and neurobiological consequences of Dcdc2 deletion across development and adulthood in a DD genetic mouse model

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Developmental dyslexia (DD) is a neurodevelopmental disorder characterized by impairments in reading acquisition and associated with altered functioning of the magnocellular-dorsal (MD) stream, involved in attentional control and reading skills.

Understanding how genetic factors influence neuronal substrates and, consequently, specific cognitive abilities during development can benefit from animal models, which allow genetic modulation under controlled environmental conditions while assessing molecular, functional, and behavioral correlates. Here, we used a preclinical mouse model characterized by the constitutive partial deletion (heterozygous knockout) of the DCDC2 gene (Dcdc2+/-), a DD candidate gene associated with interindividual variation in reading performance and motion perception, as well as with structural and functional neurobiological alterations underlying attentional control and reading skills in humans.

Preliminary results indicate that Dcdc2+/- mice show a selective delay in the acquisition of motor, somatosensory, auditory, and attentional functions during development, with long-term effects on cognitive abilities in adulthood. Furthermore, these phenotypic alterations are supported by altered activation in brain areas related to motion perception and belonging to the MD stream. The current findings may provide interesting insights into the genetic and neurofunctional mechanisms contributing to DD vulnerability within a multifactorial developmental framework.

[PS-1.8]

The magnocellular subdivision of the LGN-V5/MT tract is altered in Developmental Dyslexia (DD) dependent on biological sex

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Sensory thalami are key processing stations located between the sensory organs (e.g., the eyes and ears) and the cerebral cortex. Auditory and visual sensory thalami and their connections to the cerebral cortex are altered in adults with developmental dyslexia (DD), particularly in males. For example, structural connectivity is reduced in the left-hemispheric pathway that directly links the visual sensory thalamus (lateral geniculate nucleus, LGN) to motion-sensitive cortical area V5/MT (Müller-Axt et al., 2017, Current Biology). This LGN–V5/MT connectivity strength is associated with individual performance on rapid automatized naming of letters and numbers (RANln).

The human LGN comprises two subdivisions: the mLGN with mainly magnocelluar and pLGN with parvocellular neurons. Here, we used probabilistic tractography on diffusion-weighted Connectom-MRI data to test for alterations in the mLGN-V5/MT tract in DD. In line with our preregistered hypotheses, male DD participants had altered mLGN–V5/MT connectivity, characterized by reduced hemispheric asymmetry specifically affecting the mLGN pathway. Furthermore, and in line with previous fMRI findings in male DD (Müller-Axt et al., 2025, Brain), hemispheric lateralization of mLGN–V5/MT connectivity was significantly associated with RANln performance, such that a more neurotypical lateralisation pattern was linked to better RANln performance in male DD.

[PS-1.9]

Visual field asymmetries in motion perception in developmental dyslexia

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The lateral geniculate nucleus (LGN), particularly its magnocellular subdivision (mLGN), is involved in fast visual processing for stimuli with low spatial frequency and high contrast. Adults with developmental dyslexia have alterations in lateralisation of mLGN functional responses and reduced left LGN–V5/MT connectivity (Giraldo-Chica et al., 2015; Müller-Axt et al., 2017; Müller-Axt et al., 2025; Livingstone et al., 1991). These findings suggest potential differences in processing visual information that has characteristics of magnocellular processing, i.e., low spatial frequency and fast temporal frequency, particularly in one hemisphere.

In the present study, we examined hemifield advantages for motion perception in adults with DD and typically developing controls. Participants performed a two-alternative forced-choice task in which they fixated centrally while comparing the speed of two high-contrast Gabor patches presented in the left and right visual fields. The task estimated perceptual thresholds reflecting sensitivity to motion differences in peripheral vision.

Preliminary results showed no significant group differences in thresholds. Both groups exhibited a right visual field advantage for rapid temporal processing, with no interaction between group and hemifield, suggesting preserved asymmetry in visual motion processing for Gabor patches in DD.

[PS-1.10]

The role of the arcuate fasciculus in phonological processing in children with and without dyslexia

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Developmental dyslexia is considered a disconnection syndrome involving white matter pathway deficits (Langer et al., 2017). Previous research suggested adaptive compensation in the dorsal language pathway in dyslexic children (Zhao et al., 2024), but structural correlates of phonological processing remain understudied.

We analyzed white matter language pathway characteristics in relation to phonological processing in 19 Russian children with dyslexia and 30 controls. Participants underwent reading and phonological skills assessments and structural MRI. Tract reconstruction used the Quantitative Imaging Toolkit. Statistical analysis focused on metrics and lateralization indices of bilateral arcuate fasciculi (AF), inferior frontal-occipital fasciculi, inferior longitudinal fasciculi, and uncinate fasciculi.

Regression modeling with FDR correction revealed significant associations in children with dyslexia: better pseudoword repetition predicted by longer left long and posterior AF segments; better first sound identification predicted by lower lateralization indices of anterior and long AF density; better sound substitution predicted by lower lateralization index of the long AF segment volume. Our findings confirm adaptive compensation in long and anterior AF segments among Russian children with dyslexia using a hybrid tract reconstruction approach.

[PS-1.11]

Lateral geniculate nucleus responses rely on V5/MT integrity

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Developmental dyslexia has been linked to atypical processing in thalamocortical pathways that might be associated with altered cortico-thalamic feedback. In the visual domain, dyslexia is characterised particularly by alteration in the lateral geniculate nucleus (LGN) and the direct tract between LGN and motion area V5/MT. However, the causal mechanisms underlying pathways during visual processing remain unclear. Here, we investigated in typical reading participants whether cortical feedback shapes task-dependent modulation of the LGN. Using inhibitory transcranial magnetic stimulation (TMS) combined with fMRI, we targeted the V5/MT in adults while they performed two different visual tasks on identical stimuli. Disrupting V5/MT significantly reduced task-dependent LGN modulation and weakened the task dependency of functional connectivity between V5/MT and LGN. These findings provide causal evidence that cortical feedback from V5/MT modulates early visual thalamic processing in a task-dependent manner. Given that altered thalamocortical connectivity has been implicated in dyslexia, our results suggest a potential neural mechanism linking cortical feedback deficits to impaired processes related to vast-varying dynamic stimuli such as speech.

[PS-1.12]

Functional plasticity of the reading network: Dorsal stream recruitment under perceptual stress in a transparent orthography

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Efficient visual word recognition relies on the interplay between the ventral stream (orthographic processing) and the dorsal stream (visuo-spatial attention). This fMRI study investigated the compensatory role of the dorsal pathway in native Italian speakers using four types of perceptual degradation - rotation, mirroring, reduced contrast, and increased spacing - at three difficulty levels. These manipulations were designed to disrupt automatic orthographic identification and increase demands on visuo-spatial analysis and sub-lexical decoding.

Analyses revealed robust engagement of canonical ventral reading regions and load-dependent recruitment of dorsal areas, specifically the superior parietal and temporo-parietal cortices. Crucially, recruitment in both the ventral and dorsal streams scaled with the level of degradation and was influenced by individual reading ability, suggesting a strategic shift toward attention-mediated parsing when standard visual input is suboptimal.

These findings demonstrate significant functional plasticity within the reading network, even in languages with high orthographic consistency. The recruitment of dorsal regions highlights their role as a vital compensatory substrate for visuo-spatial analysis. By illustrating stimulus-driven adaptation, this study provides a framework for understanding the neural mechanisms that sustain reading performance under stress, offering potential insights into the visual-attentional deficits often observed in developmental dyslexia.

[PS-1.13]

Neural pathways for audiovisual integration and their reorganization in dyslexia

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We characterize the directed neural architecture of audiovisual (AV) integration and its reorganization in dyslexia, including sex-specific effects. We analyze EEG data from Glica et al. (2024), applying frequency- and time-resolved directed connectivity to reconstructed cortical sources in 88 adolescents and young adults (44 with dyslexia, 44 typical readers; balanced by sex).

We identify a two-stage hierarchical AV network: early sparse interactions linking visual, superior temporal, and prefrontal cortices, followed by widespread connectivity dominated by visual cortex outflow in the beta band and reciprocal coupling centered on superior temporal cortex in low frequencies. In dyslexia, this architecture shifts toward atypical top-down prefrontal-to-superior-temporal connectivity, while bottom-up visual-to-prefrontal and superior-temporal-to-visual feedback pathways seen in typical readers are absent.

The functional impact is sex-specific. In males, stronger early top-down prefrontal-to-superior-temporal connectivity predicts poorer multisensory integration and reading. In females, this pattern co-occurs with reversed superior-temporal-to-prefrontal feedback, consistent with compensatory reorganization that preserves performance.

These findings show that the direction and timing of prefrontal–temporal interactions determine whether altered connectivity reflects deficit or compensation, highlighting sex as critical in dyslexia research.

[PS-1.14]

Investigating the Interplay of Interhemispheric Connections, Bilingualism, Reading, and Genetics

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While language is typically left-lateralised, both bilingual individuals and individuals with dyslexia show reduced hemispheric lateralisation, and yet exhibit markedly different reading outcomes. We hypothesised that interhemispheric connectivity, particularly via the corpus callosum (CC), may underlie this divergence. Specifically, bilingualism may promote adaptive hemispheric cooperation, whereas in dyslexia it may reflect compensatory mechanisms to a left hemisphere dysfunction. Here, we explored the possibility of early bilingualism as a protective factor of dyslexia, acting through modifications in the CC structure.

To test this, we analysed MRI, genetic, and behavioural data from over 10,000 children in the Adolescent Brain Cognitive Development (ABCD) study. Mixed-effects and mediation models were used to examine the effects of a continuous bilingualism index and polygenic scores for reading difficulties on reading outcomes, with CC structure and overall brain size as mediators.

We found that bilingualism had specific positive effects on reading, partially mediated by the anterior CC, independently of the overall brain size. In contrast, polygenic scores of reading difficulties seemed to influence reading performance through brain size rather than CC. These findings suggest different neural pathways influencing reading development and support the strong potential of bilingual experience to strengthen spectrum-wide resilience to reading difficulties.

[PS-1.15]

Prosodic Modulation of Statistical Learning in Developmental Dyslexia: Evidence from EEG and Behaviour

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However, most SL studies use artificial speech streams that lack the rhythmic and prosodic structure of natural language. This is particularly relevant for developmental dyslexia, given proposals that atypical neural sampling of speech rhythm may contribute to phonological difficulties. We investigated whether prosodic modulation affects SL in children with and without dyslexia, using young adults without dyslexia as a developmental reference group. Participants were exposed to trisyllabic artificial speech streams presented in three conditions: a flat condition, in which only TPs supported segmentation, and two rhythmic conditions, in which pitch enhancement was applied either to the middle syllable only (fixed) or to the middle and final syllables (variable). EEG was recorded during familiarization to assess online neural tracking of segmentation, and learning was evaluated behaviourally using two-alternative forced-choice tests. This design allows us to examine how statistical and prosodic cues jointly support speech segmentation, and whether this interplay differs as a function of developmental dyslexia. The findings are expected to inform current accounts of rhythmic and phonological processing in dyslexia by linking behavioural performance to neural sensitivity to prosodically structured speech.

[PS-1.16]

An Integrative Study of Neurophysiological, Cognitive, Linguistic, and Psychosocial Factors in the Early Identification of Dyslexia

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Background: Early identification of dyslexia remains a significant challenge for researchers and clinicians. In this context, a multidimensional approach could improve the accuracy of early screening and intervention.

Aim: The study aims to investigate a network of potential difficulties in cognitive processes, linguistic abilities, neurophysiological markers, and psychosocial factors, as they interact in preschool children, thus shaping early patterns of Dyslexia.

Methods: A mixed-methods design was used on 230 children aged 5–6 years recruited through stratified sampling from the Epirus region in Greece. Data collection occurred during the second year of kindergarten. Assessment procedures included standardized dyslexia screening tests, measures of phonological awareness, working memory and vocabulary, psychosocial adjustment scales, parent and kindergarten teachers' questionnaires, family history records, and EEG recordings. Children at risk dyslexia and a matched control group participated in EEG assessments.

Results: 18 (8%) children identified as at risk for dyslexia, demonstrating significantly lower performance in tasks of phonological awareness, working memory, and visuospatial skills. Atypical patterns of neural activation during tasks emerged, while parental educational level and indicators of psychosocial adjustment demonstrated indirect relationships with these performances. Multivariate statistical analyses and Machine Learning techniques formed specific clusters of linguistic, cognitive, neurophysiological, and environmental characteristics, identifying associations between relative amplitude in the delta-1 and the alpha-1 frequency band within frontal, parieto-temporal, and occipital regions. Overall, the integration of behavioral assessments, EEG-derived biomarkers, and contextual family data is expected to improve the accuracy of early identification and facilitate the implementation of timely preventive interventions.

[PS-1.17]

Hidden Special Learning Difficulties in Uganda: Educational Inclusion, Misconceptions, and Implications for Reading Development

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Special learning difficulties (SLDs), including dyslexia, dysgraphia, dyscalculia, and related neurodevelopmental conditions such as attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD), remain largely under-recognized in many low-resource educational systems. In Uganda, where literacy acquisition is central to academic progression, learners with SLDs often experience persistent challenges in reading, writing, and numeracy that limit educational participation and achievement. Despite increasing global attention to developmental dyslexia and reading difficulties, research evidence from Sub-Saharan Africa remains limited. In Uganda, misconceptions frequently influence how learning differences are understood. Some children are perceived as lazy or unintelligent, while in certain communities their learning difficulties may be attributed to witchcraft or familial misfortune, delaying identification and access to appropriate support. This is an ongoing study that is currently in its initial stages and adopts a narrative review approach to synthesize literature, policy documents, and emerging research on SLDs in Uganda and highlights gaps in awareness, teacher preparation, and policy implementation affecting support for learners with SLDs.

Keywords: Special learning difficulties; developmental dyslexia; reading development; inclusive education; literacy acquisition; Uganda

[PS-1.18]

Caregiver-child interactions and their relationship with language and reading development

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The development of reading relies in part on early oral language abilities. Yet, the mechanisms linking early language input and later literacy outcomes remain insufficiently understood. This project aims to investigate longitudinal pathways from early language environments to the emergence of written language skills, with particular attention to the role of quality language interactions.

Data will be presented on a subsample of 45 children aged 5 to 6 years old, out of a larger longitudinal study including 185 children, using a multi-method approach combining semi-structured language assessments in the home environment and standardized assessments of language and reading precursors. Parental responsiveness and turn-taking in a semi-open setting are coded using standardized frameworks. Responsiveness is analyzed within a “serve and return” framework, based on topic-related exchanges and proportions of responsive parental and child behaviors. Conversational turns are identified using temporal contingency criteria, expressed as rates. The relationship between these semi-naturalistic measures and language and reading precursors will be presented.

This project contributes to the understanding of predictors of written language development by investigating the relationship between caregiver-child dynamics, oral language development and reading precursors. This work aims to refine theoretical models of language development and support earlier, more effective interventions.

[PS-1.19]

PILP, an Early Lexical Identification Test for Italian Children: First Results of a Linguistically Informed Screening

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The project concerns the development of a 3-minute collective screening test, the Early Lexical Identification Test (it: PILP), assessing reading and lexical decision abilities in Italian children aged 7-8 years. This developmental phase is still profitable for effective enhancement while being suitable for identifying difficulties involving the lexical reading route (Frith, 1986; Dehaene, 2007; Coltheart et al., 2001).

The test consists of a randomized list of 40 items — Words and Pseudowords — requiring participants to mark only existing Italian words. It was constructed through cross-consultation of two databases: DILLo (Gagliardi et al., 2024) and PVB (Caselli et al., 2015), from which 20 Words with simple phonotactic structure were extracted, balanced for frequency and concreteness/abstractness. The 20 Pseudowords were created by modifying 1 to 3 consonants per word, maintaining phonetic plausibility while avoiding phonemes sharing manner or place of articulation.

A pilot study on 23 children enabled replacement of less functional items prior to larger-scale administration. The test was proposed alongside the standardized Word Chain Test (Stella et al., 2015) to examine possible correlations. Results from approximately 300 subjects reveal a positive statistical correlation and offer insights into PILP trends, warranting further sample extension and potential adjustments.

[PS-1.20]

Language Profiles and Early Literacy Outcomes in Children at Risk for Developmental Language Disorder and/or Dyslexia

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It is well established that language difficulties in preschool years are a key risk factor for later reading difficulties. Indeed, children with Developmental Language Disorder (DLD) run a substantial risk of reading comprehension difficulties. Furthermore, a substantial proportion of children also display word-level literacy difficulties. The mechanisms underlying these word-level literacy outcomes remain poorly understood and the body of evidence so far has typically not included French-speaking children.

The present longitudinal study investigates the relationship between oral language abilities in kindergarten and early literacy precursors in a cohort of 192 children. The sample includes both children with a family history of oral and/or written language difficulties and typically developing peers. Interactions with parental and environmental home literacy characteristics are integrated into our model. More specifically, the study examines how individual differences in children's oral language profiles identified using latent profile analysis are associated with key emergent literacy skills, parental and environmental characteristics, and family history of oral and/or written language difficulties.

By linking oral language profiles to early literacy precursors, this study contributes to a better understanding of the developmental pathways leading to reading acquisition. Ultimately, this approach allows us to determine which DLD profiles are most at risk for developing dyslexia.

[PS-1.21]

15 year follow up study of language, reading and non-verbal IQ in adults with DLD

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Background: Longitudinal studies of Developmental Language Disorder (DLD) extending beyond adolescence remain scarce. The present study examines the developmental trajectory of language, reading, and nonverbal intelligence from childhood to adulthood in a Swedish DLD cohort.

Method: Twenty-two adults (aged 23–28 years) with a childhood diagnosis of DLD were reassessed using a battery equivalent to that administered at ages 8–12. Measures included nonword repetition, nonword past-tense production, receptive grammar, word and nonword decoding, and nonverbal IQ. Reading comprehension was assessed using different instruments at each time point. Sentence repetition was introduced as an additional measure at follow-up.

Results: Participants demonstrated persistent and significant language impairments in adulthood, with particularly low performance on sentence repetition and marked deficits in nonword repetition. Although receptive grammar showed improvement relative to childhood, it remained below age-expected levels. Reading outcomes indicated enduring difficulties, with decoding skills below normative expectations and reading comprehension representing the most impaired domain. Nonverbal IQ remained stable and within the average range.

Discussion: DLD constitutes a lifelong condition with substantial and enduring effects on language and literacy. These findings underscore the need for increased recognition and sustained support into adulthood and provide valuable longitudinal evidence of the persistent nature of DLD.

[PS-1.22]

Children's home screen exposure and early reading development: A longitudinal study

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Research Findings: The home literacy environment (HLE) is a well-established predictor of children's emergent reading skills. However, despite the ubiquity of digital devices, the role of the home digital environment (HDE) in early reading development remains unclear. This longitudinal study investigated associations of the HLE and HDE with foundational pre-reading (phonological awareness, letter knowledge) and verbal working memory skills in 5-year-olds, and their word reading accuracy and time one year later. Results revealed a significant negative association between the HDE and children's early phonological awareness and letter knowledge. In contrast, only formal activities within the HLE showed a significant association with later word reading fluency. Critically, the longitudinal association between HDE and poorer word reading one year later was accounted for by an indirect pathway via lower foundational prereading skills. These findings suggest a developmental pathway by which early digital exposure may impede reading acquisition by hindering its key precursors, and underscore the value of balanced, developmentally appropriate, and adult-mediated use of young children's digital media. Practice or Policy: Parents and caregivers can support early reading by prioritizing shared reading and letter–sound activities alongside screen use, and by choosing adult-mediated, language-rich digital content when screens are used.

[PS-1.23]

Development of reading-and spelling skills in prematurely born primary school children

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Introduction. Approximately 10% of children worldwide are born preterm (Ohuma et al., 2023). Despite major advances in neonatal care, preterm birth is associated with increased risk for later learning difficulties, including developmental dyslexia (Aarnoudse-Moens et al., 2009). Dyslexia prediction research has primarily focused on preschool cognitive–linguistic precursors in the general population (Ozernov-Palchik et al., 2016). However, it remains unclear whether these precursors and their predictive value differ in children born preterm.

Methods. We followed a longitudinal cohort of 68 children born preterm and 32 full-term controls. At age 5 (KG3), children were assessed on preschool predictors of literacy (RAN, nonword repetition, phonological awareness) and executive functioning. At age 7 (G2), children completed comparable phonological and executive functioning tasks and standardized measures of reading and spelling. We examined group differences in early reading and spelling and whether predictors of literacy outcomes differ between preterm and full-term children, where we hypothesize a stronger role for executive functioning in the preterms.

Results. No group differences were found in reading or spelling outcomes. Across groups, nonword repetition, RAN, and phonological awareness significantly predicted later reading and spelling. Future analyses will explore the contribution of executive functioning and early socio-emotional factors, such as duration of kangaroo care.

[PS-1.24]

Naturalistic assessment of spontaneous speech in Kindergarten and its link to Grade 1 reading skills

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According to the multiple-deficit model (McGrath et al., 2020; Pennington, 2006), dyslexia has a complex, multifactorial origin: identical reading deficits may arise from different underlying impairments, resulting in subject-specific impairment profiles. While research has traditionally focused on the phonological origins of word reading difficulties, learning to read also builds upon broader oral language development, including (1) learning word and sentence meaning (lexicosemantics; LS) and (2) mastering the combination of words into grammatical structures (morphosyntax; MS) (Coltheart et al., 2001; Levesque et al., 2021). These domains may play a particularly pivotal role due to their dual-edged influence on reading outcomes: weak MS and LS skills can act as risk factors that exacerbate reading failure, yet when well-developed, they may serve as protective factors that mitigate the impact of phonological deficits (Cavalli et al., 2017; Lefèvre et al., 2025). I present my work-in progress on a child-friendly, naturalistic assessment tool for the development of MS & LS skills. Applying it to spontaneous speech recordings of Kindergarteners, I explore the relation between pre-reading MS & LS skills and Grade 1 reading outcomes. The insights of this method hold potential for early, individual-tailored and strength-based intervention for reading problems.

[PS-1.25]

Development of inhibitory processes and reading in primary school children

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When reading a word (casa), it is necessary to activate its lexical representation and to inhibit orthographic neighbors (N), such as cosa or caso. Specifically, when neighbors are of higher frequency (HFN), they increase inhibitory demands. According to the multiple-route model (Grainger et al., 2012), interference effects increase with age, as children progress from analytical to global reading. However, it is possible that HFN interference is modulated by individual inhibitory capacity.

This study explored the development of the HFN interference and the inhibitory ability in children from 2nd, 3rd, and 4th grade. A lexical decision task manipulating HFN and a go/no-go task manipulating inhibitory difficulty were used.

Results in the lexical decision task showed an interference effect from HFN in word identification only in 4th grade, while the go/no-go task showed a progressive increase in general inhibitory ability with age. A regression analysis showed that efficiency in word identification was not modulated by general inhibitory ability.

These data reveal that lexical interference from HFN emerges late, and suggest that the inhibitory effect in reading depends on the interaction between the maturation of reading strategy and the development of inhibition specific to the lexical context, rather than on general inhibitory ability.

[PS-1.26]

Schooling shapes the brain: neural specialization for words and numbers in early childhood

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Experience-dependent neuroplasticity refers to the brain's ability to reorganize in response to experience. An intriguing example occurs when children begin formal schooling, acquiring skills such as reading or symbolic number processing. Longitudinal fMRI studies have documented substantial functional changes during the ages 5 to 7, including increasing specialization of the left fusiform gyrus for words and the intraparietal sulcus for symbolic numbers. These changes coincide with formal school entry, so it remains unclear whether these changes are driven by schooling or age. The present study addressed this question by using a quasi-experimental school cut-off design to disentangle the effects of schooling and age by comparing children who entered formal education with similarly aged peers who remained in preschool. Sixty-four children (36 schooling, 28 non-schooling) were scanned twice, one year apart, while they performed a passive fMRI task involving visually presented words and digit sequences. Children who attended first grade showed increased activation for words in the left fusiform gyrus and left supplementary motor area. They also showed increased activation for numbers in the right inferior parietal cortex. Our findings support the notion that schooling acts as key driver of functional specialization for words and numbers, above and beyond age-related maturation.

[PS-1.27]

Beyond Dyslexia: A Screening Questionnaire Capturing Cross-Domain Specific Learning Disorders Profiles in Primary School Children

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Specific Learning Disorders (SLD) are neurodevelopmental conditions manifesting with difficulties in reading, writing, and arithmetic, frequently co-occurring within the same individual. Early identification through reliable screening tools is critical to enable timely educational intervention. This pilot study evaluates a new screening questionnaire for developmental difficulties, comprising separate sections for children and parents, administered to 50 children (mean age = 9.79 years, SD = .76) from third to fifth grade. Questionnaire scores were validated against a standardized neuropsychological battery assessing reading, spelling, arithmetic, and attentional abilities. Partial correlations (Kendall's Tau B, controlling for age) confirmed that both parents' ($\tau = -.488$, $p < .001$) and children's ($\tau = -.412$, $p < .001$) scores on the reading difficulties subscale significantly predicted reading speed, reading accuracy and reading comprehension. Parent-reported scores correlated with spelling ($\tau = -.234$, $p = .019$) and arithmetic performance ($\tau = -.240$, $p = .036$), reflecting the cross-domain comorbidity profile typical of SLD. The questionnaire demonstrated adequate discriminative properties across SLD profiles: dyslexia (sensitivity = .83, specificity = .77), dyscalculia (.88, .84), dysorthography (.97, .50), and dysgraphia (.87, .58). These findings support its clinical utility as a first-level screening tool for orienting diagnostic and educational planning before formal assessment.

[PS-1.28]

Does growth in oral language predict early reading and spelling beyond the big three?

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Phonological awareness (PA), rapid automatized naming (RAN), and letter knowledge (LK) typically account for substantial variance in early decoding and spelling, while oral language generally contributes limited unique variance once these predictors are included. One explanation is that language is typically assessed at a single time point, which may not capture developmental change. The present study examines whether modeling growth in oral language provides added insight into early reading and spelling beyond established predictors. This approach aligns with developmental perspectives that view language as a foundation for decoding skills and later literacy outcomes (Snowling & Hulme, 2025).

Participants are 750 children from a Norwegian longitudinal cohort followed annually from ages 4 to 6. Oral language was assessed at each time point using identical measures, enabling estimation of individual differences in initial level and growth trajectories. PA, RAN, and LK were assessed prior to school entry. Grade 1 outcomes include word reading and spelling.

Latent growth modeling will be used to estimate variation in language level and growth, and to examine their associations with literacy outcomes while accounting for PA, RAN, and LK. The study evaluates whether developmental trajectories in language provide additional insight into early literacy development beyond these predictors.

[PS-1.29]

Infants' Sensitivity to Native Vowels: Effects of Familial Dyslexia Risk and Bilingual Exposure

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The development of perceptual sensitivity to native speech-sound contrasts in infants with familial risk of dyslexia (FR) remains underexplored, particularly in relation to bilingualism. To address this, our study examined vowel-contrast discrimination in Czech FR infants with and without bilingual exposure. We predicted (1) reduced sensitivity to vowel contrasts in FR infants, and (2) attenuated deficits in bilingual FR infants, potentially reflecting enhanced perceptual sensitivity. Infants aged 3.5–7.5 months were divided into monolingual (n = 75; 26 FR) and bilingual (n = 39; 6 FR; data collection ongoing) groups. Following a familiarisation with strings of naturally produced pseudoword [fafa], a central fixation paradigm with alternating vs non-alternating trials tested infants' discrimination of Czech phonemic /a/-/ɛ/ and /a/-/a:/ contrasts, which previously elicited distinct discrimination patterns in Czech monolingual no-FR infants. Preliminary linear mixed-model analyses of looking times indicated trending between-group differences. Nonsignificant – but non-negligible – main effect of dyslexia ($p = .091$) and its interaction with phoneme identity ($p = .098$) suggest that Czech-acquiring FR infants may already exhibit distinct vowel contrast sensitivity at 3.5–7.5 months when compared to their no-FR peers. Further data will allow for a more comprehensive assessment of the role of bilingual exposure.

[PS-1.30]

Early neural synchronization in toddlers and preschoolers at familial risk for dyslexia

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The Temporal Sampling framework proposes that dyslexia stems from poor neural synchronization to the temporal structure of speech, leading to core phonological deficits. Auditory steady-state responses (ASSRs) offer a neurophysiological index of this synchronization: delta-theta band ASSRs reflect prosodic-syllabic processing, while beta-low gamma band ASSRs reflect phonemic processing. Longitudinal evidence suggests that atypical ASSRs in the pre-reading years are linked to later reading difficulties. However, no study has examined neural synchronization before age 5, a critical period for emerging phonological processing.

As part of an ongoing longitudinal study, we assessed ASSRs to prosodic, syllabic, and phonemic modulation frequencies in toddlers (~3 y/o) and preschoolers (~5 y/o) with and without familial risk for dyslexia. While data collection is still ongoing, early cross-sectional analyses suggest a developmental effect, with preschoolers showing greater phonemic ASSR than toddlers. Preliminary trends also indicate risk-group differences in syllabic and phonemic ASSRs. Additionally, correlations between ASSRs and early sensory and cognitive reading-related measures will be studied, including rise time perception and phonological awareness. This study has the potential to clarify whether ASSRs can serve as early neural indicators of dyslexia risk, even before reading instruction begins.

[PS-1.31]

Time- and pitch-based auditory processing in Cantonese-speaking children with developmental dyslexia

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Phonological deficits are widely recognized as the core impairment in developmental dyslexia, yet their underlying auditory basis remains debated. The Temporal Sampling Framework (TSF) posits a universal role for rise time processing in reading, whereas the Language-Specific Auditory Cues (LSAC) hypothesis emphasizes pitch processing in tonal languages. This study examined both frameworks in Cantonese-speaking children with and without dyslexia.

Thirty children with dyslexia, 30 chronological age-matched, and 30 reading-level matched controls completed auditory discrimination (rise time, pitch discrete, and pitch glide), phonological/tone awareness, and reading accuracy/fluency assessments. The dyslexic group significantly underperformed both control groups on all auditory and phonological measures and further underperformed age-matched controls in reading measures. Stepwise regression across groups [YZ1.1]revealed that when considered independently, rise time, pitch discrete, and pitch glide performance each significantly predicted tone awareness and reading outcomes, with rise time additionally predicting phonological awareness, providing initial support for both TSF and LSAC. When auditory domains were mutually controlled, rise time remained a significant predictor across all outcomes, while pitch discrete/glide retained unique predictive variance only for tone awareness. These findings underscore the potentially universal role of rise time processing in reading, while also highlighting a specific role of pitch processing in tonal languages.

[PS-1.32]

Early correlates of reading development: preliminary findings with ongoing EEG analyses

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Identifying early behavioural markers of reading development is essential for understanding variability in literacy acquisition. Phonological processing and rhythmic motor synchronization are both proposed contributors to reading-related skills.

In this longitudinal study, Spanish-speaking children in their final year of kindergarten were assessed across multiple timepoints on phonological and reading-related tasks. Preliminary results show that early behavioural measures at T1 (phonological awareness, memory, and vocabulary) are moderately to strongly associated with later tapping consistency at T3. Tapping consistency has previously been linked to later reading ability and phonological decoding.

No clear associations were found between T3 tapping and concurrent reading outcomes, suggesting that rhythmic motor synchronization may not directly reflect reading ability at the same timepoint. Instead, results point to a shared underlying timing mechanism connecting early cognitive and linguistic precursors to later rhythmic performance. These findings emphasize the role of tapping consistency in relation to early precursors of reading development, with limitations in its direct association with reading outcomes. EEG data were collected in parallel to assess neural synchronization to speech rhythms, with ongoing analyses expected to further clarify relationships with reading development.

[PS-1.33]

Neural entrainment to rhythmic speech in adults with developmental dyslexia

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This EEG study seeks empirical evidence on the role of rhythm skills in phonological and reading development to inform remediation strategies. The 'Temporal Sampling' theory predicts that neural sampling of auditory information at slow rates is atypical in developmental dyslexia (DD), particularly in the delta band (0.5-4 Hz). We examine these neurophysiological mechanisms using a repetitive speech paradigm in 40 non-musician adults, 20 with a history of DD. Participants hear an isochronous sequence of syllables (SOA of 500 ms; 2 Hz delta band) while their brain activity is measured using EEG. Based on prior research (Keshavarzi et al., 2022; Power et al., 2012, 2013), we expect significant neural entrainment in both groups but reduced phase consistency and altered preferred phase in the DD group. Furthermore, these neurophysiological measures are expected to be related to the severity of participants' phonological and reading deficits. Results will be discussed in light of the Temporal Sampling Framework of Goswami (2011). They may contribute to a better understanding of the neural factors underlying DD across languages and pave the way for new avenues of remediation.

[PS-1.34]

Neural Phoneme Processing in Children with and without Dyslexia

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We investigated the neural dynamics of phoneme processing in 7-year-old children with and without dyslexia (25;9 boys), using EEG recordings collected during continuous speech listening. By applying temporal generalization to phonetic descriptor decoding, we can disentangle whether potential phoneme processing deficits are due to the maintenance of phonemes in verbal short-term memory and/or inferred differences in phonetic processing speed, both of which are thought to be impaired in dyslexia. We investigated whether phonetic processing depends on the phoneme's position or its lexical competition.

Our results reveal two key findings that may help explain the challenges faced by children with dyslexia. First, these children exhibit reduced decoding accuracy for word-onset phonemes, suggesting disruptions in either predictive, word-level anticipatory mechanisms or in the intrinsic rhythmic processing aligned with word boundaries. Second, they exhibit increased decoding accuracy for non-onset phonemes with low lexical competition approximately 400 ms after phoneme onset. This pattern suggests that children with dyslexia retain linguistically less relevant sounds longer in verbal short-term memory and process them more slowly compared to their typical reading peers.

Together, these findings suggest that dyslexia is characterized by altered phonetic encoding strategies, specifically inefficient prioritization of relevant phonological information.

[PS-1.35]

Lexical brain responses in 10-year-old children are impaired in dyslexia: an FPVS-EEG study

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Cortical specialization for print was investigated in 10-year-old typical readers (n=24, 11 males; 20 White) and children with dyslexia (n=14, 5 males; 12 White). Fast Periodic Visual Stimulation (FPVS at 6Hz) with Electroencephalogram (EEG) recordings quantified print tuning at a coarse (letters/pseudo-fonts) and fine (words/pseudoword) levels, by frequency-tagging responses to deviant stimuli. Among pseudo-font strings, words/pseudowords elicited occipito-temporal responses larger over the left hemisphere, correlating with reading performance but unaffected by lexicality. Among pseudowords, deviant words generated lexical responses strictly left-lateralized. Crucially, both groups showed lexical responses for irregular words, but regular words were not discriminated from pseudowords in dyslexia. These results demonstrate FPVS-EEG's sensitivity to reveal lexical neural responses in 10-year-old children, as well as atypical processing in dyslexia.

[PS-1.36]

Linking microsaccades and N400 to predictive sentence reading

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Language comprehension relies on the pre-activation of linguistic representations based on context, facilitating the processing of upcoming input. While previous predictability effects have been widely documented through eye movements and event-related potentials, particularly the N400 component, which is larger for less predictable words, the contribution of microsaccades in sentence reading remains relatively underexplored.

This project wants to investigate the role of microsaccades in linguistic prediction during sentence reading, combining behavioural measures and electroencephalography (EEG) in a population of typical adult readers (N=45). Adult readers will perform a silent reading task while EEG and gaze will be recorded simultaneously. The task will employ sentences with varying contextual constraint (high vs low) and terminate with a congruent word or a pseudo-word.

In high constraining sentences, incongruent targets are expected to elicit increased N400 amplitude and a higher rate of microsaccades. Furthermore, we hypothesize a correlation between microsaccadic activity and N400 modulation, suggesting a functional link between oculomotor dynamics and neural indices of prediction.

Overall, this project aims to advance our understanding of the interaction between neural and oculomotor processes in language comprehension, contributing to integrated models of reading and informing future research on reading difficulties, including dyslexia.

[PS-1.37]

ERP correlates of phonological processing in children with typical and atypical reading skills

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The mismatch negativity (MMN) and late discriminative negativity (LDN) are ERP markers with atypical responses repeatedly reported in children with reading difficulties, but their auditory versus linguistic nature remains debated. The MMN reflects automatic auditory change detection, while the LDN is more sensitive to linguistic stimuli.

We recorded ERPs in 16 Russian-speaking children (6–9 years, M_age = 7.88): 8 with age-typical reading and 8 performing below age-based reference points. In a passive oddball paradigm (240 standards, 60 deviants), we analyzed responses to tones, CV syllables, and disyllabic pseudowords, using a 64-channel ANT-neuro system and Waveguard cap. Linear mixed models tested stimulus × group interactions in early MMN (70–120 ms), late MMN (220–320 ms), and LDN (320–420 ms) windows in 9 ROIs.

Early MMN did not differ between groups. In the late MMN window, interactions were significant for syllables ($p < .001$) and pseudowords ($p < .001$), but not tones. In the LDN window, interactions remained significant for syllables ($p = .008$) and pseudowords ($p = .037$), and additionally emerged for tones ($p = .009$). Children with below-norm reading show preserved early acoustic change detection but atypical late MMN and LDN responses that scale with linguistic complexity.

[PS-1.38]

Altered Intrinsic Oscillatory Patterns in Children with Developmental Dyslexia

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Developmental dyslexia (DD) is associated with atypical functional activity in left-lateralized reading networks and their oscillatory dynamics. We examine intrinsic neural alterations in DD using magnetoencephalography (MEG). Five-minute resting-state recordings were obtained from 20 children with DD and 22 age-matched typical readers (TR) in Spain. Following source reconstruction, we extracted normalized spectra across frequency bands from 28 pairs of cortical regions and their homologues to characterize regional spectral profiles.

Source-level analyses revealed that DD was associated with reduced alpha-band power in the right lingual gyrus and right calcarine fissure. Furthermore, DD exhibited lower-frequency spectral peaks in the left fusiform gyrus and higher-frequency peaks in the right middle cingulate cortex and left insula. Spectral similarity analysis further indicated a less differentiated organization of resting-state networks in DD, with two widespread bilateral clusters showing similar spectral profiles, compared with four distinct clusters in TR.

Overall, these findings suggest that DD is characterized by altered intrinsic oscillatory activity, particularly reduced alpha power in right occipital regions, alongside diminished functional specialization of reading-related networks. These patterns could be consistent with an atypical baseline network organization of DD, characterized by reduced functional segregation and potentially altered inhibitory control in visual regions at rest.

[PS-1.39]

Neural tracking of Speech in Pre-Readers and Toddlers at Familial Risk for Dyslexia

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Dyslexia is typically diagnosed only after children fail to meet age-appropriate literacy milestones, yet interventions are most effective when implemented before reading acquisition (Ozernov-Palchik & Gaab, 2016). Identifying early neural markers of dyslexia risk is therefore critical for enabling timely intervention. The study of Neural Tracking, the brain's time-locked response to continuous speech, provides a powerful method for examining early speech processing. Its sensitivity to both acoustic and linguistic processing (Broderick et al., 2018) makes it well-suited for identifying atypical phonological processing mechanisms in young children at risk for dyslexia.

We investigated both lower-level auditory and higher-order linguistic processing. Three- year-old and five-year-old children with and without familial risk for dyslexia listened to spoken stories during electroencephalography (EEG) recording. Acoustic processing was assessed by modelling neural responses to the speech envelope. Higher-order linguistic processing through neural responses to phoneme surprisal (the unexpectedness of a phoneme given preceding context) and phoneme entropy (uncertainty in phoneme prediction, reflecting competition among phonological candidates) (Gillis et al., 2021). Temporal response functions (TRFs) derived through encoding models enabled assessment of both response latency and amplitude (Gillis et al., 2022).

Data collection is ongoing, with half of the sample acquired and the remainder expected by summer 2026. Preliminary analyses reveal significant age effects but no effects of familial dyslexia risk on neural tracking of the speech envelope. Analyses of higher-order linguistic tracking await completion of data collection to ensure sufficient statistical power. These findings will offer new insights into the developmental trajectory of phonological processing and demonstrate how neural tracking methodologies can help uncover early neural mechanisms underlying dyslexia risk, potentially informing early identification.

[PS-2.1]

Neuro-Affective Integrity in Reading Development and Challenges: An Integrative Framework Connecting Brain-Based and Cognitive-Behavioural Perspectives

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Converging evidence from affective neuroscience indicates that learning is fundamentally social-cognitive: the Executive Control, Default Mode, and Salience networks work together during reading (Immordino-Yang, Darling-Hammond, & Krone, 2018), and cognitive and emotional processing share neural substrates (Immordino-Yang & Damasio, 2007). Reading instruction cannot be treated as a purely cognitive enterprise. Yet interventions for reading difficulty have largely been designed in cognitive-linguistic terms without accounting for affective dimensions.

This has consequences for developmental dyslexia. Greater cognitive load during reading (Dehaene, 2009) compounds the emotional burden of persistent difficulty, creating conditions in which demand and distress together deplete the neural resources learning requires.

Structured literacy, as defined by the International Dyslexia Association, integrates language content and instructional principles for reading and writing. Drawing on cognitive load theory (Sweller, 2011) and affective neuroscience (Immordino-Yang, 2016), this review reveals that every component and principle engages emotion-regulation and social-cognitive systems, establishing neuroaffective integrity as neurobiologically essential to effective reading instruction.

Neuro-affective integrity operates on two timescales: immediate emotional safety freeing cognitive resources, and accumulated experience shaping learner identity. Consistent with reading-behaviour reciprocity (Morgan et al., 2008) and neural resilience in dyslexia (Hoeft et al., 2011), it may optimise neuroplastic reorganisation on which reading instruction depends.

[PS-2.2]

Lateralisation Moderates the Contribution of Short-Term Memory to Reading in Early Readers

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Research on phonological left hemisphere (LH) lateralisation and reading skills has produced inconclusive findings. Some studies report reading difficulties are associated with a hypoactivated LH and atypical bilateral organisation, whereas others suggest optimal bilateral organisation—enhanced activation in both hemispheres—boosts reading acquisition. Here, we examine phonological laterality and reading outcomes in a longitudinal cohort of Spanish-speaking Uruguayan children assessed in kindergarten (T1, age 5; N=505) and Grade 1 one year later (T2, N=318). We measured (i) phonological laterality indexes (LI) via a syllabic dichotic listening task at T1 and T2, (ii) phonological short-term memory (PSTM) at T1, and (iii) pseudo-word reading at T2. LH lateralisation increased developmentally but was unlinked to reading. However, T1 PSTM strongly predicted T2 reading, modulated by T1 LI: reduced pre-reading LH lateralisation increased PSTM's contribution to reading. Interestingly, lower pre-reading LH lateralisation related to poorer PSTM in the poorest Grade 1 readers, but to better PSTM in typical readers. These results indicate that pre-reading reduced LH lateralisation may reflect two neural phonological strategies with drastically distinct reading outcomes. We propose beneficial bilateral strategies are subtended by enhanced bihemispheric activation and stronger interhemispheric connectivity. Further research will determine which factors boost such connectivity to optimise reading outcomes.

[PS-2.3]

The processing of dynamic texts in typical and atypical readers

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This study focuses on the processing of dynamic texts in readers with and without developmental dyslexia (DD). Evidence from typically developing (TD) learners suggests that the use of multimodal (specifically audiovisual) input such as captioned videos can support L2 learning in both children and adults, and that it can improve both L1 and L2 reading skills. Yet very few studies have focused on L2 learners with DD, which raises questions about whether they rely on textual support when watching L2 captioned videos and if so, how they process subtitles, and perceive their captioned viewing experience. To fill this gap, we are designing an experiment to shed light how DD and TD readers deal with dynamic texts by assessing whether, and to what extent, caption speed affects (a) reliance on visual (subtitles) vs. auditory input, (b) eye-movements and scan-path behavior, (c) cognitive load, and (d) cognitive engagement. Further, we examine how individual differences shape the processing of dynamic texts, including variation across dyslexic reading and cognitive profiles, alongside differences in motivation, caption use, reading habits, and different linguistic and sociocultural backgrounds. As the project is in its early stages, we will present the experimental design, methodological choices, and preliminary pilot data.

[PS-2.4]

The Contribution of Eye Movements to Auditory Processing Across Reading Abilities

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Poor reading skills are associated with atypical eye-movements and atypical neural delta tracking of speech. Recently it has been found that not only auditory sources but also eye-movements track speech in delta frequencies, i.e., ocular speech tracking. Moreover, eye-movements modulate neural excitability in auditory sources. Both atypical mechanisms in poor readers might thus share a common source. This work aims i. to bridge the largely separate literatures on atypical neural entrainment and eye-movement behaviour in dyslexia, and ii. to better characterise the functional role of ocular speech tracking. To test this, forty-five participants with different levels of reading listened to continuous speech while EEG and eye-tracking were recorded. To better understand the mechanism linking eye-movements and neural speech tracking, we will examine whether and how saccades and blinks phase-reset auditory sources to better align it to the speech signal. Subsequently, we will look at the relationship between reading skills and the above mentioned measures. We hypothese stronger alignment of the auditory sources to speech after the saccades in better readers, suggesting a more efficient integration of the whole system.

Taken together, this work will give insights into the functionality of eye-movements in speech perception and help us understand atypical phenomena in dyslexia by investigating how neural and ocular mechanisms in speech perception integrate and relate to reading skills.

[PS-2.5]

Disentangling pathways to language and literacy in children at familial risk: The role of rise time detection

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Rise time detection, the ability to perceive rapid changes in the amplitude envelope of auditory signals, is a key aspect of temporal auditory processing that supports speech perception. While rise time sensitivity has been linked to phonological processing and reading development, its relationship with broader oral language abilities remains less well understood. This raises the question whether rise time detection primarily underpins phonological skills relevant for reading, or whether it also contributes to wider oral language development, particularly in children at risk for language disorders.

The present longitudinal study investigates the role of rise time detection in a cohort of 192 children aged 6–7 years at the early stages of reading acquisition. The sample is characterized by the inclusion of children with a family history of oral and/or written language difficulties, alongside typically developing peers. Rise time detection sensitivity will be linked to longitudinal measures of oral language abilities as well as to early reading skills.

This study allows to examine whether rise time detection is differentially associated with oral language abilities and reading development, and whether these relationships vary across familial risk profiles.

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[PS-2.6]

Comparing Auditory and Visual Processing Abilities in Children At-Risk for Dyslexia Before and After Formal Reading Instruction: A Longitudinal Study

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Developmental dyslexia is a neurodevelopmental disorder marked by persistent word-level reading and/or spelling difficulties, affecting about 7% of the population. A critical challenge in dyslexia research is the "dyslexia paradox": the optimal intervention window is around the third year of kindergarten, however a diagnosis typically occurs by third grade of primary school. Recent models, such as the multiple deficit model, suggest dyslexia stems from combined disorder-specific and shared risk factors, in contrast to the traditional single-deficit models. Although most consistent findings are deficits in phonological processing, there is also growing evidence for visual and auditory processing deficits.

This abstract focuses on a subgroup from a larger longitudinal study, testing children before and after formal reading instruction (n = 32; third year of kindergarten and first grade of primary school). Participants completed a large battery of tasks, including active and passive letter knowledge, auditory rise time, contrast sensitivity, visual search, visual attention span, and non-word repetition. Initial data showed significant differences between at-risk and non-risk children before reading instruction. Ongoing data collection will clarify how these profiles change with literacy training. These findings contribute to a nuanced understanding of dyslexia's multifactorial nature and highlight early markers relevant for timely intervention.

[PS-2.7]

Feasibility and Acceptability of a Prosodic Training Program for Children with Dyslexia

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Despite growing evidence highlighting the role of prosody in reading development (e.g., Calet et al., 2019), its role in dyslexia remains underexplored. This study aims to evaluate the feasibility, acceptability, and preliminary efficacy of a prosodic training program in children with dyslexia aged 8–10 years.

A systematic review conducted by our team indicated that children with dyslexia exhibited poorer prosodic skills compared to typically developing peers across several domains. These findings informed the structure of the PropoP program (Prosodic Skills Development Program for European Portuguese), which is delivered in 16 weekly 30-minute group sessions. The activities target both formal prosodic skills (e.g., auditory and vocal discrimination skills) and functional use of prosody (e.g., communicative functions associated with prosody).

Training effects will be assessed pre- and post-intervention using: i) the Reading Fluency and Accuracy Test - O REI; ii) a Prosody Assessment Grid; and iii) the Text Comprehension Test in Reading Mode – Narrative. Feasibility will be measured in terms of adherence and retention rate, drop out, session attendance, and implementation fidelity. A caregiver satisfaction questionnaire will be administered to assess the acceptability and perceived effectiveness of the intervention. Data collection is ongoing, and results will be presented at the conference.

[PS-2.8]

Same Intervention, Different Results: Unpacking Individual Differences in Reading Comprehension Gains

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Extracting meaning from text is the core goal of reading instruction, yet interventions that build decoding and oral language often yield modest gains on standardised reading comprehension tests. In a large randomised controlled trial (RCT), the UiT ReadWell program, which targets both components, produced substantial and lasting (6 months) gains. However, growth from pretest to follow-up varied among pupils who received the intervention. To inform targeted practice, we reanalyse the RCT data (N=415) within the Simple View of Reading, to ask: (1) What distinct trajectories of comprehension growth do the intervention children have when the improvements in the control group are taken into account? (2) Do baseline decoding and language skills predict membership in these trajectories?

Using latent profile analysis across three time points (pretest, posttest, follow-up), we model growth in reading comprehension to identify gain trajectories and test whether initial decoding and language predict trajectory membership.

Analyses are ongoing. Preliminary results show that multiple gain trajectories emerge and that distinct baseline skills are associated with different patterns of growth. These findings suggest that even when average comprehension improves, response heterogeneity remains substantial. This underscores the need to tailor intervention intensity and content to learner profiles. Full results will be presented.

[PS-2.9]

Effects of a flickering light device on reading performance in children with developmental dyslexia

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Flicker-based interventions have been proposed as a potential aid for individuals with developmental dyslexia, yet empirical evidence remains limited and inconsistent. The present study examined the effects of a flickering light device (Lili for Life lamp) on reading and comprehension performance in children with dyslexia.

Forty children diagnosed with developmental dyslexia participated in a double-blind, randomized protocol. Each child used the lamp under two conditions: flickering mode (ON), individually adjusted, and non-flickering mode (OFF). Reading performance (regular words, irregular words, pseudowords), visuo-attentional skills, rapid automatized naming (RAN), eye movements during text reading, and reading comprehension were assessed.

Results showed significantly better reading performance in the ON compared to the OFF condition. Accuracy and reading speed improved across word types (all $< .001$, except pseudoword reading time: $p = .008$). The number of words read per minute increased ($p < .006$), fixation durations decreased ($p = .001$), and reading comprehension improved ($p < .001$). No significant effects were observed in visuo-attentional measures or RAN.

These findings suggest that flickering light selectively facilitates decoding-related processes without generalizing to other cognitive functions, and indicate that the lamp could be used by speech therapists as a supportive tool during reading intervention.

[PS-2.10]

A Use Case for Proprioceptive Intervention in Chaotic Functioning of the Perception-Action Coupling: Developmental Dyslexia

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We approach developmental dyslexia through the mechanisms of motor control automation in the perception-action coupling by studying proprioceptive intervention.

Proprioceptive intervention is thought to influence multisensory integration and the consolidation of internal representations, the first and final stages of the perception-action coupling.

We have structured our research into three phases: Confirming a causal link; Assessing the presence of a sensorimotor deficit independent of reading tasks; Characterising this sensorimotor deficit.

Our results confirm, during silent reading in children with developmental dyslexia, a causal link with the observation of an improvement in sensorimotor processes, with cognitive processes becoming similar to those of typical readers. We have highlighted the presence of a sensorimotor deficit independent of the reading task, characterised by a non-linear, suboptimal dynamic system, both of which are dependent on proprioceptive intervention.

In the discussion, whilst acknowledging the limitations, we will evaluate data from the international literature on developmental dyslexia in relation to perception-action coupling. We will propose a chaotic dynamic model of developmental dyslexia.

Finally, we will examine our findings from the proprioceptive intervention for developmental dyslexia in the light of current approaches to impaired perception-action coupling in neurodevelopmental disorders, on bridging brain and behavioural sciences.

[PS-2.11]

From Decoding to Speech Production in Students with Specific Learning Disabilities

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This paper explores the relationship between decoding difficulties, comprehension and production of written speech in students with Specific Learning Disabilities in higher education. Reading processing is approached as a basic prerequisite for the understanding, organization and linguistic representation of academic knowledge (Dehaene, 2007; Ramus, 2024). The purpose of the study is to highlight factors that influence the processing and meaning of academic speech, as well as to investigate the way in which these factors are reflected in the structure, coherence, clarity and quality of the produced written speech. In the methodology, data were collected from a sample of 40 students, 20 men and 20 women, of whom 22 were undergraduates diagnosed with dyslexia and 18 were postgraduates, through the analysis of written assignments. The grounded thematic analysis was utilized, focusing on decoding, comprehension, organization and documentation of speech, in relation to the range of visual attention and executive functions. The findings highlight the need for targeted, differentiated and inclusive pedagogical practices, within the context of a person-centered teaching model. It is therefore necessary to formulate a holistic support framework, which critically utilizes the bibliography and promotes sustainable, pedagogically documented interventions.

[PS-2.12]

Action video games as an enhancement tool for early literacy skills: Evidence from an ongoing, longitudinal prevention study

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Background: Action video games (AVGs) have been shown to improve attention, reading efficiency, and phonological skills in children with developmental dyslexia (DD) and in preschoolers at risk for developing DD. This ongoing, longitudinal prevention study investigated whether improvements induced by an AVG-based intervention in typically developing preschoolers predict later reading abilities.

Methods: Fifty-one children belonging to the general population and attending the last year of kindergarten were assessed on visuospatial attention, phonological working memory, and rapid automatized naming (RAN) of colors and letters before (T0) and after (T1) a 15-to-20-hour AVG training program, delivered in three weekly sessions of 45 minutes. Reading skills were evaluated one year later, at the end of the first year of primary school (T2).

Results: After controlling for performance at T0, improvements in visuospatial attention and RAN from T0 to T1 significantly predicted reading abilities at T2.

Conclusion: AVG-induced enhancements in visuospatial attentional and automatization processes could be associated with subsequent reading development, supporting the potential of AVGs as an enhancement tool for early literacy skills' development.

[PS-2.13]

Flickering Lens in Children with Developmental Dyslexia and Young Adults with Reading Impairment: Placebo and Active Effects

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Developmental dyslexia (DD) is a multifactorial neurodevelopmental disorder characterised by significant impairments in reading skills. This study aimed to evaluate the effectiveness of intermittent lens glasses (Lexilens®) compared to a placebo condition (non-active lenses) in enhancing reading abilities. The crossover, double-blind design blinded both participants and experimenters to condition assignment. Participants comprised 49 children diagnosed with DD, and 48 young adults lacking any clinical diagnosis, categorised as typical or poor readers. For primary school children, the results showed that positive expectations (placebo) significantly boosted word-reading accuracy, outperforming traditional phonological interventions. This placebo effect was absent in secondary school children with DD, likely due to perceived treatment ineffectiveness. Specifically, active lenses reduced the lexicality effect, encouraging sub-lexical decoding of pseudo-words. Conversely, active lenses had no significant reading improvements in young adults without diagnosis. Nevertheless, placebo reduced word-reading errors among poor young adult readers and enhanced reading speed in typical readers. These outcomes emphasise the critical role of expectations in DD rehabilitation strategies and the necessity of rigorously controlling this factor in experimental designs testing intervention effectiveness.

[PS-2.14]

Supporting Monolingual and Bilingual Children with Reading Comprehension Difficulties: A Pilot Study

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Few studies have examined language and literacy interventions for bilingual children (Nair et al., 2023). Targeted small-group interventions for struggling readers generally produce better comprehension outcomes than larger-group interventions, whereas individualized interventions do not consistently lead to improved outcomes (Donegan & Wanzek, 2021). Regarding intervention content, approaches integrating narrative schema (Diguer, 1993), as well as non-verbal components such as mental imagery (Joffe et al., 2007) and tactile manipulation (Berenhaus et al., 2015), have shown positive effects on reading comprehension. This study investigates whether a targeted small-group reading comprehension intervention using non-verbal elements benefits bilingual children with reading difficulties. A six-week intervention (one 45-minute session per week) was implemented with Swiss-French primary school children (ages 8–9), organized into two groups including monolingual and bilingual children. Children read stories and reconstructed them using storyboards, tactile supports, and self-filmed video montages on a tablet. A quasi-SCED design with multiple baselines across participants was employed (Tate et al., 2016). Conclusions are based on individual trajectories. Variability was high during the pre-intervention phase, and Tau-U analyses did not reveal significant treatment effects, although positive trends were observed in two children. Further testing is ongoing, and the full dataset will be presented at the conference.

[PS-2.15] CANCELLED

~~From Cognitive Predictors to Intervention: The Role of Visual Attention and Letter Knowledge in Arabic Reading Acquisition~~

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Background: Arabic orthography is visually complex, requiring fine-grained processing of letter forms and diacritics. While dominant models of reading emphasize phonological skills, visual-attentional mechanisms may play a critical role, particularly in visually dense writing systems such as Arabic.

Method: A two-step approach was adopted. First, a cross-sectional study with Lebanese first-grade children examined the contribution of visual attention span and letter knowledge to reading, alongside phonological skills. Second, a structured visual-attentional training program targeting letter-level processing (diacritics and allographic variations) was implemented with Moroccan second-grade children.

Results: Visual attention span and letter knowledge significantly predicted reading performance beyond phonological skills. Following the intervention, children showed improvements in reading-related outcomes, supporting a causal contribution of visual-attentional mechanisms.

Conclusion: These findings highlight the importance of visual processing in Arabic reading acquisition and support the integration of visual-attentional components into models of reading. They further demonstrate the value of theory-driven interventions, contributing to bridging cognitive and applied approaches in the study of reading and developmental dyslexia.

[PS-2.16]

Evaluating the validity of cognitive and reading tests for Russian-speaking adolescents at risk of dyslexia using ROC-curve analysis

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Determining the predictors of reading difficulties is essential for both theory and practice. Previous research has largely focused on preschool and early elementary children, meaning adolescents have remained significantly understudied. In the present study, we examined the validity of cognitive and reading tests for identifying Russian-speaking adolescents with reading difficulties. There were two groups of the participants: typically developing adolescents (29 girls, 69 boys, Mean age = 15.71) and those at risk for reading difficulties (17 girls, 40 boys, Mean age = 15.30). The first group was matched to the second by age and gender. We used standardized tests to assess phonological processing, visual processing, and word- and text-level reading. The findings indicated that the phonological test and three reading tests successfully distinguished between adolescents with and without reading difficulties. ROC-curve analysis revealed that these tests demonstrated high validity (AUC > .80), along with strong specificity and sensitivity. Consequently, these instruments can be recommended for identifying reading difficulties in Russian-speaking adolescents.

[PS-2.17]

Longitudinal study of literacy development across Hiragana, Kanji, and English: I. Early prediction from preschool literacy skills

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In the Japanese education system, children learn multiple scripts sequentially in order of Hiragana, Kanji, and English. While early literacy skills, such as phonological awareness (PA) and letter knowledge (LK), are known to predict later reading and writing development over the long term, it remains unclear whether these skills can predict literacy development across scripts with different orthographic characteristics. The present longitudinal study followed a cohort of 140 children (67 boys). PA (mora segmentation and isolation) and Hiragana LK were assessed in preschool, Hiragana reading fluency in Grades 1-2, Kanji reading and writing in Grades 3-6, and basic English literacy skills in Grade 7. As a result, among the 26 children with poor PA and LK, 19 showed low Hiragana reading fluency (73.1%), 14 showed low achievement in Kanji reading or writing (53.9%), and 12 showed poor English literacy skills (46.2%). Moreover, 8 children met poor/low criteria in all three scripts (30.8%) and 15 children in two or more scripts (57.7%). These results indicate that, while preschool PA and LK can generally predict later reading and writing difficulties across different writing systems and language status (L1 and L2), late-emergent and/or script-specific difficulties should also be considered.

[PS-2.18]

Longitudinal study of literacy development across Hiragana, Kanji, and English: II. Emergence of difficulties in later-acquired scripts

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The Hypothesis of Granularity and Transparency predicts a higher prevalence of developmental dyslexia in writing systems with smaller grain sizes and greater irregularity. In the Japanese education system, children learn multiple scripts sequentially in order of Hiragana (medium-grained, regular), Kanji (large-grained, irregular), and English (small-grained, irregular). This sequence may lead to a certain proportion of children with late-emergent difficulties in Kanji and/or English. The present study examined this possibility by following a longitudinal cohort of 140 children (67 boys). Hiragana letter knowledge was assessed in preschool, Hiragana reading fluency in Grades 1-2, Kanji reading and writing in Grades 3-6, and basic English literacy skills in Grade 7. As a result, among the 19 children who exhibited Kanji reading or writing difficulty, only 2 (10.5%) were first identified at this stage, and the remaining 17 (89.5%) had previously been identified as having difficulties in Hiragana in earlier grades. Similarly, among the 17 children who exhibited poor English literacy skills, all (100%) had previously been identified as having difficulties in Hiragana and/or Kanji. Contrary to expectations, the present results provide little evidence for late-emergent difficulties associated with the characteristics of writing systems in individuals' trajectory of literacy development.

[PS-2.19]

Statistical Learning of Graphotactic Patterns in Spanish: Evidence from Primary School to University

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Learning to read and write involves statistical learning (SL) mechanisms that enable the unconscious acquisition of written language regularities. However, SL remains underexplored in transparent languages. This study examined whether Spanish-speaking students show SL to graphotactic patterns and how this ability relates to literacy development. Specifically, we aimed to: (1) determine whether SL of spelling rules and consonant cluster frequencies is present from primary school through university; (2) examine whether SL improves with increased exposure to written language; and (3) assess its association with reading and writing skills. A total of 183 participants, from primary school to university completed tasks measuring sensitivity to spelling rules and consonant cluster frequencies, along with assessments of reading, writing, and vocabulary.

Participants discriminated between frequent and infrequent graphotactic patterns above chance across all levels, with performance improving from early primary to university, suggesting progressive strengthening of SL through exposure. Sensitivity to consonant cluster frequencies emerged earlier and stabilized sooner than sensitivity to specific spelling rules, indicating distinct developmental trajectories. SL showed a modest contribution to writing, while vocabulary was the strongest predictor of literacy outcomes. These findings highlight the role of SL in transparent orthographies and their role in literacy acquisition.

[PS-2.20]

Cross-language transfer in bilingual children with reading difficulties: effects of a literacy intervention on word reading

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Approximately 40% of children worldwide learn to read in a language other than their home language or in two languages simultaneously. Although literacy instruction in one language can enhance reading outcomes in another, less is known about how such cross-language effects unfold over time in children with reading difficulties. In a cross-over randomised controlled trial, we evaluated a 15-week Welsh-language literacy intervention in 257 bilingual children with poor reading skills. Initially, 129 children (mean age = 111.44 months) received the intervention, while 128 (mean age = 110.62 months) served as waitlist control. Reading efficiency in Welsh and English was assessed at baseline, post-intervention, and follow-up. The intervention produced significant improvements in Welsh word reading at posttest, and children who received the intervention earlier showed advantages in Welsh at follow-up consistent with a timing-dependent effect. Short-term improvements were also observed in English decoding at posttest, providing evidence of cross-language transfer in this low-achieving sample. At follow-up, no between-group differences were observed in English. This is the first randomised controlled trial to evaluate a Welsh-language literacy intervention and the first to examine temporal effects on cross-language transfer in poorer readers. The findings highlight the importance of instructional timing in bilingual literacy intervention.

[PS-2.21]

Decoding Across Orthographies: Grapheme-Phoneme Processing in Adult Dyslexic Learners of EFL

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The present exploratory study examines the decoding processes of Spanish-speaking adults with developmental dyslexia learning English as a foreign language. The main focus is on the interaction between orthographic opacity and grapheme-phoneme correspondence. Although orthographic transparency has been extensively studied in the context of reading acquisition, there is a limited understanding of how adult students with dyslexia resolve decoding inconsistencies in an opaque second language. This study builds on previous research (Cifre and Coblouvn, 2025; Goswami et al., 2001; Ziegler, 2005) to examine how the orthographic opacity of English influences decoding, focusing on complex vowel grapheme patterns (e.g., ee, ea, ai, ou) which exhibit inconsistent phonological correspondences. A comparative design will be employed, with adults with and without dyslexia. Participants' performance will be compared using phonological decoding tasks in both languages, which include reading words aloud, phonemic segmentation, phoneme identification, and word dictation. To supplement the data, semi-structured interviews will be conducted to explore the use of resolution mechanisms in different orthographic contexts. Adopting a sequential explanatory mixed-methods approach, this study integrates quantitative and qualitative data to account for variability in decoding performance. The preliminary results will be presented at the time of the congress.

[PS-2.22]

Dichotic listening reveals distinct hemispheric dominance pathways to strong phonological skills: The role of overall task performance in bilingual pre-readers.

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Reduced ear/hemispheric dominance in the syllable dichotic listening paradigm is associated with poorer phonological skills, as in dyslexia; but with stronger phonological abilities, as in bilinguals; suggesting distinct underlying mechanisms that lead to opposite reading outcomes. We address this paradox by examining a factor so far overlooked: overall dichotic task performance.

With that goal, syllable dichotic listening was measured in 88 bilingual pre-reader children to test whether ear dominance is influenced by overall performance and how this impacts phonological outcomes.

Ear dominance was significantly modulated by overall task performance: higher performers showed stronger right-ear dominance. Crucially, while better phonological skills were predicted by stronger “typical” right-ear dominance in low performers, they were predicted by reduced dominance in high performers. The two groups did not differ in phonological ability.

These findings suggest that bilingual children may rely on different neural strategies to achieve similar phonological outcomes. In line with the callosal dichotic listening model, we propose that increased bilateral reports and reduced dominance supporting better phonological processing in high performers may stem from greater interhemispheric connectivity. In contrast, reliance on the dominant left-hemisphere to support stronger phonological skills in low performers may occur when interhemispheric connectivity is not optimally engaged.

[PS-2.23]

Hearing Word Boundaries: Prosodic Cue Weighting in Dyslexic vs. Neurotypical Listeners

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This study examines how listeners use acoustic cues to segment words in a continuous speech signal focusing on differences between dyslexic and neurotypical adults. We used a reverse correlation (revcorr) paradigm with dimensional noise, in which participants categorized two ambiguous homophonic sentences (c'est l'appel ("it's the call") vs. c'est la pelle ("it's the shovel"), both / sɛlapel/). The prosodic features of fundamental frequency (F0) and segment duration (speech rate) were randomly manipulated. Sixteen dyslexic and eighteen neurotypical participants completed a one-interval two-alternative categorization task over 800 trials. Revcorr kernels were estimated using a generalized linear model to quantify how variations in F0 and timing at segment boundaries influenced perceptual decisions.

Neurotypical listeners relied on both f0 and segment duration near the word boundary. In contrast, dyslexic participants exhibited high interindividual variability, resulting in no significant effects at group level. However, a consistent pattern in the segment duration dimension suggests that dyslexic listeners relied more on relative timing cues near the boundary, than on F0 cues.

These findings suggest that neurotypical listeners use stable prosodic strategies, whereas dyslexic listeners rely on more individual-specific temporal processing for speech segmentation.

[PS-2.24]

Lost in (French) Sound? Dyslexia and L2 Speech Perception in Basque Bilinguals

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Dyslexia's influence on second language (L2) speech perception remains poorly understood, and most existing research focuses on English as the target language. To contribute to a more comprehensive understanding of L2 comprehension processes, this study will examine how dyslexia affects the processing of acoustic cues in L2 French. We will display French homophone pairs, such as l'amie ("the friend") vs. la mie ("the breadcrumb"), both realized as /lami/, to individuals with and without developmental dyslexia (DD). Basque-Spanish bilinguals learning French as an L2 will perform an ABX discrimination task and a sequence recall task. Additionally, given the evidence linking dyslexia to deficits in temporal sampling and prosody, we will incorporate a rhythmic component to assess the role of prosodic timing in L2 perception. Participants will be exposed to and asked to reproduce French prosodic rhythmic patterns, followed by a rhythmic entrainment task. The effect of this rhythmic engagement on subsequent speech perception and reading measures will be evaluated, allowing us to test whether sensitivity to temporal structure modulates the processing of acoustic cues. This design will contribute to cross-linguistic evidence in dyslexia and will elucidate the underlying mechanisms involved in auditory L2 word recognition by French L2 learners.

[PS-2.25]

Hemispheric lateralisation for speech in Basque-Spanish multilingual children: associations with multilingual experience and literacy

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Early multilingual experience may shape the neural organisation of speech processing, yet its relationship with hemispheric lateralisation and literacy development remains poorly understood. This study examined whether multilingual experience and literacy skill predicted hemispheric lateralisation for speech in Basque-Spanish bilingual children, using a passive dichotic listening EEG paradigm.

Data were collected from 54 children aged 7–12 years. Multilingual experience was quantified using a language history and exposure questionnaire. Phonological and reading ability were assessed using standardised tasks and combined into a literacy composite. EEG was recorded during passive dichotic listening, in which consonant-vowel syllables were presented simultaneously to each ear. The auditory N1 component was quantified as mean amplitude and peak latency differences between left and right hemisphere electrode clusters.

A cluster-based permutation test confirmed that speech elicited significantly larger N1 amplitude than a noise control condition over posterior-temporal sensors, validating the speech-specificity of the paradigm. Mixed effects models revealed that multilingual experience and literacy independently modulated hemispheric amplitude asymmetry. Higher multilingual experience was associated with stronger left-hemisphere dominance, while higher literacy skills were associated with more bilateral N1 amplitude. No significant lateralisation effects were found for latency.

These findings suggest that multilingual experience and literacy skill have dissociable influences on hemispheric specialisation for speech, with implications for understanding neural plasticity in multilingual language development.

[PS-2.26]

Identification of dyslexia in Learners of French as a second language

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Identifying a child learning french as a second language with a specific language disorder is not easy for professionals (teachers, speech therapists): how can we differenciate transitory difficulties linked to the appropriation of a second language and difficulties linked to a specific disorder?

The purpose of this study is to examine the manifestations of dyslexia in L2 French in recently arrived in France Arabic-speaking children, in order to search for markers that would allow the rapid identification of a child with specific written language disorders. These markers of dyslexia should make it possible to distinguish a dyslexic Arabic-speaking child from a non-dyslexic Arabic-speaking child.

To study the phonology of the subjects, speech perception/production, phonological skills, reading and orthographic production were examined. Both spontaneous and experimental data were collected. The experimentation was based on tools adapted to the needs of the study with speech therapists: the ELDP2, Phonoludos, Odedys 2, ELFE and Chronodictées. Eight children aged eight to ten years were observed: two bilingual dyslexic children, two monolingual dyslexic children, two monolingual children and two typically developing bilingual children.

The results show difficulties in the production/perception of phonemic units, significant weaknesses in the manipulation of phonological units - and particularly phonemic units - in all dyslexic subjects. In decoding and reading too, many phonemic errors are made ; in orthographic production we find many phonetic errors. These manifestations are atypical, and are rarely found in non-dyslexic subjects, which confirms the general hypothesis of the existence of a phonological deficit identifiable in bilinguals dyslexic subjects, even though French is still being learned.

[PS-2.27]

How event nominalizations impact reading comprehension in monolingual children with and without dyslexia, and in bilingual children with a migrant background

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The present study investigates reading comprehension strategies in Italian children with and without developmental dyslexia (DD), and in bilingual children with Italian as their societal language. Participants were 28 typical monolingual children, 30 bilingual children, and 21 monolingual children with DD. We examined how texts containing complex grammatical structures, specifically event nominalizations (Wolfer, 2016), are comprehended compared with texts containing active and passive verbs. An eye-tracking reading comprehension paradigm was implemented. Participants read short texts carefully (Screen 1), then clicked to display a comprehension question with three response options, while the text remained available (Screen 2). Alongside comprehension accuracy and standard aggregated eye-movement measures, including gaze duration, total dwell time, and number of regressions, we used scanpath analyses to identify reading patterns associated with text difficulty and reader profile. Results showed that event nominalizations did not systematically reduce comprehension accuracy across groups. However, they increased processing demands, as indexed by more regressions in texts containing nominalizations, especially on Screen 2. Importantly, distinct reading profiles emerged: typical monolingual children showed efficient processing; bilingual children showed preserved decoding but difficulty in integrating comprehension-relevant information; children with DD, instead, showed generalized inefficiency in decoding and integration during online processing of syntactically complex texts.

[PS-2.28]

Cross-linguistic transfer in bilingual spelling: Evidence from Welsh- and English-language literacy interventions

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Purpose: Bilingual literacy involves managing two interacting orthographic systems, where language co-activation can both support and hinder spelling development. We examined how improving literacy in one language influences bilingual children's spelling development in both of their languages. We tested whether literacy instruction in Welsh or English differentially affects English and Welsh spelling accuracy and phonological sensitivity, providing insight into the mechanisms supporting orthographic system differentiation.

Method: Two randomised controlled trials were conducted with Welsh-English bilingual children. In Study 1, children received a Welsh-medium literacy intervention (n=85, Mage=9.29, SD=12.23) or wait-list control (n=75, Mage=9.22, SD=12.34). In Study 2, children received the English-medium equivalent intervention (n=121, Mage=8.40, SD=9.98) or wait-list control (n=75, Mage=8.43, SD=.57). Children completed identical English spelling-to-dictation tests at pre- and post-test. Responses were scored for whole-word accuracy, English phonological sensitivity, and Welsh phonological sensitivity using English and Welsh phoneme-to-grapheme mappings.

Results: The Welsh-language intervention significantly improved both Welsh (d=0.37) and English (d=1.14) phonological sensitivity, indicating cross-language transfer from Welsh to English. The English-language intervention improved English phonological sensitivity only (d=0.31) with no reliable change in Welsh sensitivity. Neither intervention yielded significant gains in conventional spelling accuracy over the short term.

Conclusions: Findings demonstrate asymmetric cross-linguistic transfer in bilingual spelling development: strengthening literacy in the more transparent orthography (Welsh) enhances phonological mapping across languages, whereas English instruction yields language-specific gains. Results support interactive activation models positing shared sub-lexical processing moderated by language-specific inhibition.

[PS-2.29]

Development of a digital screening tool for the detection of reading difficulties in university students.

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Research on reading difficulties in university students indicates that these difficulties are both common and underrecognized, often due to limited diagnosis and support at earlier educational stages. Their consequences go beyond academic performance, affecting students' emotional well-being and educational pathways. Dyslexia often remains unidentified for years, highlighting the need for accessible screening tools in higher education. Based on an in-depth review of adult dyslexia assessment procedures, we developed a digital screening tool including pseudoword reading, word reading, phoneme deletion, letter rapid automatized naming, digit span, and spelling tasks. This presentation reports findings from a first pilot study using cognitive interviews with 10 university students, 5 with dyslexia and 5 typical readers. Interviews were audio-recorded and analyzed to detect difficulties, ambiguities, and usability issues, informing refinement of the instrument. Screening scores will also be compared with the Autoinforme de Trastornos Lectores para Adultos (ATLAS) to explore preliminary convergent validity.

[PS-2.30]

Examining the effect of professional development on teachers' knowledge and self-efficacy for dyslexia evaluation referrals for black students experiencing reading difficulties

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This mixed-methods study examined the impact of a professional development (PD) program on teachers' knowledge and self-efficacy regarding dyslexia evaluation referrals for Black students experiencing reading difficulties. A pre-/post-survey design measured changes in teachers' knowledge of early literacy skills, understanding of dyslexia characteristics, and confidence in referral decisions. Results demonstrated significant gains across these areas, suggesting the PD intervention effectively increased educators' preparedness to recognize and respond to indicators of dyslexia.

Qualitative data collected through semi-structured interviews provided deeper insight into participants' experiences and perceptions. Three key themes emerged: the need for comprehensive teacher preparation in dyslexia and early literacy, the influence of systemic bias on dyslexia identification practices, and challenges distinguishing dyslexia from language acquisition needs in bilingual students. Participants also described increased awareness of how race and instructional context shape referral decisions.

Findings indicate that targeted professional development can improve teachers' capacity to support diverse learners and make more informed, equitable referral decisions for students with suspected dyslexia. Results also underscore the need for broader systemic changes in educator preparation, screening practices, and school-based decision-making processes to address persistent racial disparities in dyslexia identification and services. Implications for future research, policy, and professional learning are discussed.

[PS-2.31]

Early predictors of grammatical spelling in French: Shared or distinct from lexical spelling? A longitudinal study from kindergarten to second grade.

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French spelling requires mastery of both lexical and grammatical dimensions. While some evidence exists regarding early predictors of lexical spelling, those of grammatical spelling remain unknown. This study investigates early predictors of grammatical spelling, using lexical spelling as a benchmark to identify shared versus dimension-specific mechanisms.

340 children in France were followed from kindergarten (T1) to grades one (T2) and two (T3). At T1 and T2, a comprehensive battery of early literacy measures covering language-based and code-related skills was administered. At T3, spelling skills were assessed through both targeted measures - word list spelling and inflection production tasks - and sentence spelling.

Preliminary analyses, focusing on global scores, were conducted on 113 children on predictors significantly correlated with at least one spelling dimension (14 predictors assessed at T1 and 6 predictors assessed at T2). For sentence spelling, all predictors had the same strength for lexical and grammatical spelling (Bayes factors in favor of the null). For targeted measures, all 14 T1 predictors had the same strength, but 3 out of 6 T2 (lexical) predictors more strongly predicted lexical spelling.

These findings reveal shared predictors for both dimensions, with differential lexical effects pending examination across grammatical categories.

[PS-2.32]

Children's Perception of Dyslexia and Developmental Language Disorder (DLD): Impact on Mental Health and Educational Trajectory - Pilot Study

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Introduction: Dyslexia and Developmental Language Disorder (DLD) are neurodevelopmental disorders with a significant impact beyond the academic domain, affecting mental health and psychosocial functioning. They are often associated with comorbidities, including anxiety, depression, and behavioral difficulties, which may compromise educational and professional trajectories, as well as social integration throughout life.

Objective: To analyze children's perceptions of their reading and writing difficulties and the impact of these on mental health and educational trajectory.

Methodology: A 46-item questionnaire, distributed across seven domains, was developed and administered to 46 children with Dyslexia/DLD. The instrument was discussed and refined by a multidisciplinary panel of experts. Dichotomous responses were numerically coded, with reverse scoring of positively worded items, ensuring that higher values reflected greater negative impact. Means were calculated per item and per domain.

Results: A low to moderate overall impact was observed, with greater expression in the avoidance of literacy-related tasks, frustration associated with reading and writing, and anxiety in school assessment contexts. Nervousness during tests and difficulties in information retrieval were particularly notable. Family support emerged as the main protective factor, while school support was relevant but not universal.

Conclusion: The findings reinforce the need for early and integrated intervention, centered on the child and addressing academic, emotional, and social dimensions.

[PS-2.33]

Experiences of students with dyslexia in higher education in Ireland: A mixed-methods study

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Adults with dyslexia report difficulties with reading speed, written expression/structure, and time-management. Given the high literacy and time-management demands involved in moving from secondary school to further/higher education, this causes barriers to adequate learning opportunities for these students. The currently established model of support in higher education assesses the needs of the student and then adds on supports, though research has suggested that availability of these is variable, and supports are not always well-tailored to students with dyslexia. This study investigated the experiences of adults with dyslexia in higher education institutions (HEIs) in Ireland with respect to educational supports. We combine qualitative data from interviews with current students with dyslexia, with quantitative data from an online questionnaire to gain a broad insight of students experiences, and to give recommendations for improvements. Our findings suggest that there cannot be a one-size-fits-all approach to accommodations for dyslexia, and that not all students will face the same difficulties. However, there are common challenges that many students face, and supports which can be beneficial for them students. Issues regarding access to support are also common, and need to be addressed by HEIs.

[PS-2.34]

Visual Span and Reading in Dyslexia: Converging Evidence from Laboratory and Online Measures

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Visual span, the number of letters that can be reliably identified without eye movements, is widely characterized as a sensory bottleneck on reading speed and predicts reading performance in both typical and low-vision populations (e.g., Legge et al., 2007). Here, we examine its role in dyslexia and whether it can be measured reliably in scalable online settings. In a laboratory study, adults with dyslexia and typical readers completed standardized assessments alongside measures of reading speed and visual span. The dyslexia group showed slower reading speeds and reduced visual spans relative to typical readers. Across participants, visual span size was positively associated with reading speed ($r \approx .45$). We then adapted the paradigm for online testing. A validation study with typical readers replicated this relationship ($r \approx .63$). In a larger online sample of individuals with self-reported dyslexia, reading speeds were slower, and visual span size showed a robust association with reading ($r \approx .60$), despite substantial heterogeneity. Together, these findings show that the visual span–reading relationship generalizes across lab and online contexts. While not specific to dyslexia, visual span appears to contribute meaningfully to individual differences in reading and can be assessed using brief, psychophysically grounded tools at scale.

[PS-2.35]

Adaptive information sampling through childhood: Eye-tracking evidence from a reading dual-task

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While many studies have examined how children adapt their learning to their environments, less is known about how learning is shaped by cognitive constraints. Using a new battery of three dual-task paradigms and eye-tracking, this study examined whether engagement across competing information streams varies with developmental profile. 105 children aged 5 to 11 completed dual-tasks spanning language, literacy, and numeracy domains, each pairing a domain-relevant primary task with a neutral concurrent distractor task. The literacy dual-task contrasted a misspelling-detection reading task alongside a neutral distractor task. There was no evidence of differential engagement trade-offs for low-literacy children; however, eye-tracking revealed consistent developmental and ability-related differences in gaze behaviour. Higher-literacy and older children showed more efficient reading patterns, including shorter gaze durations and go-past times, greater word coverage, and increased regressions to misspellings. Both efficient early word processing and targeted re-inspection supported misspelling detection performance. Notably, increased visual sampling and regressions were not detrimental in this context, but instead aligned with task requirements to actively monitor spelling. Overall, findings suggest that while overt dual-task prioritisation was not demonstrated within this paradigm, fine-grained eye-movement measures revealed ability-related differences in how children sample and process text containing misspellings.

[PS-2.36]

The methodological use of the Children's Communication Checklist 2 (CCC-2) in research

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Language and communication difficulties affect 5–10% of children, but early identification is challenging due to heterogeneous profiles and limited assessment tools. The Children's Communication Checklist 2 (CCC-2) is widely used to assess structural and pragmatic language via caregiver report, yet its methodological use varies substantially. This scoping review examined (1) research contexts and purposes for CCC-2 use, (2) which composites, subscales, and derived scores are reported, and (3) how reliability and validity evidence is presented. Following established guidelines, systematic searches identified 295 peer reviewed studies involving children aged 4–16 years. Considerable heterogeneity was found. Although the General Communication Composite and Social Interaction Deviance Composite were most frequently reported (60% and 36%), over one third of studies used selected subscales or custom composites. The CCC-2 was often applied beyond its screening purpose without psychometric justification. Reliability and validity evidence was reported in only 16% and 7% of studies, respectively, using inconsistent methods. Inconsistent reporting and limited psychometric transparency restrict comparability and interpretation, underscoring the need for clearer reporting standards and further validation work.

[PS-2.37]

Developing an EEG-Neurofeedback to boost Interhemispheric Connectivity in a Phonological Task

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Developmental dyslexia (DD) is characterised by struggles in phonological processing (PP), which is strongly left-lateralized (left-temporoparietal areas). Previous work reports reduced/disrupted left-hemisphere (LH) activation in DD. To compensate this reduced LH engagement, children with DD increasingly recruit preserved right-hemisphere (RH) systems. However, this RH activation is only beneficial if information is successfully transferred to the LH via interhemispheric (IH) connectivity through the corpus callosum. Weaker callosal integration in DD may constrain RH-to-LH support during PP. We aim to design and validate a child-friendly EEG-based neurofeedback (NF) to increase bilateral hemispheric activation and IH connectivity during PP. This system lays foundation for future interventions targeting phonological skills in dyslexic children. We hypothesise that boosting both RH function and IH connectivity may rebalance hemispheric dominance and support challenged LH phonological networks. This study tests the feasibility of this approach in typically developing children, later extending it to dyslexic children. The protocol uses passive dichotic listening to elicit bilateral auditory N1/N100 ERPs (minimising task demands). NF targets latency difference between RH and LH N1/N100 responses (ΔLat=N1_RH−N1_LH). We examine whether single-trial N1/N100 latency and ΔLat are stable enough for closed-loop NF. Current analyses show bilateral N1/N100 responses and LH–RH differences, supporting ΔLat-based NF.

[PS-2.38]

Integrating Eye-Tracking Technology into Reading Assessment and Intervention: Perspectives of Future Speech and Language Therapists

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Recent advances in eye-tracking research have improved our understanding of developmental dyslexia and reading acquisition by providing objective behavioural markers of reading processes. As efforts to bridge brain-based and cognitive-behavioural approaches continue, eye-tracking technology may facilitate the translation of research findings into evidence-informed clinical practice. Its successful implementation, however, depends partly on the preparedness of future professionals.

This study explored the perspectives of undergraduate students in the Department of Speech and Language Therapy at the University of Ioannina regarding the use of eye-tracking technology in the assessment and intervention of reading difficulties. Participants were 50 third-year students (6 men, 44 women), primarily aged 18–25 years. Data were collected through an anonymous online questionnaire including Likert-scale items and open-ended questions. Quantitative analyses were conducted for closed-ended responses, while thematic content analysis was applied to qualitative data.

Preliminary findings indicate that students perceive eye-tracking as a valuable tool for enhancing the objectivity and precision of reading assessment through indicators such as fixation patterns and saccadic eye movements. They also recognized its potential to support individualized intervention planning. Reported barriers included equipment costs, limited accessibility, the need for specialized training, and challenges integrating eye-tracking data into existing therapeutic frameworks.

These findings highlight the importance of incorporating emerging technologies into speech and language therapy education to support evidence-informed practice for individuals with reading difficulties.

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