5TH INTERNATIONAL SYMPOSIUM ON BILINGUAL AND L2 PROCESSING IN ADULTS AND CHILDREN

Swansea University

23rd-24th May, 2024

Cover design: Eider Iglesias Juantorena

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WELCOME

Welcome to the 5th International Symposium on Bilingual and L2 Processing in Adults and Children (ISBPAC 2024) in Swansea.

After the great successes of previous ISBPAC symposia at the University of Kaiserslautern in 2016, TU Braunschweig in 2018, online organised by Radboud University and the Max Planck Institute for Psycholinguistics in Nijmegen in 2021 and most recently at the AcqVA AURORA center at UiT The Arctic University of Norway in 2022, Swansea University is very pleased to host the 5th symposium on *Bilingual and L2 Processing in Adults and Children*.

There were 98 submissions and overall standard has been very high. We would like to thank the reviewers for the time and effort they put in to reviewing the abstracts. We will have 14 talks and 52 posters spread over two days with four plenary speakers. We also very excited to have two pre-conference workshops.

On the social side, in addition to our conference dinner, our student helpers (Walaa, Dan and Milo) have arranged various social functions for students and early career researchers attending the conference. We will also have some Welsh language taster classes during the lunch breaks for you. I'm assured you will all be able to read in Welsh after 20 mins!

If you use Twitter/X and would like to tweet during the conference, please use the hashtag #ISBPAC2024 and tag us @ISBPAC2024.

We hope you have a wonderful time at our conference.

Vivienne and Gemma

PRE-CONFERENCE WORKSHOPS

Morning

Latent Variable Modelling

Emily Lowthian
Swansea University

Join our Latent Class Analysis Workshop tailored for both beginners and seasoned researchers. This workshop delves into the theory and practical applications of LCA using commonly used software like Mplus, R, SPSS, and Stata. Gain hands-on experience in model estimation, interpretation, and visualization to effectively uncover hidden patterns within your datasets. After a consideration of the technical application, we will explore how to interpret results for writing a paper. A number of helpful resources will be provided, along with recommendations of books and journal articles.

Modelu Newidyn Cuddiedig

Ymunwch â'n Gweithdy Dadansoddi Dosbarth Cuddiedig (LCA) wedi'i deilwra ar gyfer dechreuwyr ac ymchwilwyr profiadol. Mae'r gweithdy hwn yn archwilio damcaniaeth a chymwysiadau ymarferol LCA gan ddefnyddio meddalwedd a ddefnyddir yn gyffredin fel Mplus, R, SPSS a Stata. Gallwch ennill profiad ymarferol mewn amcangyfrif, dehongli a delweddu model i ddatgelu patrymau cudd yn eich setiau data yn effeithiol. Ar ôl ystyried y cymhwysiad technegol, byddwn yn archwilio sut i ddehongli canlyniadau ar gyfer ysgrifennu papur. Darperir nifer o adnoddau defnyddiol, ynghyd ag argymhellion ar gyfer llyfrau ac erthyglau cyfnodolion

Date: 22nd May 2024, 8:30- 11:30 am
Location: Richard Price Building (room tbc)

Afternoon

How to Engage the Public with (Language) Science

Sharon Unsworth
Radboud University

Science communication, public engagement, outreach, knowledge transfer – whatever you call it, communicating with non-academic audiences about your research can be a challenge (as well as lots of fun!). In this hands-on workshop, we'll cover key concepts and share concrete tips about the why and how of sci-com, as well as discussing the importance of measuring the impact of your sci-com and public engagement activities. The workshop is intended for (early career and more senior) researchers wanting to learn more about how to do sci-com (better).

Sut i Ymgysylltu â'r Cyhoedd wrth Drafod Gwyddoniaeth (Iaith)

Cyfathrebu gwyddonol, ymgysylltu â'r cyhoedd, allgymorth, trosglwyddo gwybodaeth – beth bynnag rydych yn ei alw, gall cyfathrebu â chynulleidfaoedd anacademaidd am eich ymchwil fod yn her (a llawer o hwyl hefyd!). Yn y gweithdy rhyngweithiol hwn, byddwn yn trafod cysyniadau allweddol ac yn rhannu awgrymiadau ymarferol ynghylch pam rydym yn cyfathrebu am wyddoniaeth a sut, gan drafod pwysigrwydd mesur effaith eich gweithgareddau cyfathrebu gwyddonol ac ymgysylltu â'r cyhoedd. Mae'r gweithdy yn addas i ymchwilwyr (gyrfa gynnar a rhai mwy profiadol) a hoffai ddysgu rhagor am sut i gyfathrebu (yn well) am wyddoniaeth.

Date: 22nd May 2024, 14:00- 16:00 pm
Location: Richard Price Building (room tbc)

CONFERENCE PROGRAMME

All times in British Summer Time (BST)

Wednesday, May 22nd, 2024 (pre-conference workshops)

8:30-11:30	Emily Lowthian (Swansea University) *Latent Variable Modelling*
14:00-16:00	Sharon Unsworth (Radboud University) *How to Engage the Public with (Language) Science*

Thursday, May 23rd, 2024

08:15-08:45	Registration
08:45-09:00	Welcome
09:00-10:00	Plenary 1: Gwennan Higham *Developing personal integration projects through a multilingual Welsh language provision for adult migrants* *Datblygu prosiectau integreiddio personol drwy ddarpariaeth Gymraeg amlieithog i fewnfudwyr*
10:00-10:30	Coffee break
10:30-12.00	Carrie N. Jackson and Theres Gruter: *Whether prediction and adaptation lead to learning among beginning L2 learners* Serge Minor and Natalia Mitrofanova: *Crosslinguistic influence in child bilingual acquisition: A Visual World eye-tracking study on grammatical case and aspect processing by German-Russian and Spanish-Russian bilinguals* James Turner and Lewis Baker: *Phonological effects in predictive processing of syntax: eye-tracking evidence from L1 Mandarin speakers in the UK*
12:00-13:00	Lunch break
13:00-14:30	Poster session 1
14:30-15:30	Adel Chaouch-Orozco and Fernando Martín-Villena:

	Network science tools unveil the early stages of L1 lexical attrition Wanyin Li, Bene Bassetti, and Steven Frisson: *The effects of changing the word order of collocations on L2 sentence processing: an eye-tracking study*
15:30-16:00	Coffee break
16:00-17:00	Trisha Thomas, Andrea Takahesu Tabori, Antje Stoehr, and Ying Xu: *The impact of bilingual language proficiency on automatic speech recognition accuracy in children* Anamaria Bentea and Theodoros Marinis: *Wh-questions in Romanian Child Heritage Speakers – Investigating the Use of Differential Object Marking and Number Agreement in Comprehension and Production*
17.00-18.00	Plenary 2: Holger Hopp *How Sentence Processing can support L2 Learning: Evidence from Structural Priming* *Sut y gall Prosesu Brawddegau gefnogi Dysgu L2: Tystiolaeth o Breimio Strwythurol*
18:30-21:00	Conference dinner

Friday, May 24th, 2024

9:00-10:00	Plenary 3: Christos Pliatsikas *Bilingualism and Neuroplasticity: Taking stock and moving forward* *Dwyieithrwydd a Niwroblastigedd: Ystyried a symud ymlaen*

10:00-10:30	Coffee break
10:30-12.00	Alex Sheehan, Doug Saddy, and Christos Pliatsikas: *Bilingualism modulates domain-general functional connectivity: insights from resting-state electroencephalogram* Chih Yeh, Caroline F. Rowland, and Sergio Miguel Pereira Soares: *How bilingualism influences language processing in the developing brain: A systematic review of the neurobiological evidence* Ioannis Iliopoulos and Claudia Felser: *Linking offline judgements and ERP responses in the L1 and L2 processing of filler-gap dependencies*
12:00-13:00	Lunch break
13:00-14:30	Poster Session 2
14:30-15:30	Liz Smeets: *Crosslinguistic influence can affect L1 feature representations: evidence from CLLD* Chantal van Dijk, Gerrit Jan Kootstra, Sharon Unsworth: *Cross-linguistic priming of relative clause comprehension in English-Dutch and German-Dutch bilingual children: Evidence for cumulative priming*
15:30-16.00	Coffee break
16.00-17.00	Ilaria Venagli, Theo Marinis, Tanja Kupisch *Biliteracy and L2 proficiency modulate reading strategies and reading-related skills in late L2 learners with and without dyslexia*.

	Floor van den Berg, Raoul Buurke, Jelle Brouwer, Hanneke Loerts, Remco Knooihuizen, Martijn Bartelds, Martijn Wieling, and Merel Keijzer: *The relationship between bilingual engagement and cognitive aging in regional minority-majority language contexts: A Lifelines study*
17:00-18:00	Plenary 4: Sharon Unsworth *Priming cross-linguistic influence and predicting priming: Evidence from bilingual children* *Preimio dylanwad trawsieithyddol a rhagfynegi preimio: Tystiolaeth gan blant dwyieithog*
18:00-18:15	Conference closing

POSTER SESSIONS

SESSION 1

1. *Crosslinguistic priming of syntactic and thematic roles: Evidence from Polish-English bilingual children* Katherine Messenger, Marta Wesierska, Vanessa Cieplinska, and Ludovica Serratrice.
2. *Exploring the link between multilingual experiences, genetic risk factors for Alzheimer's Disease and cognitive performance in middle-aged adults* Janine Rook, Gregory Poarch, Vincent DeLuca, and Merel Keijzer.
3. *The effect of L1 on the acquisition of definiteness in L2: Evidence from L1-English and L1-Russian bilinguals acquiring L2-Hebrew* Dana Plaut-Forckosh, Marianna Beradze, Iris Hindi, and Natalia Meir.
4. *What you hear is not what you see: irony comprehension in monolingual and multilingual children* Kimberley Mulder, Elise van Wonderen, Britt Daize and Josje Verhagen.
5. *The role of lexical overlap and cognate facilitation in initial child foreign language speech segmentation* Katie Von Holzen, Marie Schnieders, Sophia Wulfert, and Holger Hopp.
6. *Anaphora resolution in L2 English: The L1 advantage* Lydia White, Heather Goad, Guilherme Garcia, Natália Guzzo, Liz Smeets, and Jiajia Su.
7. *Meta-CLI: A web app for a community-augmented meta-analysis of cross-linguistic influence in bilingual children* Elise van Wonderen, Chantal van Dijk, and Sharon Unsworth.
8. *Investigating language effects on cognition using three-gendered languages: The case of Ukrainian simultaneous bilinguals* Oleksandra Osypenko, Silke Brandt, Aina Casaponsa, and Panos Athanasopolous.
9. *Bilingualism and Mental health in Middle Childhood. A longitudinal investigation* Paulina Salgado-Garcia, Rory T. Devine, and Andrea Krott.
10. *L1 variation and L2 acquisition: L1 German /eː/-/ɛː/ overlap and its effect on the acquisition of L2 English /ɛ/-/æ/* Marcel Schlechtweg, Jörg Peters, and Marina Frank.

11. *Does L1 attrition affect predictive processing? Evidence from Japanese expats in the U.S.* Theres Grüter and Sachiko Roos.
12. *Integration of Multiple Speech Cues for Native and L2 Listeners during Online Speech Processing with Visual-World Eye-Tracking Paradigm* Xiaomu Ren and Clara Cohen.
13. *Verb aspect processing in monolingual and bilingual heritage speakers of Turkish* Onur Özsoy, Nisa Büyükyıldırım, and Özce Özceçelik.
14. *Well-being and motivation in later life intervention studies – a pilot study comparing language learning and a combined physical-cognitive course* Louisa Richter, Jascha Rüsseler, Greg Poarch, and Merel Keijzer.
15. *Predicting production: Individual differences and possible sources of cross-linguistic influence in a third language* Yevgeniy Melguy, Clara Martin, and Arthur Samuel.
16. *Processing of Prosody and Case Marking in Turkish Monolingual and Heritage Language Speakers* Selim Tiryakiol, Leyla Zidani-Eroglu, and Fatih Bayram.
17. *The presence of orthography enhances regressive crosslinguistic influence in Spanish-Basque-English trilinguals* Antje Stoehr, Christoforos Souganidis, Trisha Thomas, Jessi Jacobsen, and Clara D. Martin.
18. *Does structural priming differ between heritage speakers and late bilinguals? Evidence from reaction times for the Mandarin and English transitive alternation* Vera Xia, Johanne Paradis, and Juhani Järvikivi.
19. *Explicitness of referring expressions in heritage speakers' majority English* Tatiana Pashkova and Shanley E. M. Allen.
20. *Are textually enhanced subtitles overrated?* Hanneke Loerts, Vincent Fan, Laura Fiche, and Anastasia Pattemore.
21. *The acquisition of gender in adolescent German learners of Spanish: Evidence from production and perception* Clara Terlaak, Sarah Schimke, and Johanna Wolf.
22. *Conceptual Restructuring in L2 Acquisition: the Influence of Reading Direction on Actants' Selection in Causal Events* Mireille Copin, Inès Saddour, and Cyrille Granget.
23. *Effects of culture relatedness on bilingual emotional responses to words: Insights from word norms and event-related potentials (ERPs)* Yanxi Lu, Francesca Citron, Kate Cain, and Bo Yao.

24. *Visual Event Representation Facilitates the Processing of Grammatical Case by Russian-German Bilingual Children* Serge Minor, Natalia Mitrofanova, and Marit Westergaard.
25. *Educating "the next generation" of SLA researchers: Results of the UPSKILLS project* Tihana Kras and Maja Milicevic Petrovic.
26. *Does Explicit Instruction Lead to Implicit Processing of L2 English Generic NPs?* Neal Snape, Helen Zhao and Menghan Wang.
27. *Processing Gender Stereotypes in the Bilingual Brain* Joanna Porkert, Anna Siyanova-Chanturia, and Merel Keijzer.

SESSION 2

1. *When the dative becomes less reliable – L1 attrition in a multilingual context* Judith Schlenter and Marit Westergaard.
2. *Testing the Switching Experience and Environment Questionnaire (SEEQ): A measure of bilingual switching behaviours* Zlatomira G. Ilchovska, Ali Mazaheri and Andrea Krott.
3. *Language choice and naming difficulty: Evidence from bilingual degraded picture naming* Nora Kennis, Martin J. Pickering, and Holly Branigan.
4. *The Processing of Subject Pronouns in L2 English: An Online Visual World Eye-tracking Study* Linghui Diao and Leah Roberts.
5. *Pronoun resolution in adult L2 learners of German by speakers of null- and overt-subject languages: Cross-linguistic influence or a learning mechanism?* Angelika Golegos, Anna Czypionka, and Theodoros Marinis.
6. *The role of individual differences in the online processing of L2 English articles by L1 Spanish learners and L1 English controls* Jelena O'Reilly and Verónica García-Castro.
7. *How L2 Accented Speech Influences Grammatical and Natural Gender Prediction* Carly Levy, Felicity Sarnoff, Carrie N. Jackson and Holger Hopp.
8. *Does reduced engagement in prediction lead to fewer false memories of predictable words in L2?* Katja I. Haeuser and Theres Grüter.
9. *Cross-linguistic ungrammatical priming in Canadian French-English bilinguals: Evidence from a self-paced*

reading task Foteini Karkaletsou, Gunnar Jacob and Shanley E.M. Allen.

10. *Prediction-based grammatical learning in L2 processing* Duygu F. Şafak and Holger Hopp.
11. *Verb-bias effects in L1-to-L2 and L2-to-L1 cross-linguistic structural priming* Chantal van Dijk and Holger Hopp.
12. *The Effect of Metalinguistic Awareness on Theory of Mind – preliminary findings* Shijun Yu, Andrea Krott, and Ian Apperly.
13. *Do multilingual children outperform monolingual children in a visual perspective taking task? A replication of Fan et al. (2015)* Josje Verhagen, Kimberley Mulder, and Elise van Wonderen.
14. *Within and Across-Language Priming and the Lexical Boost Across Development in a Structurally Biased Language* Alina Kholodova, Fenia Karkaletsou, and Shanley Allen.
15. *Higher level of biliteracy is associated with better executive function in Greek-English bilingual children* Froso (Effrosyni) Argyri, Artemis Stefani, Frederique Liegeois, Jonathan Clayden, and Sezgi Goksan.
16. *How does language proficiency mediate prediction skills of early bilingual children and adults?* Figen Karaca, Susanne Brouwer, Sharon Unsworth, and Falk Huettig.
17. *Processing Differences in Early and Late Bilinguals as Revealed from Linguistic and Neurolinguistic Data* Hideyuki Taura.
18. *The Multilingual Picture Database.* Various authors.
19. *Negation processing and working memory in Mandarin-Italian bilingual children* Shenai Hu, Maria Vender, Gaetano Fiorin, and Denis Delfitto.
20. *L3 Processing of Verbal Aspect in English by Russian-German Bilingual Children: Evidence from Eye-Tracking* Natalia Mitrofanova, Serge Minor, Nadine Kolb, and Marit Westergaard.
21. *L1 attrition in instructed L1 Spanish-L2 English bilinguals: Evidence from relative clause attachment preferences* Elena García-Guerrero and Cristóbal Lozano.
22. *Gray matter volume correlates with language proficiency in the right angular gyrus of early cultural bilinguals* Mia R. Coutinho, Edith Brignoni-Pérez, Alison K. Schug, and Guinevere F. Eden.

23. *Language learning as a non-pharmacological intervention in older adults with (past) depression* Jelle Brouwer, Floor van den Berg, Remco Knooihuizen, Hanneke Loerts, and Merel Keijzer.
24. *Priming ditransitives in L2 Mandarin leads to adjustments in production but not in predictive processing* Yanxin (Alice) Zhu & Theres Grüter.
25. *Comparing bilingual and monolingual children's interpretation of novel-verb sentences: is their development related to vocabulary or executive function?* Noorin Rodenhurst and Katherine Messenger.

PLENARY SPEAKERS' TALKS

(In chronological order)

Developing personal integration projects through a multilingual Welsh language provision for adult migrants / Datblygu

prosiectau integreiddio personol drwy ddarpariaeth Gymraeg amlieithog i fewnfudwyr

Gwennan Higham
Swansea University

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This talk is based on a study which examines the experiences of four adult migrants enrolled on a new Welsh for Speakers of Other taLanguages (WSOL) provision in Wales. It will investigate the investment of these migrants in learning Welsh and the impact of WSOL on their self-development goals in a new host country, described as personal integration projects. While English remains the primary integration medium for adult migrants in Wales, the findings in this study suggest that learning the minority Welsh language can strengthen the participants' agency and personal growth. These findings further challenge monolingual norms, traditionally adopted for adult migrant language instruction in Wales, as elsewhere in the UK. Ultimately, this research underscores the transformative potential of an inclusive and multilingual minority language education in shaping a meaningful notion of multicultural citizenship in Wales.

Bydd y cyflwyniad hwn yn seiliedig ar astudiaeth ymchwil sy'n edrych ar brofiadau pedwar o fewnfudwyr sydd wedi cofrestru ar gyrsiau Cymraeg i Siaradwyr Ieithoedd Eraill (WSOL) newydd yng Nghymru. Bydd yn ymchwilio i fuddsoddiad yr ymfudwyr hyn mewn dysgu Cymraeg ac effaith WSOL ar eu hunanddatblygiad mewn cymdeithas groeso newydd, a ddisgrifir fel prosiectau integreiddio personol. Er mai Saesneg yw'r prif gyfrwng integreiddio ar gyfer ymfudwyr yng Nghymru, mae canfyddiadau'r astudiaeth hon yn awgrymu y gall dysgu'r Gymraeg grymuso a chryfhau hunanwerth yr unigolion hyn. Mae'r canfyddiadau hefyd yn herio normau unieithog, a fabwysiadwyd yn draddodiadol ar gyfer addysg i ymfudwyr yng Nghymru, fel mewn mannau eraill yn y DU. Mae'r ymchwil hwn yn tanlinellu'r potensial sydd i ddarpariaeth addysg gynhwysol ac amlieithog wrth lunio syniadau ystyrlon o ddinasyddiaeth amlddiwylliannol yng Nghymru.

How Sentence Processing can support L2 Learning: Evidence from Structural Priming / Sut y gall Prosesu Brawddegau gefnogi Dysgu L2: Tystiolaeth o Breimio Strwythurol

Holger Hopp
TU Braunschweig

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In this talk, I explore the extent to which sentence processing can support the acquisition of grammar in a second language. I review how the temporal staging of lexical and syntactic processing can enhance (or impede) learners' abilities to extract grammatical detail from the input for learning. Moreover, sentence processing mechanisms, such as prediction, can trigger grammatical learning via priming. Finally, parsing strategies allow learners to make generalizations across different grammatical structures. Bringing together different strands of research, I will outline how typical features of (L2) sentence processing scale up to be mechanisms of language acquisition

Yn y sgwrs hon, rwy'n archwilio i ba raddau y gall prosesu brawddeg gefnogi caffael gramadeg mewn ail iaith. Rwy'n adolygu sut gall camau arleisiol o brosesu geirafol a chystrawennol wella (neu rwystro) gallu dysgwyr i dynnu manylion gramadegol o'r mewnbwn ar gyfer dysgu. Hefyd, mae dulliau prosesu brawddegau, megis rhagfynegi, yn gallu ysgogi dysgu gramadegol drwy gyflymu. Yn olaf, mae strategaethau dosbarthu'n galluogi dysgwyr i gyffredinoli ar draws strwythurau gramadegol gwahanol. Drwy ddod â llinynnau gwahanol o ymchwil ynghyd, byddaf yn amlinellu sut mae nodweddion cyffredin prosesu brawddeg (L2) yn datblygu i fod yn ddulliau i gaffael iaith.

Bilingualism and Neuroplasticity: Taking stock and moving forward / Dwyieithrwydd a Niwroblastigedd: Ystyried a symud ymlaen

Christos Pliatsikas
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Bilingualism has been shown to cause adaptations to the structure of the brain, in ways similar to those reported for other type of cognitively challenging experiences. However, these effects have been expressed in variable, and sometimes contradictory, ways. This includes different directions of those adaptations, with both increases and reductions in grey matter volume and white matter diffusivity reported, different effects for various age groups (children, young adults, healthy older adults, older patients), but also different effects for groups with qualitatively and quantitatively different bilingual experiences. Following current suggestions that bilingualism should be treated as a multidimensional dynamic experience, this talk will review the available evidence from different age groups through the perspective of experience-based neuroplasticity and will link the evidence to neuroplastic patterns reported in other (non-linguistic) domains of learning. A theoretical suggestion will be presented, the Dynamic Restructuring Model, which synthesizes the available findings and draws parallels to theories on the biological basis of experience-based neuroplasticity. This will be followed up by some newer evidence from my lab on bilingual children and adults, young and old, and will conclude with suggestions on how the field should move forward.

Dangoswyd bod dwyieithrwydd yn achosi addasiadau i strwythur yr ymennydd, mewn ffyrdd sy'n debyg i'r rhai yr a gofnodir mewn mathau eraill o brofiadau sy'n heriol yn wybyddol. Serch hynny, mae'r effeithiau hyn wedi'u mynegi mewn ffyrdd amrywiol ac weithiau anghyson. Mae hyn yn cynnwys cyfeiriadau gwahanol yr addasiadau hynny, gydag adroddiadau am gynnydd a gostyngiad yng nghyfaint y freithell, a thryledded y gwynnin, gwahanol effeithiau ar gyfer grwpiau oedran amrywiol (plant, oedolion ifanc, oedolion hŷn iach, cleifion hŷn), ond hefyd effeithiau gwahanol ar gyfer grwpiau â phrofiadau dwyieithog sy'n wahanol yn feintiol ac yn ansoddol. Yn dilyn awgrymiadau cyfredol y dylai dwyieithrwydd gael ei drin fel profiad dynamig aml-ddimensiwn, bydd y sgwrs hon yn adolygu'r dystiolaeth sydd ar gael gan grwpiau oedran gwahanol drwy safbwynt niwroblastigrwydd sy'n seiliedig ar brofiad a bydd yn cysylltu'r dystiolaeth â'r patrymau niwroblastig yr adroddir amdanynt mewn parthau dysgu eraill (heb fod yn rhai ieithyddol). Caiff awgrym damcaniaethol ei gyflwyno, y Model Ailstrwythuro Dynamig, sy'n cyfuno'r canfyddiadau sydd ar gael ac yn cymharu'r rhain â damcaniaethau ar sail fiolegol niwroblastigrwydd sy'n seiliedig ar brofiad. Caiff hyn ei ddilyn gan

dystiolaeth fwy diweddar o'm labordy ar blant ac oedolion dwyieithog, hen ac ifanc, a byddwn yn cloi gydag awgrymiadau ar sut dylai'r maes hwn symud yn ei flaen.

Priming cross-linguistic influence and predicting priming: Evidence from bilingual children / Preimio dylanwad trawsieithyddol a rhagfynegi preimio: Tystiolaeth gan blant dwyieithog

Sharon Unsworth
Radboud University

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The starting point for this talk is the long-standing observation that under certain circumstances, one of a bilingual child's two languages may influence the other (Paradis & Genesee, 1996). This cross-linguistic influence varies across linguistic domains, language

combinations and children, and several language-level and individual-level factors have been invoked to explain this variation (see Serratrice, 2013, van Dijk, et al., 2022 for review). Which of these factors constitute necessary and/or sufficient conditions for cross-linguistic influence and the exact mechanisms by which cross-linguistic influence occurs remain unclear, however. In this talk, I will report on a series of recent studies from my research group in which we try to arrive at a better understanding of cross-linguistic influence in bilingual language development by drawing on insights from the bilingual adult psycholinguistic literature (e.g., Hartsuiker et al., 2004). Our central hypothesis, following work by Serratrice (2016, 2022), is that cross-linguistic influence in bilingual children is driven by (structural) priming and reflects a certain level of cross-language sharing. I will show that effects of cross-linguistic influence are visible in within- as well as between-language priming, and that it is possible to prime ungrammatical as well as grammatical cross-linguistic influence. I will furthermore explore the impact of linguistic and non-linguistic factors, namely language proficiency and perspective-taking, on priming behaviour in bilingual and monolingual children. Along the way, we consider some theoretical and practical challenges raised by these findings, and we explore CLI not only from a researcher's perspective but also from the perspective of children, parents and teachers.

Y man cychwyn ar gyfer y sgwrs hon yw'r ystyriaeth hirsefydlog y gall un o ieithoedd plentyn dwyieithog ddylanwadu ar y llall mewn amgylchiadau penodol (Paradis & Genesee, 1996). Mae'r dylanwad trawsieithyddol hwn yn amrywio ar draws parthau ieithyddol, cyfuniad ieithoedd a phlant, a chyfeiriwyd at sawl ffactor ar lefel ieithyddol ac ar lefel unigol i esbonio'r amrywiad hwn (gweler Serratrice, 2013, van Dijk, et al., 2022 am adolygiad). Yr union rai o'r ffactorau hyn sy'n angenrheidiol a/neu'n ddigonol ar gyfer dylanwad trawsieithyddol, a'r union fecanweithiau y mae eu hangen er mwyn i ddylanwad trawsieithyddol ddigwydd, yn parhau'n aneglur, fodd bynnag. Yn y sgwrs hon, byddaf yn adrodd ar gyfres o astudiaethau diweddar gan fy ngrŵp ymchwil lle'r ydym yn ceisio cael dealltwriaeth well o ddylanwad trawsieithyddol mewn datblygiad ieithoedd dwyieithog gan dynnu ar fewnwelediadau o'r llenyddiaeth seicoieithyddol am oedolion dwyieithog (e.e., Hartsuiker et al., 2004). Ein prif ddamcaniaeth, gan ddilyn gwaith gan Serratrice (2016, 2022), yw bod dylanwad trawsieithyddol mewn

plant dwyieithog yn cael ei ysgogi gan breimio (strwythurol) ac yn adlewyrchu lefel benodol o rannu trawsieithyddol. Byddaf yn dangos bod effeithiau dylanwad trawsieithyddol i'w gweld mewn preimio o fewn ieithoedd yn ogystal â rhwng ieithoedd, a'i bod hi'n bosibl preimio dylanwad trawsieithyddol anramadegol yn ogystal â dylanwad gramadegol. Ar ben hynny byddaf yn archwilio effaith ffactorau ieithyddol ac anieithyddol, sef hyfedredd iaith a chymryd persbectif, ar ymddygiad preimio mewn plant dwyieithog ac unieithog. Ar hyd y ffordd, rydym yn ystyried rhai heriau damcaniaethol ac ymarferol a ddaeth i'r amlwg yn sgil y canfyddiadau hyn, wrth i ni archwilio dylanwadau trawsieithyddol nid yn unig o bersbectif yr ymchwilydd ond hefyd o bersbectif plant, rhieni ac athrawon.

TALKS

(In alphabetical order)

Bilingualism modulates domain-general functional connectivity: insights from resting-state electroencephalogram

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Previous bilingualism research indicates that one's degree of bilingual experience dynamically impacts cognition, brain structure, and function. This is demonstrated by increased performance amongst bilinguals in behavioural tasks in the language and executive control domains[1–3], changes to brain structure in regions

associated with language and executive control[4–6], and alterations to brain function and connectivity in resting-state electroencephalography (EEG) studies[7–9]. These findings include increased posterior activity compared to monolinguals, increased interhemispheric connectivity, and increased long-distance communication as experience increases. The BAPSS model of bilingual functional brain development suggests that these patterns indicate that bilinguals begin to rely less on frontal regions, and more on posterior and subcortical regions as experience increases[10]. The aim of this study was to determine how degree of bilingualism interacts with domain-general task demands to impact whole-brain functional connectivity. The study used a novel task-driven resting-state EEG paradigm, using the short-term variability of resting-state connectivity to measure the patterns of connectivity both pre- and post- a cognitively demanding task. We used the Language and Social Background Questionnaire to assess demographics and degree of bilingualism[11].

The task used was a serial reaction-time artificial grammar learning task designed to assess hierarchical structure representation and implicit statistical learning. This is a very generalised higher cognitive ability so is considered to be cognitive domain-general, with bilinguals having been found to perform better than monolinguals on this task[12]. We used a binary Lindenmayer grammar which follows the Fibonacci sequence[13], presented to participants as red or blue circles on the screen, to which they must respond indicating which colour they were just shown[14]. We analysed the data using Generalised Additive Models – a non-linear modelling method – modelling LSBQ composite score against connection strength between multiple regions of interest. The connectivity patterns were then compared to assess any differences between the at-rest and post-task states.

Pre-task, level of bilingualism showed a significant relationship with the connectivity strength between long-distance (e.g., frontal-parietal), inter-hemispheric, and intra-hemispheric connections – a total of 4 significant connections affected by level of bilingualism. Our post-task recordings yielded 10 significant bilingualism-modulated connections – involving multiple long-distance (e.g., parietal to frontal; central to occipital), inter-hemispheric, left temporal, and medial occipital region connections. Crucially, the post-task connectivity analysis revealed new bidirectional interhemispheric temporal connections, and an increase in the number of total connections to occipital and left temporal

areas. These findings are compatible with the BAPSS model, indicating that linguistic experience affects the brain regions recruited to complete the task at hand – involving greater occipital, temporal, and interhemispheric connectivity, particularly during task-based cognition. We propose that this is due to the increased control demands in bilingualism, leading to increased efficiency of automatic monitoring processes, and thus greater strength of functional connections in regions enlisted for these demands. The clustering of connections around the left temporal region post-task is particularly unexpected. This suggests strong language network activation despite no language being present in the task.

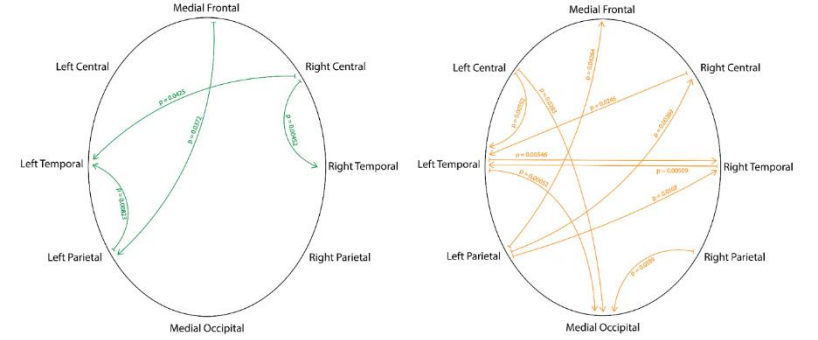

Figure 1: Connections significantly modulated by level of bilingualism for the pre- and post-task conditions. Left = pre-task (green arrows), right = post-domain-general task (orange arrows). Arrows indicate the directionality/flow of information of the connection.

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Biliteracy and L2 proficiency modulate reading strategies and reading-related skills in late L2 learners with and without dyslexia

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Background. The consistency of grapheme-phoneme correspondences (GPC) modulates reading strategies. Monolingual readers of transparent orthographies (consistent GPC) may favor the processing of small grain size units (e.g., graphemes) given their consistent correspondences. Conversely, readers of more opaque orthographies (inconsistent GPC) rely on larger grain size units (e.g., bigrams, or trigrams), in that they are more consistent than smaller units [1]. Studies on *biliteracy* effects in early bilinguals, considering the exposure to both *transparent* and *opaque* orthographies, have shown that reading strategies are modulated by cross-linguistic interactions [2]. It remains unclear whether late bilinguals *adapt* their L1 reading strategies to the target language [3] or develop *hybrid* strategies [2] as an effect of the experience with two different orthographies. Additionally, it is unclear whether such orthographic-specific cross-linguistic interactions modulate reading strategies in L2 learners with developmental dyslexia (DD).

Goal. This study investigates how the development of proficiency in an opaque late L2 (English) affects the reading strategies of late L2 learners (with and without DD) whose L1 has a highly transparent orthography (Italian). This is investigated in both the L1 and L2.

Method. Eighty participants took part in the study (*M* age = 17.05, *SD* = 1.43). Twenty-nine participants were formally

diagnosed with DD. All participants were Italian native speakers and had started learning English at school (*range* = 3 – 8). An eye-tracking reading task was used to investigate whether identical words and nonwords are read differently when embedded in Italian vs. English sentences (Table 1).

Results. A *glmer* model analyzed fixation counts on target (non)words, considering Group (TD vs. DYS), Lexicality (Word vs. Nonwords), Language (IT vs. EN), and English proficiency. A significant four-way interaction ($p = .027$) indicated that English proficiency (marginally) significantly reduced fixations on Italian ($p = .051$) and English words ($p = .002$), and Italian ($p < .001$) and English nonwords ($p = .058$) in DYS participants. In TDs, English proficiency didn't affect fixations in Italian ($p = .702$) or English words ($p = .635$), but its impact on Italian and English nonwords differed significantly ($p = .046$). Fixations decreased on English nonwords with increasing English proficiency. In contrast, fixations on Italian nonwords increased with English proficiency (Figure 1: real words, Figure 2: nonwords).

Discussion. Our findings indicate that improved proficiency in English reduces fixations on both Italian and English targets in DYS learners, regardless of lexicality, thus implying larger grain size unit processing as a function of higher English proficiency. Conversely, TDs show no English proficiency effects when reading Italian and English real words, arguably due to well-established lexical reading skills. Interestingly, increasing English proficiency in TDs correlates with more fixations on Italian nonwords, suggesting smaller grain size unit processing. This effect may support the hypothesis that highly proficient TDs are able to adapt their reading strategy to the target language [1]. Alternatively, it could suggest a strategy-switch cost. The implications of these results will be discussed.

Language	Lexicality	Example
IT	Real word	Berrettini dimostra grande **agilità** e velocità sul campo da tennis
	Nonword	Berrettini dimostra grande **iradità** e velocità sul campo da tennis
EN	Real word	Federer shows considerable **agility** and speed on the tennis court
	Nonword	Federer shows considerable **iradity** and speed on the tennis court

Table 1. Experimental items – Eye-tracking sentence reading task.

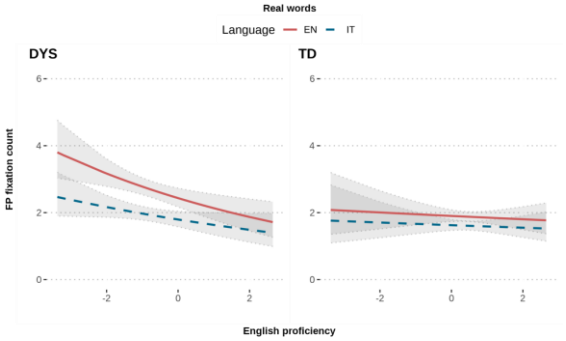

Figure 1. First-pass fixation count on Italian (blue line) and English (red line) real words.

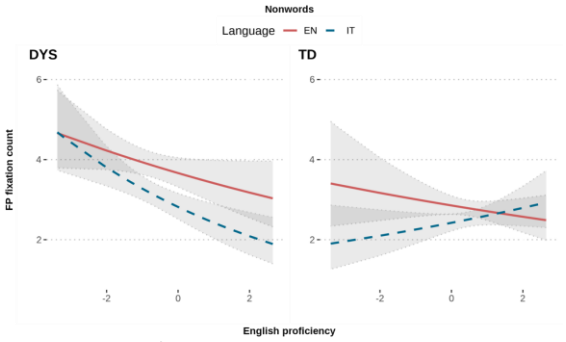

Figure 2. First-pass fixation count on Italian (blue line) and English (red line) nonwords.

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Crosslinguistic influence can affect L1 feature representations: evidence from CLLD

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A question in acquisition research is whether crosslinguistic influence exerted by the L2 ever affects L1 feature representations (i.e. grammatical attrition). Most studies on attrition of discourse properties have tested the Interface Hypothesis (IH), which argues that attrition affects only the ability to process interface structures, not knowledge representation (Sorace, 2011, Chamorro et al. 2016). We test attrition of a discourse property using the Attrition via Acquisition model (Hicks & Dominguez, 2020). Following Lardiere (2009) for L2 acquisition, the AvA argues that feature changes to the L1 grammar involve the addition of grammatical forms transferred from an analogous L2 structure.

We examine the features associated with Clitic Left Dislocation in Romanian versus Italian, comparing two types of object left dislocation: contrastive topic and focus fronting. Italian and Romanian differ in the contexts in which they use clitics. In Romanian, both fronted topics [+anaphor] and fronted foci [-anaphor] require a clitic (compare 1b to 2b), but only when the left dislocated object is specific (compare 1b to 3b). The specificity distinction is irrelevant for Italian (compare 1a to 3a). In Italian, the insertion of a clitic after a dislocated direct object is restricted to contrastive topics and is disallowed with contrastive focus fronting (compare 1a to 2a). Thus, in Italian, CLLD is constrained by discourse anaphoricity (following López, 2009) and in Romanian by specificity.

Assuming that offline tasks reflect knowledge representation, we report on an acceptability judgment task presented in oral and written form where participants rated answers to questions (see (1)-(3)) and on a written elicitation task where participants had to complete missing verbs or clitics+verbs in sentences with object initial word orders (see example in (4)). Participants were 17 Romanian and 18 Italian monolinguals, Romanian immigrants to Italy (n=37) and to Canada/US (n=30), the latter being a control group to examine potential attrition not induced by the L2 grammar, as English does not use clitics.

Results confirm a discourse effect for Italian monolinguals and a specificity effect for Romanian monolinguals. Specificity was also the only significant factor for Romanians in Canada/US, while there was more variability for Romanians in Italy, suggesting influence from L2 Italian (see Fig. 1). Since attrition is typically

categorized by individual variation, we further categorized the L2 Italian group based on their reported language dominance, defined as frequency of current language and self-reported language proficiency. We found a significant effect of both discourse and specificity for Romanians in Italy who were dominant in Italian (n=14). Like monolinguals and Romanian dominant speakers, they allowed clitics with fronting of both specific topics and foci, but also with non-specific topics, an option transferred from their L2.

Our findings support the AvA, as grammatical attrition was found for Romanians in Italy, resulting in the addition of the L2 option without loss of the L1 option. The results contribute to a better understanding of the factors that modulate attrition, showing it can cause a change in speakers' L1 knowledge representation and does not only affect online sensitivity with interface structures.

Examples (contexts, questions and answers are presented in Romanian)

a. Q: What did you do with the couch and the table? **[+anaphor, +specific]**
- [Il divano]$_i$ ***(l'**)ho messo in soggiorno, ma il tavolo si è rotto
The couch cl.acc.m.sg. have put in living room but the table refl is broken
- [Canapeaua]$_i$ am pus-***(o)** în sufragerie, dar masa s-a rupt
Couch.def have put-cl.acc.m.sg in living room but table.def refl-is broken
'The couch I put in the living room, but the table broke.'

b. Q: You put the table in the living room, right? **[-anaphor, +specific]**
a. Il DIVANO (***l'**) ho messo in soggiorno, non il tavolo.
The couch cl.m.3sg have.1sg put in living room not the table
b. CANAPEAUA am pus-***(o)** în sufragerie, nu masa.
couch-the have.1sg put-cl.f.3sg in living room not table-the
'The couch I put in the living room, not the table. The table broke during the transportation.'

c. Q: Did you find a red skirt and a pair of boots? **[+anaphor, -specific]**
a. Una gonna rossa ***(la)** cerco già da due mesi, però ho trovato un paio di stival
a skirt red cl.f.3sg search.1sg already since two months but have.1sg found a pair of boot
b. O fustă roșie (***o**) caut deja de două luni, dar am găsit o pereche de ghete negre.
a skirt red cl.f.3sg search already for two months but have.1sg found a pair of boots black
'I've been looking for a red skirt for two months, but I did find a pair of black boots

d. **Example trial Written Elicitation task**
Anna and Beatrice are talking about Lea and Gianni who recently got married. Anna says to Beatrice:
Q: They have visited the Virgin Islands if I remember correctly.
A: Insulele MALDIVE *le au* vizitat în luna de miere, nu Insulele Virgine
The Maledives *(CL) have.3pl* visited for the honeymoon, not the Virgin Islands.

Table 1: Distribution of clitics in Italian and Romanian

	[+anaphor] (topic)		[-anaphor] focus	
	[+Specific] Condition 1	[-Specific] Condition 2	[+Specific] Condition 3	[-Specific] Condition 4
English	X	X	X	X
Italian	✓	✓	X	X

Romanian	✓	X	✓	X

Figure 1: Mean acceptability ratings (1-6) of Romanian monolinguals and Romanians in US/Canada and Italy. Error bars show 95% confidence intervals.

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Crosslinguistic influence in child bilingual acquisition: A Visual World eye-tracking study on grammatical case and aspect processing by German-Russian and Spanish-Russian bilinguals

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We investigate the effects of crosslinguistic influence (CLI) in grammatical processing by comparing across bilingual groups, carefully matched by background and lexical proficiency. We employ Visual World eyetracking and focus on the processing of grammatical case and aspect by Russian heritage 6-12 y.o. bilinguals. Both case and aspect have been found to be vulnerable in heritage Russian [1] and acquired early in monolinguals [2]. The heritage Russian speakers were sampled from two populations: Spanish-Russian (n= 85) and German-Russian bilinguals (n=45) closely matched by age, overall exposure (Q-Bex) and lexical proficiency in the heritage language (MAIN narratives). The choice of the populations was determined by structural similarity between languages: Russian and German both mark grammatical case (nominative vs accusative) in the noun phrase, while Spanish doesn't employ overt case marking. On the other hand, Spanish and Russian exhibit a certain overlap in their use of verbal aspect (perfective vs imperfective) to distinguish between completed vs ongoing events in the past, while German doesn't grammatically mark verbal aspect.

We used a paradigm based on [3] to investigate whether the participants could use nominative vs accusative case marking on the first NP to anticipate the possible continuation of the sentence, and a paradigm based on [4] to test whether the participants look at the picture representing an ongoing event more when they listen to a verb in the imperfective aspect vs perfective aspect. We present results on the processing of 1) grammatical case (in Russian: by two groups of bilinguals in comparison to each other as well as monolingual Russian-speaking children; and in German: by German-Russian bilinguals and monolingual German-speaking children) and 2) grammatical aspect (in Russian: by two groups of bilinguals in comparison to each other as well as monolingual Russian-speaking children, and Spanish: by Spanish-Russian bilinguals and monolingual Spanish-speaking children). We used Bayesian generalized mixed regression analysis to statistically evaluate the differences between the bilingual groups and the respective monolingual controls. The analysis revealed a significant effect of both case and aspect in Russian in the bilingual groups, with no differences between the bilingual groups on either case or aspect. Although no facilitation from the societal language was observed in the processing of case and aspect in the heritage language, our results indicate that there may be facilitation from the heritage language to

the societal language for the bilingual participants. We discuss the results in light of further studies that report differential effects of CLI on the sociatal language vs the heritage language of bilingual children.

Examples of experimental stimuli:

Case Task

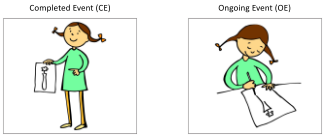
Visual display: Objects or Visual display: Events

SVO: $Fluffy_{NOM}$ $rabbit_{NOM}$ *will now eat* $cabbage_{ACC}$

OVS: $Fluffy_{ACC}$ $rabbit_{ACC}$ *will now eat* fox_{NOM}

Aspect Task

Completed Event (CE) Ongoing Event (OE)



Šël pervyj urok. *Devočka risovala / narisovala tonkuju vazu. (RU)*

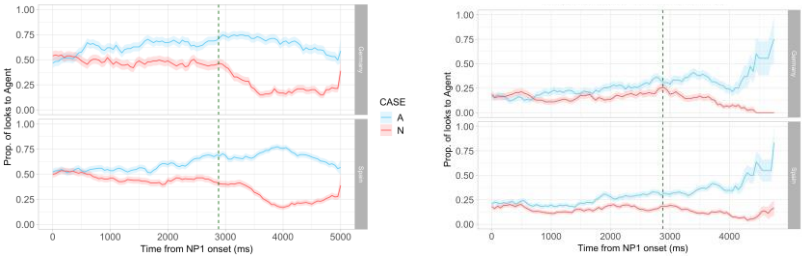
Era la primera clase en la escuela. *Una nena dibuj-aba / dibuj-ó un florero delgado. (SP)*

It was the first lesson at school. *The girl was drawing / drew a thin vase.*

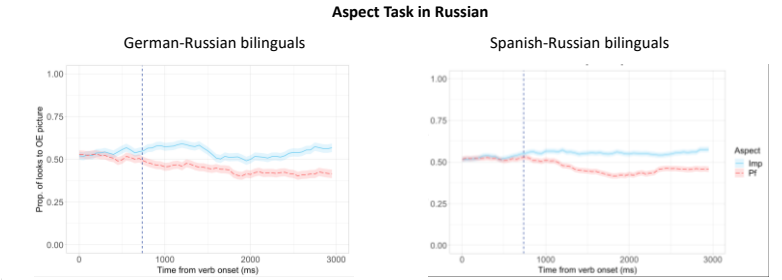
Results:

Case Task in Russian

Visual display: Objects Visual display: Events



Bayesian generalized mixed effects regression revealed significant effect of case in the prediction window for both bilingual groups, but no evidence that the effect was stronger in one of the groups.



Bayesian generalized mixed effects regression revealed significant effect of aspect for both bilingual groups, but no evidence that the effect was stronger in one of the groups.

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Cross-linguistic priming of relative clause comprehension in English-Dutch and German-Dutch bilingual children: Evidence for cumulative priming

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Cross-linguistic influence in bilingual acquisition has been conceptualised as cross-linguistic priming, that is, the result of long-term prior linguistic exposure (e.g., Serratrice, 2016). Whilst some evidence exists for cross-linguistic structural priming in children's *production* (e.g., Unsworth, 2023; Vasilyeva et al., 2010), evidence for cross-linguistic priming in children's *comprehension* is indirect only: through studies on cross-linguistic influence (e.g., Serratrice, 2007) and with adult L2 learners (e.g., Kidd et al., 2015). Consequently, it is unclear whether cross-linguistic influence in bilingual children's is the outcome of cross-linguistic priming. Therefore, this study investigates bilingual children's relative clause (RC) comprehension in within- and between-language priming tasks, asking the following questions:

(RQ1) Is there cross-linguistic influence in bilingual children's RC comprehension?
(RQ2) Can we prime this cross-linguistic influence?
(RQ3) Are RC priming effects cumulative?

Thirty-six English-Dutch and 35 German-Dutch bilingual children (6-to-11 years) participated. RC word order in Dutch (1) and German (2) is ambiguous between a subject (SRC) and an object interpretation (ORC). English SRCs and ORCs word orders differ (3 and 4) with ORC order overlapping with Dutch and German RCs. Children were tested in two sessions (Figure 1). In session 1, they conducted a within-language priming task (Dutch-to-Dutch) that served as a baseline. Target items were spoken Dutch ambiguous RCs paired with two pictures: the SRC and ORC interpretation. Children chose the picture they believed matched the RC. Each target was preceded by a prime. Primes were similar to targets, except that they contained disambiguated SRCs or ORCs (i.e. by pronouns) or an unrelated sentence (e.g., "Where is the big cat?"). In session 2 (English-to-Dutch and German-to-Dutch), Dutch prime sentences were replaced by English or German primes. In English, RCs were disambiguated by word order, in German, by case marking. Children's ORC choices were analysed. Furthermore, to investigate cumulative priming effects, we calculated children's previous number of ORC choices for each trial.

Regarding RQ1, generalized linear mixed effect models showed significant main effects of group and session and a significant group-by-session interaction. English-Dutch children were more likely to interpret Dutch ambiguous RCs as ORCs than

German-Dutch children and English-Dutch children's ORC choices increased from in the between-language session (Figure 2). These effects suggest cross-linguistic influence from English to Dutch: English ORC-order overlap boosted the ORC interpretation for ambiguous RCs (e.g., Hulk & Müller, 2001). Regarding RQ2, there were no significant effects of or interactions with prime structure. Hence, there was no evidence of Dutch-to-Dutch, nor English/German-to-Dutch RC comprehension priming. Regarding RQ3, there was a positive relationship between English-Dutch children's previous ORC choices and ORC choice on a given trial in both experiments. This finding suggests that whilst there were no direct priming effects visible in the English-Dutch group, their exposure to ORCs in both Dutch and English primed the ORC interpretation in Dutch over time.

Our findings offer evidence that cross-linguistic influence in bilingual acquisition is the outcome of long-term cross-linguistic priming, also in comprehension, in line with error-based learning (e.g., Chang et al., 2006).

Examples

(1) Waar is de kat die$_{subject/object}$ de koe$_{subject/object}$ knuffelt?
where is the cat that the cow hugs
"Where is the cat that hugs the cow." (**SRC**) / "Where is the cat that the cow hugs?" (**ORC**)

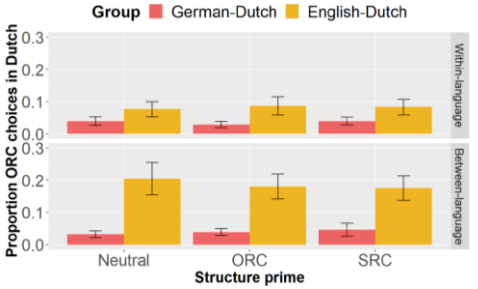
(2) Wo ist die Katze die$_{subject/object}$ die Kuh$_{subject/object}$ umarmt?
Where is the cat that the cow hugs
"Where is the cat that hugs the cow." (**SRC**) / "Where is the cat that the cow hugs?" (**ORC**)

(3) **SRC:** Where is the cat that hugs the cow?

(4) **ORC:** Where is the cat that the cow hugs?

Figure 1. Example of prime-target trial in within-language and between-language priming tasks.

Figure 2. Mean proportion of ORC choices and standard errors by group and prime type by language session.



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How bilingualism influences language processing in the developing brain: A systematic review of the neurobiological evidence

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Previous literature has revealed that bilingual experiences influence language processing, development and induce neurobiological changes. Work so far has focused on several aspects (e.g., phonetic contrasts discrimination, vocabulary growth, and word learning) and probed similar research questions using different methods. Crucially, no study has yet attempted to understand how these findings fit together, and whether they report comparable or conflicting findings. Therefore, a systematic understanding of neural correlates in the developing bilingual brain is needed. Herein, we review emerging findings on the developing bilingual brain from 98 peer-reviewed studies across methodologies (online processing: MEG/EEG/ERP; neuronal activity: fNIRS/fMRI, structural changes: MRI/DTI), ages, and languages to provide a more holistic understanding for the entire literature. These studies contain different types of bilinguals: simultaneous bilingual, sequential bilingual, and L2 learner.

The literature on simultaneous bilingual acquisition focuses primarily on comparing first language acquisition between bilinguals and monolinguals. Findings suggest that simultaneous bilinguals tend to exhibit greater and long-lasting neural and behavioral sensitivity to phonetic contrasts compared to monolinguals. However, it suggests that simultaneous bilinguals also require more time to acquire the phoneme inventories for both languages due to less exposure than their monolingual peers. Despite similar behavioral performances in various tasks, simultaneous bilinguals show different brain responses from monolinguals, requiring more bilateral and DLPFC activation, more attentional control for language processing, and greater reliance on pragmatic cues in context. Other

studies compare neurobiological differences between simultaneous bilinguals, sequential bilinguals, and monolinguals. Results show that sequential bilinguals often fall between the other two groups. For instance, sequential bilinguals tend to have higher cortical thickness compared to simultaneous bilinguals but lower compared to monolinguals; or they have less refined white matter tracts within language-related areas compared to simultaneous bilinguals, but better than monolinguals.

The literature investigating L2 learners focuses more on individual differences. Many studies show prominent relations between L2 proficiency and the corresponding neurobiological changes. L2 learning in childhood follows similar developmental trajectories to L1 acquisition, i.e., native-like ERP patterns in language processing, greater activation from language areas, and a gradual shift from bilateral to left-lateralized brain responses as L2 proficiency increases. Eventually, the L2's brain networks converge to those of the L1.

Finally, we integrated the developmental literature with two bilingual frameworks based on adult studies—Adaptive Control Hypothesis (ACH) and Dynamic Restructuring Model (DRM). Results for simultaneous bilinguals align with the ACH, suggesting that bilingual processing imposes greater cognitive demands. Therefore, a reconfiguration of neural networks to optimize language performance in bilingual brains is often observed. Some other findings speak rather in favor of the DRM, by focusing on the interaction between the amount of language exposure, proficiency, and neuroadaptation. Indeed, with increasing bilingual experience, bilingual children appear to exhibit comparable brain responses and structural changes as described in DRM. In sum, although several patterns emerged, further research is required to advance our understanding of the effects of bilingual language acquisition in the developing brain.

Linking offline judgements and ERP responses in the L1 and L2 processing of filler-gap dependencies

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The degree to which second language (L2) learners can acquire implicit (vs. explicit) knowledge of the target language has been subject to much debate. While offline judgments are commonly used as metrics for explicit knowledge, event-related potentials (ERP) have been taken to be indicators of implicit sensitivity to the L2 property under investigation (e.g. Tokowicz & MacWhinney, 2005). Exploration of the relationship between offline judgments and ERPs has thus far been confined to the P600 ERP component (Lemhöfer et al., 2014; Morgan-Short et al., 2022; White et al., 2012). The present study contributes to this line of research by investigating the relationship between the brain responses elicited by ill-formed filler-gap dependencies and end-of-trial judgements. We innovate on previous work by testing the same individuals in both their native language (L1) and their L2, and by examining their sensitivity to both grammatical and semantic anomalies across structurally similar sentences.

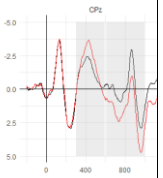
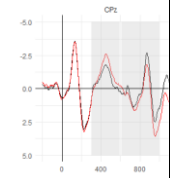
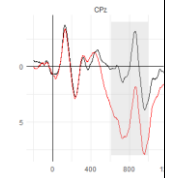
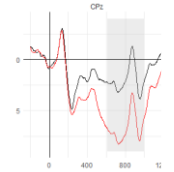
106 L1 German/L2 English speakers (Age: 25.53 years [sd: 5.5]; AoA: 8.2 years [sd: 2.07]; L2 proficiency: CERF level C1 [range: B1-C2]) took part in two (one in German, one in English) binary plausibility and two binary grammaticality judgement tasks while their brain responses were being recorded. Our stimulus sentences involved extraction from relative clauses with either semantically plausible vs. implausible fillers, or with a filled vs. unfilled gap position (Table 1). The plausibility and grammaticality judgement data were analysed separately. Mixed-effects models showed significant interactions with LANGUAGE, reflecting larger PLAUSIBILITY and GRAMMATICALITY effects in participants' L1 than in their L2. An initial analysis of the EEG recordings revealed a bi-phasic N400/P600 effect for the plausibility manipulation and a P600 effect for the grammaticality manipulation (Figure 1). The aggregated amplitudes of a central ROI (C1, C2,C3,C4,Cz) for the N400 and a posterior ROI (P1, P2, P3, P4, Pz) for the P600 effects were later inserted as dependent variables into three linear mixed-effects models, with LANGUAGE, JUDGEMENT and PLAUSIBILITY/GRAMMATICALITY as independent variables. Results

showed that the size of the N400 response was solely modulated by PLAUSIBILITY, with no effect of, or interaction with, the factor JUDGEMENT. For the P600 triggered by the same stimuli, we found a significant interaction of JUDGEMENT and PLAUSIBILITY, with an increased P600 response for implausible sentences that were correctly rejected. The same interaction pattern was attested for the P600 data in the grammaticality judgement task, with a larger P600 response for filled-gap sentences that were correctly rejected. No significant interactions with the factor LANGUAGE were observed.

Summarising, although participants' offline judgements were less accurate overall in their L2 than in their L1, we observed similar ERP patterns to semantic (N400 & P600) and syntactic (P600) anomalies in both languages. Independently of language status, P600 responses were larger for accurate judgements, whereas the size of the N400 response to implausible stimuli was unrelated to judgement accuracy. These findings support and extend previous findings linking the P600 to explicit knowledge (e.g. Morgan-Short et al., 2022), while suggesting that the N400 response may be associated with implicit processing.

Plausibility Judgement Tasks	
German	*Kristin bekam den Brief/#Kater, den der Geliebte **gelesen** hatte ohne jede Erlaubnis.* 'Kristin received the letter/#tomcat that the lover had **read** without permission.'
English	*Bill approached the house/#woman that the old president **built** in the countrysid*
Grammaticality Judgement Tasks	
German	*Tom nahm den Knochen, obwohl/*den die Halterin ihrem Hund **diesen** gegeben hat* 'Tom took the bone although/*which the owner had given **it** to her dog.'
English	*Michael watched the boy {while/*for whom} Susan was playing some music **f** **him** last night.*

Table 1: Example stimulus sentences for plausibility and grammaticality judgement tasks in German and English

Plausible/Implausible Condition		Grammatical/Ungrammatical Condition	
L1 GERMAN	L2 ENGLISH	L1 GERMAN	L2 ENGLISH
			

Note: black line = plausible/grammatical, red line = implausible/ungrammatical

Figure 1: Average ERP waves at the CPz electrode in L1 and L2 at the words marked in bold in Table 1.

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Network science tools unveil the early stages of L1 lexical attrition

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L1 lexical attrition, the weakening or loss of L1 lexical-semantic abilities, is attributed to reduced L1 exposure and/or L2 interference (Schmid et al., 2019). Semantic fluency tasks, where participants provide exemplars of a given semantic category within a timeframe, are central to L1 attrition research. However, traditional analyses have yielded inconclusive results (Schmid & Köpke, 2009). While some studies indicate that L1 attriters name fewer items than functional monolinguals, others report no significant differences (Jarvis, 2019). Our study moves beyond traditional analyses, employing a novel network science approach to investigate the bilingual lexicon's structural properties, thus offering a fresh perspective in L1 attrition research.

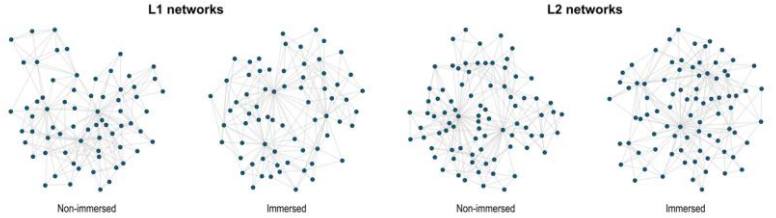
Data from two semantic fluency tasks were collected from 94 immersed and 80 non-immersed late bilinguals with comparable L2 proficiency (as measured by the OQPT). In their L1 Spanish, participants provided exemplars of the fruits and vegetables category, whereas in L2 English, they named animals. Following previous studies (Christensen & Kenett, 2021), we built networks with nodes representing words and edges capturing co-occurrences. The analysis focused on three network measures reflecting the lexicon's structural organisation, which may be critically impacted during lexical attrition (Gallo et al., 2021): Clustering coefficient (CC), the degree to which nodes group together; average shortest-path length (ASPL), the average distance between node pairs; and modularity (Q), the degree to which the network comprises distinct communities. Importantly, higher CC is associated with better semantic organisation in bilinguals and monolinguals (Cosgrove et al., 2021; Feng & Liu, 2023); lower ASPL with faster navigability within the lexicon (Siew & Guru, 2023); and lower Q with more efficiently organised knowledge networks (Siew & Guru, 2023).

We examined if L2 immersion results in L1 lexical attrition, manifested by shifts in the native semantic system's structure, reflected by lower CC, higher ASPL, and Q. Bootstrap analyses were conducted, involving the generation of partial networks from

randomly selected node subsets, repeated 1000 times for subsets containing 50% to 90% of the original network nodes. This created a sampling distribution for each measure and network. Using analyses of covariance (ANCOVA), we found significant differences between the L1/L2 semantic networks of immersed and non-immersed bilinguals. The L1 networks of the immersed participants showed signs of attrition, being less densely connected and sparser (Figure 1). Conversely, their L2 networks displayed a more efficient organisation than those of the non-immersed subjects (Figure 2). In-depth analyses examining language use and proficiency further validated these observations. Notably, these trends were not observed in traditional analyses like response count.

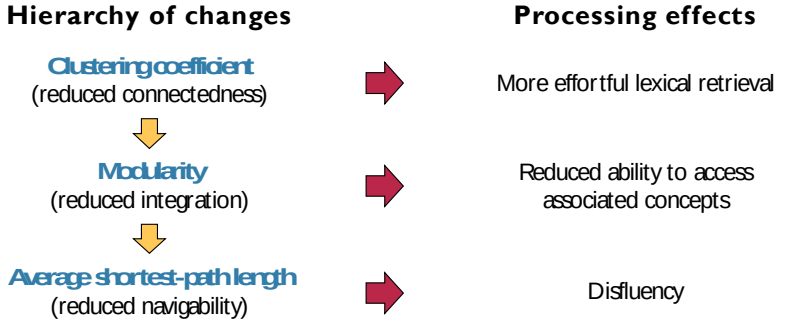
These findings demonstrate the network science approach's effectiveness in elucidating the complex dynamics of bilingual semantic memory systems. Furthermore, our analysis indicated that the erosion of the native semantic system is a gradual process, first impacting network interconnectivity, with information flow and community structure being less affected initially. Drawing from these insights, we introduce the Lexical Attrition Foundation (LeAF) framework, offering a network-based developmental perspective on lexical attrition and laying the groundwork for future research (Figure 3).

Figures 1 and 2



Visualisation of the L1 and L2 semantic networks for the immersed and non-immersed groups.

Figure 3



The Lexical Attrition Foundation (LeAF) framework.

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Phonological effects in predictive processing of syntax: eye-tracking evidence from L1 Mandarin speakers in the UK

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Whilst a considerable number of studies have investigated the role of semantics in bilinguals' predictive processing of syntax (e.g., several studies demonstrate that bilinguals' greater reliance on lexical semantics compared to morphosyntax leads to quantitative and qualitative differences in bilingual vs. monolingual processing), far less attention has been given to cases where bilinguals' phonological processing may likewise influence their predictive processing of syntax (see Schlenter, 2023 for a recent review of predictive processing studies with bilinguals).

We tested 30 L1 Mandarin speakers who had just begun a residence abroad at a UK University along with 30 L1 English controls. All participants completed two Visual World eye-tracking experiments testing syntactic and phonological processing in English. The syntax experiment tested predictive processing of number with the determiners *th**is**/th**ese**/th**at**/th**ose***, each followed by a balanced number of singular and plural nouns, as well as *the+noun* to test sensitivity to nominal number marking independent of determiner number marking (English and Mandarin differ regarding number morphology). The phonology experiment tested processing of minimal pairs contrasting /i/ vs. /ɪ/ (e.g., *sheep* vs. *ship*), a tense-lax contrast which is known to be difficult for L1 Mandarin learners of English (Yang et al., 2016), as well as minimal pairs contrasting word-final /z/ vs. /s/ (e.g., *rise* vs. *rice*). Given that the /i/–/ɪ/ contrast helps to distinguish the English determiners *these* and *this* (along with /z/–/s/), we hypothesised that participants who struggle with the processing of these vowels would also struggle to use these two determiners predictively in online processing.

Results of the syntax experiment reveal that for the congruent conditions (e.g., *that + singular noun*), L1 Mandarin speakers correctly predict the upcoming noun. The exception is the determiner *this* (see Figure 1). Mixed effects binomial logistic

regression modelling confirms that the difference between the proportion of looks to the target and competitor is significantly lower for the *this* condition compared to the other determiners. Further analyses suggest this may be linked to a phonological processing difficulty: in the phonology experiment, the difference between the proportion of looks to target and competitor increases significantly more slowly for /ɪ/ over time than for /i/ (i.e., the L1 Mandarin speakers find the processing of the vowel in *this* more challenging than the vowel in *these*). This is likely due to the phonetics of the Mandarin /i/ vowel mapping on to English /i/ more straightforwardly than English /ɪ/. In the incongruent conditions of the syntax study, L2 learners are able to retreat from their initial predictions from the determiner when they encounter the noun coda (i.e., the point at which they hear nominal plural morphology/lack thereof), similarly to the native controls. However, unlike the controls, in the congruent *this + singular noun* condition it appears that the L1 Mandarin speakers never fully discount the plural noun (Figure 2) even after processing the nominal coda. This is again confirmed by statistical modelling and possible explanations are explored.

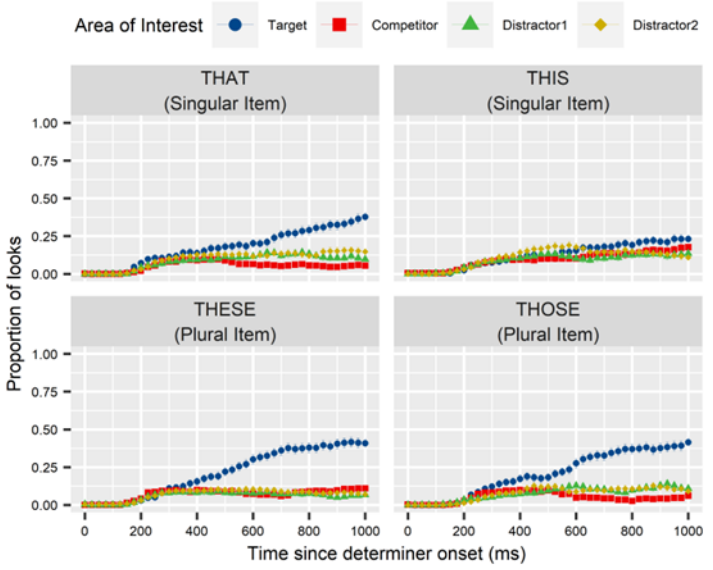

Figure 1: Determiner onset

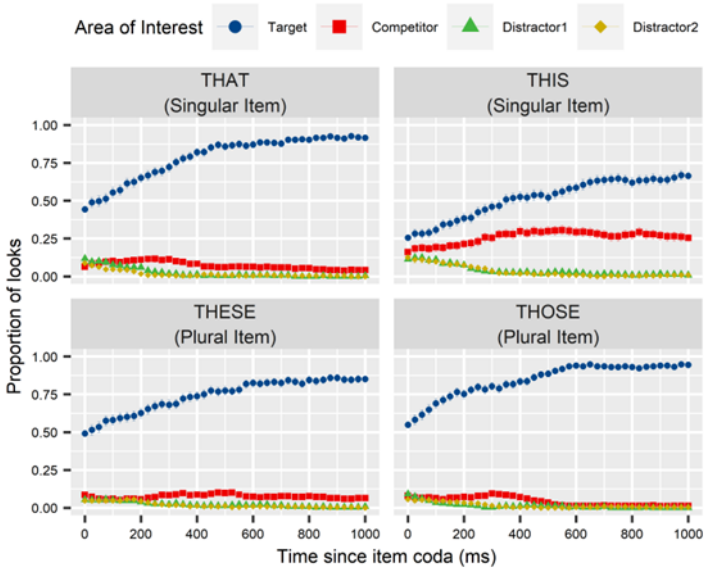

Figure 2: Noun Coda

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The effects of changing the word order of collocations on L2 sentence processing: an eye-tracking study

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Research show collocations (defined as pairs of words that occur together frequently) are processed faster than free word combinations in both L1 and L2 readers (e.g., Vilkaitė & Schmitt, 2019; Vilkaitė, 2016). This faster processing of collocations compared with novel word combinations is called the 'collocation advantage'. The advantage is mainly observed for canonical collocations (where collocations occur in their default configurations, e.g., *provide information*); however, in natural language, collocations also occur in non-canonical/non-default configurations. For L1 readers, the collocation advantage was still observed for two types of variations: non-adjacency (where one or more words are inserted between the components of a collocation .e.g. *provide some of the information*)(Vilkaitė, 2016), and morphological variation (where the morphological forms of the words are modified, e.g., *provides/providing information* (Vilkaitė-Lozdienė, 2022). In contrast, for L2 readers, one study found that the processing advantage disappeared in non-adjacent collocations (Vilkaitė & Schmitt 2019). This result may indicate that L2 readers process non-canonical collocations differently from L1 readers. However, other types of variation collocations have not been investigated in L2 speakers.

The present eye-tracking reading experiment investigated whether collocations with a modified word order, specifically passivized collocations, still show an advantage (e.g., active collocation: *he improved quality* -> passive collocation: *quality was improved*), whether word order changes affect L1 and L2 readers similarly, and whether the collocation advantage is separate from contextual predictability. Thirty-nine advanced L2-English learners and 40 English natives read 48 sentences containing either an active collocation, a passive collocation, or their corresponding controls

(counterbalanced). Example: *…he improved/discussed quality…* (active), *…quality was improved/discussed…* (passive).

Generalised mixed models revealed that changing the word order of collocations did not eliminate the collocation advantage in either L1 or L2 readers. The collocation advantage was still present, even with contextual predictability strictly controlled, but it was more consistent in late rather than early reading measures. This study provides evidence that advanced L2 readers process non-canonical collocations with modified word order in a qualitatively similar manner to L1 readers, and that the impact of variation on the processing of collocations might depend on the type of modification (cf. Vilkaitė & Schmitt, 2019) and/or to what degree variation collocations are different from their canonical forms. In summary, our results do not support the view that L2 readers rely on rules and words while L1 readers match meaning to form (Wray, 2008). Rather, both L1 and L2 readers seem to adopt a more unified approach in collocation processing.

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The impact of bilingual language proficiency on automatic speech recognition accuracy in children

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Recent advances in Automated Speech Recognition (ASR) and Generative Artificial Intelligence have led to a surge of voice-enabled applications, many of which are targeting child users such as educational apps, social robots, smart toys, and intelligent tutoring systems (Dousay et al., 2018). For young learners who are still developing their literacy proficiency and fine motor skills, ASR has the potential to lower interaction barriers and make digital content more accessible to them in service of their learning and development (Xu & Warschauer, 2020; Xu et al., 2021). However, these systems may be biased against speakers of diverse languages and dialects, which may exacerbate educational inequality (Koenecke et al., 2020). The United States is home to a diverse background of English speakers, with the largest group being Latinos growing up speaking Spanish. As educational tools incorporating ASR are implemented at increasingly larger scales, biases inherent in ASR may hinder their learning and thus exacerbate educational inequalities.

The present study examines the effect of language proficiency, assessed through the Bilingual English Spanish Oral Screener, of Spanish-English bilingual children from Southern California (N = 199; ages 3-7 years) on the transcription accuracy of their English speech by four widely used ASR systems (Amazon, Google, IBM, Whisper). Speech samples were sentence and word-level speech collected via a picture-naming task in English. Items consisted of a total of 30 monosyllabic, plosive-initial words that had been selected from the MacArthur Communicative Developmental Inventory (CDI) (Fenson et al., 2006) to ensure that the items being used were in the expressive vocabulary of the age group of our participants. The items consisted of 10 tokens of each of our phonemes of interest—the English voiceless plosives /p/, /t/ and /k/. We computed the phonetic distance (Aline) between ASR transcription and human transcription. We also measured voice onset time production, which is an acoustic feature that likely differs between bilingual and monolingual children (Fabiano-Smith &

Bunta, 2012). 3 additional items were short, expressive sentences taken from the CDI that children were asked to repeat to analyze the Word Error Rates.

Analyses reveal differences in the accuracy of transcription between ASR systems and overall lower accuracies than reported in prior studies of ASR performance of monolingual English-speaking children (Sobti et al., 2024). Additionally, children who were older or more proficient in English had their speech transcribed more accurately by all APIs. We further investigated if the acoustic properties (VOT) of the children's speech affected transcription accuracy but only found an effect of VOT on the ASR of IBM. While previous research has identified racial disparities in ASR among adult speakers, our study is the first rigorous study that directly focuses on ASR performance among Latino bilingual children. Because previous studies of adult speakers have found evidence for a lack of inclusivity in the acoustic models of ASR, bilingual children are at an increased risk of avoiding benefiting from educational advancements that rely on ASR. These results highlight the need for greater language diversity in ASR model development. We aim for insights gained from this research to help inform strategies for future inclusive technology development.

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The relationship between bilingual engagement and cognition across the adult lifespan in regional minority language contexts in the north of the Netherlands

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The sustained and complex life experience of bilingualism has been previously linked to better-preserved cognitive functioning in the face of typical or pathological brain aging (Dash et al., 2022; Gallo et al., 2022). This cross-sectional study contributed to this line of work by investigating the association between a continuous measurement of bilingual engagement and cognitive aging in regional minority language contexts, which have received limited attention in the literature despite being quite common. We used an existing sample drawn from the Lifelines Cohort Study (Buurke et al., 2023; Scholtens et al., 2015; Sijtsma et al., 2022) comprising Frisian-Dutch bilinguals (n = 7,448) and Low Saxon-Dutch bilinguals (n = 10,114). All participants lived in the north of the Netherlands and ages ranged between 20 and 80, enabling an adult lifespan perspective. Cognitive functioning was measured using the Cogstate Brief Battery, which consists of four tasks assessing processing speed, attention, working memory, and recognition memory (Fredrickson et al., 2010). Bilingual engagement was operationalized as language entropy, calculated using the proportion of use of the regional minority language and Dutch across several conversational contexts (Gullifer & Titone, 2020). We modeled the relationship between age and bilingual engagement as a non-linear interaction using generalized additive mixed modeling and controlled for gender, educational attainment, and location-related variability in the analysis. The results demonstrated that performance on all cognitive tasks significantly decreased with age, but we did not identify a robust main effect of bilingual engagement or an interaction between bilingual engagement and age. As such, our results suggest that bilingual engagement does not play a key role in processing speed, attention, working memory, and recognition memory performance across the adult lifespan in Frisian-Dutch and Low Saxon-Dutch bilinguals. Implications for the bilingual engagement measurement and potential investigations into regional minority language bilingualism and cognition will be discussed.

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Whether prediction and adaptation lead to learning among beginning L2 learners

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Some argue that structural priming and adaptation rely on implicit learning mechanisms, involving adjustment to linguistic representations due to prediction error (e.g., Chang et al., 2006). Building on this account, recent studies have shown that when L2 learners are explicitly forced to predict the structure of an upcoming (prime) sentence, they are more likely to experience prediction error and consequently exhibit greater adaptation, compared to simply

copying a prime sentence (Grüter et al., 2021; see also Alzharani, 2023). However, these studies have investigated prediction and priming among intermediate or advanced L2 learners. Considering research that shows only participants with sufficient baseline knowledge of a target structure exhibit significant priming of that structure (Jackson & Ruf, 2017; McDonough & Fulga, 2015), it remains an open question whether this advantage for prediction-supported priming extends to beginning-level learners, who may not yet possess stable L2 linguistic representations.

To address this question, beginning-level American L2 learners of German (*n*=33, ongoing) completed a written production priming experiment, focusing on adverb placement in L2 German. Prime sentences contained either a fronted temporal phrase (TP) or sentence-medial TP, as in (1) and (2). Both word orders are dispreferred in English and beginning-level L2 German learners are less likely to produce either word order, relying instead on S-V-O-TP word order, the preferred word order in their L1 English (Hopp et al., 2018; Jackson & Ruf, 2017).

(1)	Am Wochenende	schreibt	der Journalist	einen Artikel. (TP-fronted prime)
	Over.the weekend	writes	the journalist	an article.
(2)	Der Journalist	schreibt	am Wochenende	einen Artikel. (TP-medial prime)
	The journalist	writes	over.the weekend	an article.

„The journalist writes an article over the weekend."

(3)	Heute	sieht	die Frau	einen Vogel. (Target sentence)
	Today	sees	the woman	a bird.

"Today the woman sees a bird."

Using a within-subjects design, participants received either TP-fronted or TP-medial primes in a "guessing" condition, where they guessed how a virtual partner would describe a picture prior to seeing the actual prime sentence, which they then evaluated as the same or different from their initial guess. This manipulation was intended to explicitly induce prediction and computation of prediction error. They received the other type of prime sentence in a "copying" condition, where they re-typed the prime sentence in a standard repetition priming procedure. Results show substantially greater production of whichever prime sentence type participants received in the "guessing" condition, regardless of the structure of the preceding prime sentence (Fig. 1). This increased production extended to an immediate post-test, compared to a baseline task prior

to the priming phase, but did not extend to a delayed post-test conducted 2-14 days later (Fig. 2). Further, participants exhibited no change from baseline to delayed post-test in a grammaticality judgement task that measured their knowledge of grammatical and ungrammatical sentences with TPs in German. These findings implicate prediction as a possible learning mechanism in L2 acquisition but highlight the limits of such a mechanism for fostering longer-term changes in production or learning that extends to the development of grammatical knowledge among beginning L2 learners.

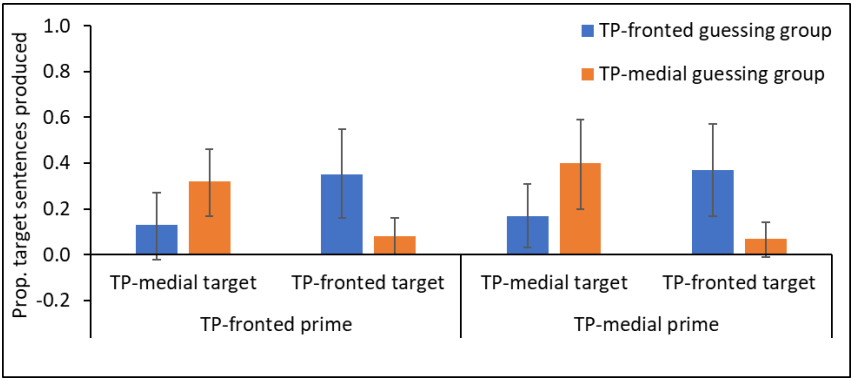

Figure 1. Priming phase: Proportion of target sentences. Error bars represent 95% CIs.

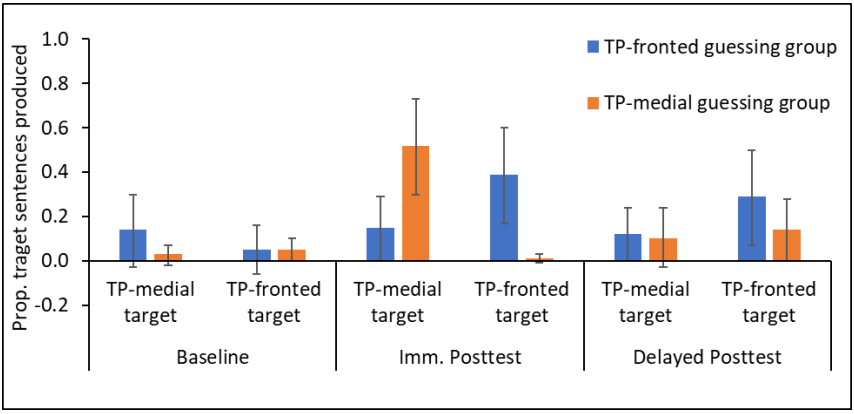

Figure 2. Baseline/Posttest/Delayed Posttest: Proportion of target sentences. Error bars represent 95% CIs.

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Wh-questions in Romanian Child Heritage Speakers – Investigating the Use of Differential Object Marking and Number Agreement in Comprehension and Production

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Research on adult Heritage Speakers/HSs has demonstrated that they are highly heterogeneous in terms of Heritage Language/HL acquisition outcomes and typically diverge from monolinguals in their first language/L1 [1-5], however few studies have examined both real-time morphosyntactic processing and production in child HSs. This study compares the comprehension and production of *which*-questions (examples (1)-(4)) in heritage Romanian and aims to understand whether *a.* morphosyntactic cues like Differential Object Marking/DOM and number agreement guide online interpretation in monolingually-raised and HL children and *b.* whether HL children use these cues in their production. Wh-dependencies in Romanian present morphosyntactic properties that lend themselves well to assessing the use of grammatical cues in (online) comprehension and production: (i) DOM (*pe*) precedes object wh-phrases; (ii) number agreement disambiguates between subject and object interpretations.

Thirty-one child Romanian HSs with L2 German (5;6-10;0) and thirty monolingually-raised Romanian children (6;4-10;4) took part in a visual-world eye-tracking and an elicited production task (32 test items/task). In the **eye-tracking task**, children saw pairs of pictures (Fig.1) while listening to subject/object *which*-questions and had to choose the picture that matched the question. Half the test items contained two singular NPs (number match), for the other half NP1 was plural and NP2 singular (number mismatch). Eye-movements and offline responses were recorded. The **offline results** revealed significantly better performance with subject- compared to

object-questions (p<.001) and an effect of age (p<.01) in both groups, and that monolinguals were significantly more accurate with object *which*-questions (p=.003) than the HSs. The **online results** (Fig.2) showed similar processing patterns in monolinguals and HSs for subject questions, which overall displayed more looks to Target images than object questions. The data also revealed a higher proportion of looks to Target in object-questions with number mismatch than in questions with number match, but only in the monolingual group. Fig 3. illustrates the set-up of the **elicited production task** for subject/object *which*-questions. **The results** indicate that monolingual children produce significantly more target subject and object *which*-questions than HL children. Number mismatch does not seem to enhance *which*-question production in either group, however significant differences appear in the use of other structures, like bare *who*-questions, passive object questions and object questions introduced by '*what tiger'* instead of *'which tiger'*.

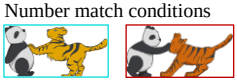
Our findings indicate that DOM in Romanian does not eliminate the subject-object asymmetry found with *which*-questions in children [6]. Moreover, these findings suggest that, on the group level, HS children have more difficulties with the comprehension and production of object *which*-questions relative to monolingually-raised children. Although number mismatch does not seem to impact offline comprehension in either group, the online data suggest that this mismatch guides monolingual children's online processing of object-*which* questions more than DOM-marking on its own. The fact that HS children do not seem to recruit the number information in the online processing of a short syntactic dependency could indicate more protracted processing, e.g., number information is processed after the end of the sentence because of slower processing speed [7].

Examples

1. **Care tigru**$_{SG}$ împinge ursul panda$_{SG}$? (subject *number match*)
   'Which tiger is pushing the panda?'
2. **Pe care tigru**$_{i\ SG}$ îl$_{i}$ împinge ursul panda$_{SG}$? (object *number match*)
   'PE which tiger him is the panda pushing?'
3. **Care tigrii**$_{PL}$ împing ursul panda$_{SG}$? (subject *number mismatch*)
   'Which tigers are pushing the panda?'
4. **Pe care tigrii**$_{i\ PL}$ îi$_{i}$ împinge ursul panda$_{SG}$? (object *number mismatch*)
   'PE which tigers them is the panda pushing?'

Fig 1. Example of image pair used to assess comprehension of *which*-questions

Number match conditions



Number mismatch conditions

Fig 2. Proportion of looks to target image for monolingually-raised and HS children by condition (data analysed with GAMMs)

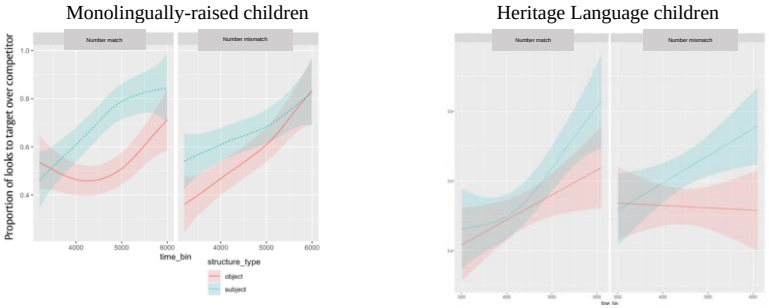
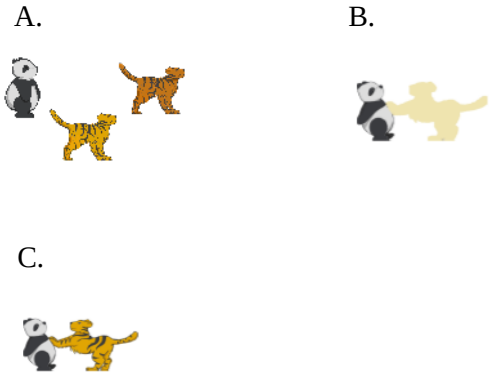


Fig 3. Sample item from the elicitation task targeting a subject *which*-question like (1). Participants were first introduced to the characters (A), then see the action in which either the agent(s) or the patient(s), are covered (B) and have to ask a question starting with a *which*-phrase. After the participant asks the question, the third picture (C) shows the answer.



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POSTERS

(In alphabetical order)

Anaphora resolution in L2 English: The L1 advantage

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In Italian, null pronouns prefer prominent antecedents, usually subjects. The antecedent for an overt pronoun, in contrast, is typically another NP (henceforth object) (Carminati 2002). Interpretation of pronouns in non null subject languages like English is more open to ambiguity: the antecedent can be either subject or object. Nevertheless, native speakers are reported to prefer subject antecedents (Contemori & Dussias 2020; Cunnings et al. 2017); see (1).

However, prosody can impact pronoun interpretation, leading to a shift in preferences. Grimshaw and Rosen (1990) report that unstressed pronouns in English prefer a prominent antecedent, while stressed pronouns prefer non-subject antecedents; compare (1) and (2). Similarly, Gargiulo et al. (2019) find that, in production of Swedish (another non null subject language), speakers signal a shift in antecedent preferences by means of stress on a pronoun or a pause between clauses.

The role of prosody in L2ers' interpretations of pronouns in non null subject languages has not previously been considered. We examine interpretation of English pronouns by L1 Italian speakers and English native speakers (NSs). We hypothesize that NSs and L2ers will show a preference for subject antecedents in the case of unstressed pronouns, with a shift away from this preference in cases involving stressed pronouns or a pause between clauses.

In order to manipulate prosody, it is necessary to use auditory stimuli. With the exception of recent eye-tracking studies (Contemori & Dussias 2020; Cunnings et al. 2017), most previous research on pronoun interpretation has relied on written stimuli (e.g.,

Sorace & Filiaci 2006) (but see White et al. (2024) for the use of auditory stimuli with learners of L2 Italian).

We report on an online experiment, involving 21 L2ers (L1 Italian) and 21 English NSs. Stimuli were 24 biclausal sentences (like (1)/(2)), recorded by a native speaker and presented auditorily. Stimuli manipulated presence/absence of stress and presence/absence of pause between clauses. Stressed pronouns were produced with higher pitch peaks, increased duration and greater intensity relative to unstressed pronouns; pauses averaged 400ms in length. Each sentence was preceded by a written context introducing potential referents (subject/object/ external). After listening to a sentence, participants indicated their preferred referent for the pronoun. See example test item in (3).

The L2ers showed sensitivity to prosody, as predicted (see Figure 1): subjects were preferred for unstressed pronouns while stress led to a statistically credible decrease in subject choices, regardless of pause ([Equation] = −0.99, 95% HDI = [−1.89, −0.14] (no pause); [Equation] = −1.60, 95% HDI = [−2.58, −0.69] (pause)). NS results, however, were unexpected. Although there was an overall preference for subject antecedents over object antecedents ([Equation] =0.56, 95% HDI = [−0.08, 1.18]), neither stress nor pause led to a shift in antecedent choices.

The L2ers' sensitivity to stress may be indirectly attributable to the L1: the two different pronoun types in Italian (null versus overt) differ in their antecedent preferences; this contrast may make L2ers extra-sensitive to differences in the L2 (unstressed versus stressed). The lack of sensitivity shown by the NS group, on the other hand, suggests that prosody alone may be insufficient to lead to changes in their antecedent choices and that richer contextual information may be required as well.

Example sentences (potentially ambiguous; subscripts indicate *preferred* interpretations):

(1) Monica_i phoned Claudia_j when she_i was in the office.
(2) Monica_i phoned Claudia_j when SHE_j was in the office.

(3) **Example test item:**

Written context (on screen)	Carol, Janet and Laurel are working on a project together
Test sentence (audio)	Carol called Laurel when she was in the office
Question (on screen)	Who was in the office?
Choices (on screen)	Carol/Laurel/Janet

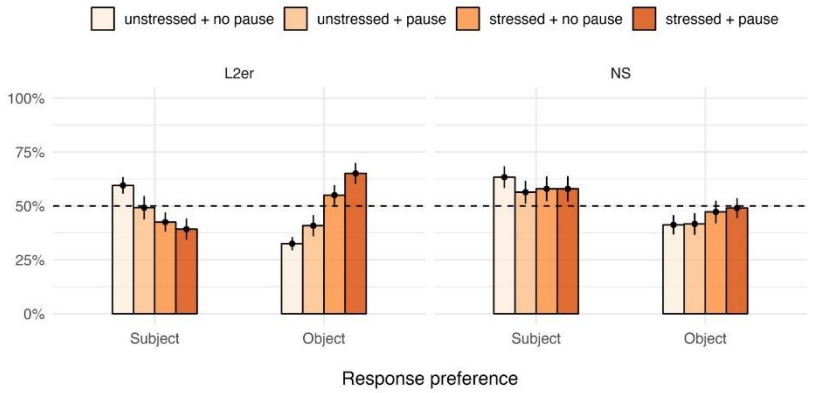

Figure 1. Antecedent choices in English by L2ers and native speakers (in %)
(Note: external referents were rarely chosen, ~5% of all responses.)

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Subtitled audiovisual input that exposes learners to images combined with sound and on-screen text is increasingly being used for foreign language learning. For learners to notice the target language and successfully uptake it, textually enhanced (TE) subtitles have been proposed as a powerful tool, as they cause increased reading time and longer fixations (as measured by eye-tracking, e.g. Puimège et al., 2023). However, the studies that found a positive effect of TE subtitles on learning implemented short video treatments and/or one-off data collections. Conversely, studies that incorporated longitudinal viewing treatments (Pattemore & Muñoz, 2022) found no evidence of TE subtitle benefits, presumably due to the loss of attention towards TE subtitles over time, as was observed in Indrarathne et al. (2018). To date, no studies have examined processing of TE subtitles through eye-tracking over time. This study aims to fill this gap by implementing a prolonged viewing intervention where participants watch the entire season of a TV show with TE subtitles. The participants' eye-movements were recorded during the first and the last episode to measure a potential shift in attention to TE target words.

Twenty-five international students with little to no knowledge of Dutch were asked to watch the first season (13 episodes of 21 minutes each) of the TV series '*The Good Place*' (Schur, 2016) in the original version with L2 English audio and L3 Dutch subtitles. The participants completed vocabulary size tests as a proficiency proxy for English and Dutch. Before the first episode and after the final (13th) episode, participants were asked to perform a vocabulary test containing (1) 16 regularly occurring target words that were enhanced in the subtitles throughout the season; (2) 16 unenhanced target words that appeared equally often in the subtitles as the enhanced ones; and (3) 16 filler words that did not appear in the subtitles at all. The first and last episodes were viewed with an eye-tracker (EyeLink Portable Duo), while the episodes in between were viewed at home over two weeks. Using this set-up, we aimed to determine the extent to which TE increases fixations towards words, as well as the acquisition of these words. Over time, we also aimed

to observe whether enhanced words receive the same amount of attention or whether the words are increasingly being skipped.

Preliminary analyses of the eye-tracking data suggest that TE words receive more attention and are less often skipped than unenhanced words. Skipping rate decreased overall when comparing the first and last viewing session, but the amount of time participants fixated on target words only decreased for the unenhanced target words and not for TE words. The L3 Dutch vocabulary tests additionally revealed significantly larger vocabulary gains for TE words as compared to both filler and unenhanced words. These results extend research into the benefits of subtitled television, and TE subtitles in particular, to vocabulary acquisition of L3 Dutch through L2 English and stress the importance of examining learning and viewing behaviour over a prolonged period of time.

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Bilingualism and Mental health in Middle Childhood - A longitudinal investigation

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Extensive evidence suggests that poor mental health during childhood predicts academic difficulties, later mental health problems, and work instability (Constantini et al., 2023; Bornstein et al., 2010). It remains unclear if bilingual and monolingual children exhibit similar mental health trajectories. Some findings indicate that speaking the parents' language reduces mental health risks for bilingual children (Rumbaut, 1994), but other studies suggest that bilingual children have higher levels of anxiety and depression (Tilley et al., 2021). This project aimed to investigate whether bilingualism influenced the trajectories of children's internalising and externalising problems regardless of language proficiency, family background and school characteristics. Utilizing a large dataset, the Millenium Cohort Study (MCS), this study provides robust insights by adjusting for a numerous covariates, highlighting the specific contributions of bilingualism to mental health.

Methods. The MCS is an on-going longitudinal study conducted across England, Scotland, Wales, and Northern Ireland. The present study involved the subset of 15,435 children (49% girls), including 2,146 (49.4% girls) bilinguals, who were assessed at ages three, five, seven and eleven. Mental health was measured using the Strengths and Difficulties Questionnaire, capturing internalising (emotional and peer problems) and externalising problems (conduct problems and hyperactivity symptoms). Results were analysed by means of latent growth curve models. The study was pre-registered on the Open Science Framework at https://osf.io/ghsw6/.

Results. We first analysed the data without controlling for covariates (sex, non-verbal IQ, parents' mental health, ethnicity, socio-economic status, language proficiency, bilingual peers, and teacher in class). For internalising problems, Unadjusted models indicated there was a significant effect of bilingualism on the intercept (.676, $p < .001$), indicating that bilingual children had higher levels of internalizing problems than monolingual children at age 3. There was also a significant effect of bilingualism on the slope for internalising, indicating that bilingual children showed greater declines in internalising problems compared to monolinguals. But they still scored higher than monolinguals at ages 5 and 11. For externalising problems, there was no effect of bilingualism on the

intercept (.216, p.09), indicating that bilinguals had similar levels of externalizing problems than monolinguals.
Importantly, when models were adjusted to account for the influence of covariates, bilinguals exhibited lower levels of both internalising (-.309, $p < .05$) and externalising problems (-.671, $p < .05$) at all ages. Socioeconomic status moderated the effect on externalising problems, with benefits observed only in low (unstandardized estimate -1.36, $p < .00$) and mid-level
(-.54, $p < .00$) socioeconomic groups, but not in the high socioeconomic group (.11, p .61).

Conclusion. If not accounting for confounding variables, such as ethnicity, socio-economic status or language proficiency, bilingualism is associated with higher mental health issues in terms of internalising problems. But after controlling for covariates, bilingualism might play a protective role in children's mental health. For internalising problems, this is the case for children in all socio-economic groups. For externalising problems bilingualism is beneficial for lower socioeconomic groups. These findings have the potential to inform public policies and benefit bilingual communities.

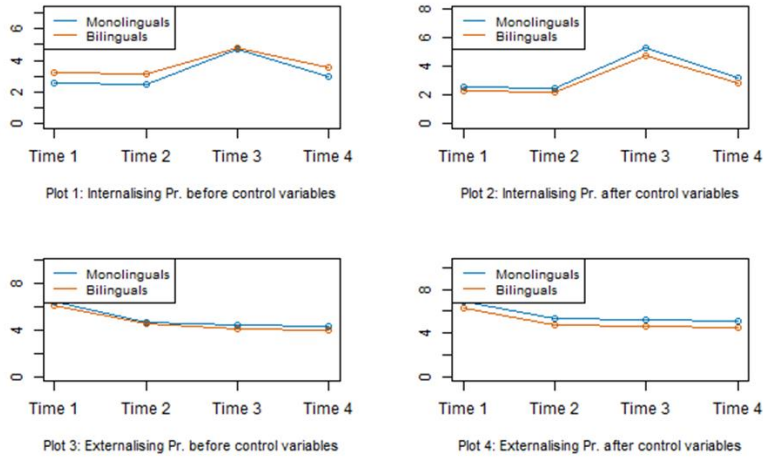

Figure 1
Bilingualism shows benefits for both, internalising and externalising problems, after controlling for covariates.

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Comparing bilingual and monolingual children's interpretation of novel-verb sentences: is their development related to vocabulary or executive function?

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Previous research into children's comprehension of syntactic structures has investigated awareness of transitive and intransitive structures amongst monolingual children (Noble et al., 2011). This research has found that children as young as two associate novel-verb transitive sentences (e.g. *the rabbit is meeking the duck*) with a causal scene and do not associate intransitive sentences (e.g. *the rabbit is meeking*) with a causal action; though they do not necessarily choose a non-causal scene as a match for intransitive sentences either (Arunachalam et al., 2016). These findings suggest that monolingual children acquire verb-general knowledge of syntax

early on, but less attention has been paid to bilingual children. Bilingual children may acquire verb-knowledge more slowly than monolingual children due to decreased input for each language, but research into bilingual children's understanding of the same sentence structures is lacking. Moreover, their bilingual experience may affect their language learning in other ways: because bilingual children need to attend to different languages in different contexts, it is argued they have a "bilingual advantage" in executive function (Bialystok, 2015). One possibility is that this could support children's interpretation of sentences.

This study compared 46 bilingual children, aged 3 to 5 years, who spoke English and any other language, with 64 monolingual, English-speaking 3- to 5-year-olds, in their ability to associate transitive sentences with a causal scene, and intransitive sentences with a non-causal scene. Participants saw pairs of pictures depicting causal events and non-causal events and heard transitive or intransitive descriptions (see Figure 1). They were instructed to point to the image they thought matched the sentence. The study was conducted online using Pavlovia; parents were asked to complete the tasks with their child and record the responses they gave. They completed eight trials per structure, increasing the number of trials (two) typically used in such studies for greater reliability. Children's executive function skills were tested via the Bivalent Shape Task (Mueller & Esposito, 2014) and vocabulary was measured with the British English Crosslinguistic Lexical Tasks, verb comprehension test (Haman et al., 2012).

Logistic mixed effects model found that children pointed more at the causal scene on transitive than intransitive trials in each group, but overall, monolingual children were more likely to do so than bilingual children. In both groups, children matched causal scenes to transitive sentences greater than chance; older children's points to the scene were at chance on intransitive trials but the youngest children pointed above chance to the causal scene on intransitive trials. Executive function performance did not differ between bilingual and monolingual children and was also found not to relate to performance in the sentence task, however those with higher vocabulary more frequently pointed to the causal image for transitive than for intransitive sentences.

Therefore, the number of languages spoken by a child does not affect their ability to comprehend transitive and intransitive sentences: bilingual preschoolers showed the same verb-general knowledge of syntax as monolingual preschoolers. Verb knowledge

was related to this performance but executive function, as measured by the BST, was not.

Figure 1. *Example stimulus (adapted from those used in Noble et al., (2011)) for the transitive sentence trial, "the rabbit is meeking the duck", correct response on the right.*

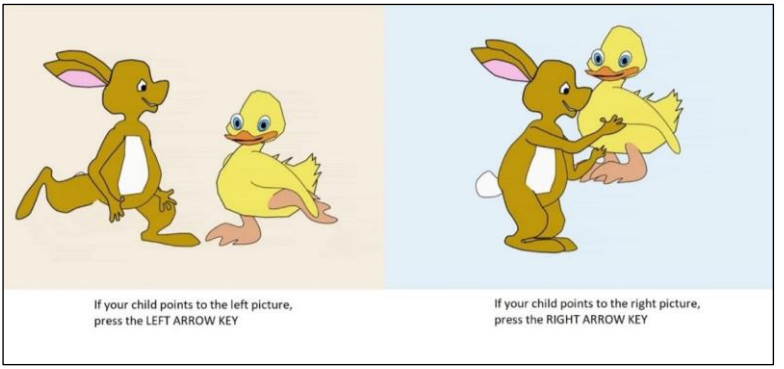

Table 1. *Mean proportion (SD) of points to the causal image for transitive and intransitive sentence trials and mean (SD) CLT and BST scores by language group and age*

2.2 Participants	2.3 Transitive	2.4 Intransitive	2.5 CLT Score	2.6 BST Score
2.7 Bilingual (all)	**2.8 0.72 (0.21)**	**2.9 0.56 (0.21)**	**2.10 26.33 (4.03)**	**2.11 26.15 (4.26)**
2.12 3-year-olds	**2.13 0.69 (0.20)**	**2.14 0.63 (0.21)**	**2.15 24.25 (4.09)**	**2.16 23.81 (5.26)**
2.17 4-year-olds	**2.18 0.72 (0.16)**	**2.19 0.51 (0.21)**	**2.20 26.00 (3.81)**	**2.21 27.85 (1.86)**
2.22 5-year-olds	**2.23 0.76 (0.25)**	**2.24 0.54 (0.22)**	**2.25 28.53 (3.11)**	**2.26 27.06 (3.73)**
2.27 Monolingual (all)	**2.28 0.84 (0.17)**	**2.29 0.56 (0.25)**	**2.30 27.62 (3.76)**	**2.31 26.56 (4.06)**
2.32 3-year-olds	**2.33 0.80 (0.14)**	**2.34 0.64 (0.19)**	**2.35 24.62 (3.53)**	**2.36 23.86 (4.62)**
2.37 4-year-olds	**2.38 0.85 (0.19)**	**2.39 0.52 (0.22)**	**2.40 28.37 (3.10)**	**2.41 27.58 (2.52)**
2.42 5-year-olds	**2.43 0.86 (0.18)**	**2.44 0.52 (0.31)**	**2.45 29.67 (2.70)**	**2.46 28.12 (3.38)**

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Conceptual Restructuring in L2 Acquisition: the Influence of Reading Direction on Actants' Selection in Causal Events

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Recent studies on second language acquisition have used on-line measures to investigate the influence of L1 structures on cognition, but research on conceptual restructuring through L2 acquisition have yielded mixed results (Flecken et al. 2015, Wang & Wei 2021). However, research has mostly focused on Indo-European or East Asian languages, and expression of aspect or motion. We propose to study reference to entities of causal events in French and Syrian Arabic.

Previous research have investigated the "Agent-first" preference, postulating a universal bias to choose Agents as subjects and focus attention on them when describing causal events – even if this can be modulated by syntactic priming and reading direction (Sauppe & Flecken 2021, Esaulova et al. 2020). Moreover, previous works have also shown that preferences in visual event representations are derived from reading direction and that first fixated characters are usually chosen as subjects (Gleitman et al 2007).

Our study aims to investigate the influence of reading direction in the perception and representation of causal events' actants by L1 and L2 French speakers. We wish to study the "Agent first" preference in French L1 and Syrian Arabic L1, and whether it can be modulated by the Agent's position on the screen. It is part of a longitudinal project on conceptual restructuring in Syrian Arabic learners of French, to see if exposure to a different reading direction can affect dynamic scene perception.

We collected data from 29 Syrian Arabic speakers and 22 French L1 speakers using verbalization tasks in French, and then again for the learners group in Syrian Arabic L1 after distracting tasks. Eye-tracking data were collected for both tasks. The same

group of participants did the task in French L2 and Syrian Arabic L1. In each experiment, participants had to watch and narrate short videos, in which one character (Agent) hits the other (Patient) with an object. We counterbalanced the Agent's left-right position across the videos and presented mirror versions of the stimuli to half the participants. Our two areas of interest (AOI) were the two protagonists' faces and shoulders. In the verbalizations, we analyzed the first introduced character in the retelling and the subject of the collision predicate.

Analyses show mixed results. While the analysis of collision verbs' subjects confirms the linguistic Agent-first preference for both groups, independently of the Agent's position, total dwell times reveal that more time is spent looking at Patients. Moreover, discourse analyses suggest no Agent-first preference, as order of introduction "Patient > Agent" is more frequent in French L1. However, this preferential order is modulated by reading direction: Agents on the left are more likely to be mentioned first in French L1. Conversely, native Arabic speakers introduce right-positioned Agents first more often in Syrian Arabic L1 but not French L2, as there is no preferential order of mention. These results suggest some conceptual restructuring that lessens the influence of a right-to-left reading bias.

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Crosslinguistic priming of syntactic and thematic roles: Evidence from Polish-English bilingual children

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A key issue in the study of bilingual language development concerns the nature of syntactic representations in children's two languages – specifically, the extent to which they are shared cross-linguistically. Evidence from structural priming in adults suggests that proficient second language learners can rely on shared syntactic structures [1] and that thematic role ordering can be primed across languages [2, 3]. The evidence for shared syntax in bilingual children is limited to a small number of studies showing significant syntactic priming effects in one [4] or both directions [5]. Other studies have found word order, but not syntactic, priming in the same group of children [6]. Whether bilingual children are sensitive to the priming of thematic roles instead of or alongside the priming of syntactic structure is not yet known.

In this study we investigated the priming of syntactic structure and thematic role order in a group of Polish-English bilingual children. In Polish, like in English, transitive events can be linguistically encoded by active (A) and passive (B) constructions. Unlike in English, Polish has a third construction (OVS) with the same thematic role order as the passive – the object/theme appears before the subject/agent – but with the syntactic structure of an active (C). This allowed us to test whether children could be primed to produce a passive in English by a passive in Polish (syntactic priming), and/or by an OVS prime in Polish (thematic role order priming). Equally, whether a passive prime in English would exclusively prime a passive in Polish (syntactic priming), and/or whether it would also prime an OVS construction (thematic role order priming).

In a bidirectional priming experiment, we tested 48 Polish-English bilinguals (26 girls; *M*age: 9;5, range: 7;11–11;4). Children completed two sessions of a Snap! game with 48 prime-target items (Figure 1) a week apart (order of prime language counterbalanced across children and sessions). In a pre-priming baseline task, children produced no passives in English or Polish; after priming they produced more passives in English than in Polish (Table 1); they produced no OVS constructions in Polish.

After hearing Polish primes, children produced more passives in English than in the baseline phase (Zs>3, ps≤.001) and after hearing passive and OVS primes than after hearing active primes (Z=2.75, p=.006); the effect of passive and OVS primes did

not differ (Z=0.88, p=.39). After hearing English primes, children produced more passives in Polish than in the baseline phase (Zs=1.9, ps≤.05) but there was no difference in the effect of active compared to passive primes (i.e. no effect of priming; Z=0.06, p=.95).

We observed small (~2%) crosslinguistic priming effects, both syntactic priming and thematic role order priming, from Polish to English. However, priming was not bidirectional: English passive primes did not elicit more Polish passive responses than active primes; this may reflect greater competence in the societal language, English. Using another sample of the same population we are testing whether priming for these structures is stronger within-languages than across. We are also examining what crosslinguistic priming effects adult bilinguals show.

Examples of prime sentences:

A. Policjant czyści pistolet. (Active)
   "The policeman [agent] cleans the gun [theme]."
B. Pistolet jest czyszczony przez policjanta. (Passive)
   "The gun [theme] is cleaned by the policeman [agent]."
C. Pistolet czyści policjant. (OVS)
   "The policeman [agent] cleans the gun [theme]."

Figure 1. *Snap game pictures: Polish prime, English target*

Prime condition	English passives	Polish passives
Baseline	0	0
Active	18 (2.2%)	8 (1.0%)
Passive	36 (4.3%)	8 (1.0%)
OVS	30 (3.6%)	–

Table 1. *Total number (%) of Passive target responses by target language and priming condition.*

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Cross-linguistic ungrammatical priming in Canadian French-English bilinguals:
Evidence from a self-paced reading task

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Language contact in bilingual contexts often leads to the emergence of ungrammatical structures and hence to language change[2]. However, so far relatively little is known about the psycholinguistic mechanisms driving this process. Relevant work has suggested that cross-linguistic structural priming might be a potential driver of contact-induced language change[6]. To date, most priming research has examined structures that are grammatical in both languages[7], with only some studies testing structures that are ungrammatical in the target language when copying the syntax of the source language[2,3]. While these mostly focus on production, very little is known about how bilinguals process such structures after encountering grammatical equivalents in the other language[4].

The present study investigates priming in the processing of French ungrammatical ditransitive sentences that copy the syntax of English grammatical ditransitive sentences. While English allows both Prepositional Object – PO (1a) and Double Object – DO structures (1b), French only allows POs with canonical word order (1c) or with scrambled word order (1d). We study this asymmetry in the contact context of Canada where evidence on production and/or comprehension of DOs in French (1e), i.e., upon omission of the dative marker *à* (to), is almost non-existent. Importantly, a recent study has shown that French-English bilinguals in Canada tend to rate them as relatively acceptable, but still significantly lower than POs[5].

On this basis, a cross-linguistic priming task with self-paced reading (SPR) is implemented on Gorilla[1] to examine how Canadian French-English bilinguals are influenced by English ditransitive prime sentences (2a-c) in processing ungrammatical French DO target sentences (2d). English primes are either DOs (2a), i.e., the grammatical equivalent structure to the target, or POs with canonical word order (2b), i.e., the grammatical alternative. Unlike previous studies, ungrammatical English primes are also included, namely scrambled POs (2c) to test whether word order overlap with the French DO target (indirect object before direct object) facilitates processing. English primes are presented as whole sentences and French target are presented region-by-region in a moving window display. Reading times (RTs) in milliseconds will be measured on

the critical region of the target (see Table 2) and compared across the different types of primes. Statistical analysis will be carried out via linear mixed effects models.

If cross-linguistic priming is indeed a psycholinguistic mechanism behind language change, then we expect ungrammatical French DO targets to be read faster when primed by a grammatical English DO sentence than when primed by a grammatical English PO sentence. Moreover, we expect that ungrammatical English PO scrambled primes will facilitate processing on the target more than grammatical English PO canonical primes due to word order overlap.

Data collection is ongoing. Data will be available to present by the time of the conference.

Structure	*English*	*French*
Prepositional Object – PO	(1a) The man gives a book to the woman.	(1c) L'homme donne un livre à la femme. (1d) L'homme donne à la femme un livre.
Double Object – DO	(1b) The man gives the woman a book.	(1e) * L'homme donne la femme un livre.

Table 1. Cross-linguistic differences between English and French in the formation of ditransitives with full noun phrases (NPs) in the argument structure.

Sentence	*Condition*		
Prime (English)	(2a) The man gives the woman a book for her birthday. (DO)	(2b) The man gives a book to the woman for her birthday. (PO canonical)	* (2c) The man gives to the woman a book for her birthday. (PO scrambled)
Target (French)	* (2d) Le garçon / donne / **le fermier un chapeau** / dans la rue.		

	The boy gives the farmer a hat in the street. (DO)

Table 2. Set of conditions for primes and targets. Different regions are separated by / on the target (2d), where the critical region is marked in bold.

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Does Explicit Instruction Lead to Implicit Processing of L2 English Generic NPs?

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Our study provided instruction on English generic NPs to upper-intermediate and advanced L1-Japanese L2-English learners. The

instruction was designed and conducted as an experimentalized online tutor (Zhao & MacWhinney, 2018) that implements random assignments, practice tasks, and immediate feedback. Participants were randomly divided into a treatment group (n = 20) and a control group (n = 17). A pre-test, training sessions and two post-tests were administered that measured knowledge of English generic NPs based on Krifka et al.'s (1995) classification of kind NP-level and sentence-level generic sentences. Only the definite singular and bare plural can be used for NP-level generics such as a natural kind with a kind predicate like *the dodo bird is extinct* / *dodo birds are extinct*. The indefinite singular and bare plural are acceptable for sentence-level generics, e.g., *an orange has lots of vitamin C* / *oranges have lots of vitamin C*. The treatment group was trained for generic usage through an online acceptability judgement task with many practice trials and metalinguistic feedback (in Japanese). The control group received online English preposition training. The study was programmed in PsyToolKit by one of the authors.

A follow-up session was created using a timed grammaticality judgement task (GJT) one year after instruction to investigate whether the treatment group (n = 13 of the original 20 participants) has internalized explicit knowledge. The implicit GJT aims to discover whether the learners process the generic NPs in contexts and correctly select the appropriate article within five seconds since there was no way of measuring this during the instruction period. A new control group (n = 20) was included where they received the same GJT to complete. Statistical analyses revealed that the treatment group were faster than the control group at rejecting ungrammatical sentences NP-level natural kind generics (treatment group mean RTs = 1644ms, control group mean RTs = 2503ms, $p = .05$, $d = 4.43$). For comprehension question accuracy responses, all three subtypes at the NP-level were accepted and rejected more often by the treatment group.

We contend that not all instruction leads to a successful outcome regarding explicit knowledge becoming implicit (see Umeda et al. 2019 as an example). However, our findings are promising for L2 learners and teachers, confirming that learners can pick up even the more difficult and less frequent article cues from computer-based instruction, given the right type and amount of instruction.

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Does L1 attrition affect predictive processing? Evidence from Japanese expats in the U.S.

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Bilinguals' engagement in predictive processing in their weaker language is often reduced and/or delayed when compared to their stronger language and/or to functionally monolingual comparison groups (Kaan & Grüter, 2021). The extent of these differences appears to be modulated by the nature of the predictive cue, with semantic cues supporting prediction more robustly across populations than morphosyntactic ones (Hopp, 2015), and early bilinguals/heritage speakers more likely to pattern with monolinguals than post-childhood L2 learners (Fuchs, 2022). No study to date has

investigated whether long-term immersive exposure to an L2 affects predictive processing in the L1. Sentence processing has shown to be remarkably robust to L1 attrition, yet some studies have reported subtle effects of L2-to-L1 influence (Dussias & Sagarra, 2007; Kasparian & Steinhauer, 2017). Here we investigate whether potential effects of L1 attrition extend to predictive processing.

Methods. 56 L1 Japanese speakers raised in Japan – 26 long-term U.S. residents (>2yrs, median: 10yrs; "Expats") and 30 shorter-term visitors (<2yrs, median: 2.5 mths; "L1ers") – participated in a visual-world eye-tracking study in Japanese testing use of a semantic and a morphosyntactic predictive cue not present in English: prenominal ***classifiers*** (Fig.1; replicating Mitsugi, 2018) and ***case-marking*** (Fig.2; replicating Kamide et al., 2003).

Results. For both cues, we used mixed logit models to calculate the likelihood of a look to the target prior to its being named in the condition where it was predictable (*different-classifier*, *ditransitive*; respectively) vs the condition where it was not (*same-classifier*, *accusative*).

Classifiers: Both groups were more likely to look at the target in the different- vs same-classifier condition (Fig.3). The effect of Condition was significant in both groups (L1: b=.86, p<.001; Expats: b=1.17, p<.001), and did not interact with Group (b=0.3, p=.38). This replicates Mitsugi's (2018) findings from L1 (and L2) Japanese speakers, indicating semantically informative classifiers serve as robust predictive cues for Japanese listeners, with no apparent attenuation by long-term residence abroad.

Case-marking: Both groups were more likely to look at a potential theme (N2 in Fig.4) following dative- vs accusative-marked objects (L1: b=.71, p=.04; Expats: b=.73, p=.04; no interaction with group), indicating anticipation of a ditransitive construction based on a dative-marked object. This replicates Kamide et al.'s (2003) and Mitsugi and MacWhinney's (2016) findings from L1 (but not L2) speakers. Notably, the effect is subtle in both groups, and visually appears attenuated in the Expat compared to the L1 group (Fig.4). Further exploratory analyses showed no modulation by length-of-residence-abroad as a continuous predictor, yet when expats were median-split (>10yrs abroad, N=14, vs 2-9yrs abroad, N=12), the effect remained robust only in the subgroup with less time abroad.

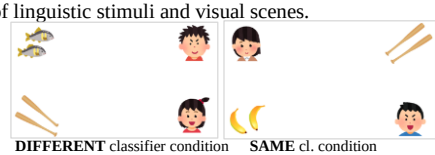
Taken together, these findings demonstrate that use of both semantic and morphosyntactic cues for predictive processing in L1 remains robust even after long-term residence in a non-L1 environment, with only tentative indication of potential attenuation

of predictive use of the morphosyntactic cue among those with the longest time abroad. Further analyses are under way to examine this trend, as well as the roles of proficiency and frequency of language use.

Fig. 1. CLASSIFIER experiment: example of linguistic stimuli and visual scenes.

nichiyoobi-ni otokonoko-ga 2 hon-no batto-o katta
Sunday-TEMP boy-NOM 2-**CL**-GEN bat-ACC bought
"On Sunday, the boy bought two bats."

Note: *hon-* is used for long, string-like objects, and is compatible with 'bat' and 'banana', but not 'fish'.



DIFFERENT classifier condition **SAME** cl. condition

Fig. 2. CASE experiment: example of linguistic stimuli and visual scene.

ACCUSATIVE condition
kooen-de otokonoko-ga hato-o yasashiku sawatta.
park-LOC boy-NOM **pigeon-ACC** gently touched.
"At the park, the boy gently touched the pigeon."

DITRANSITIVE condition
kooen-de otokonoko-ga hato-ni yasashiku pankuzu-o ageta.
park-LOC boy-NOM **pigeon-DAT** gently bread crumb-ACC gave
"At the park, the boy gently gave breadcrumbs to the pigeon."

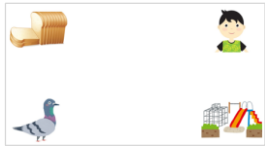


Fig 3. CLASSIFIER experiment: Mean fixation proportions by group (L1: left, Expats: right).

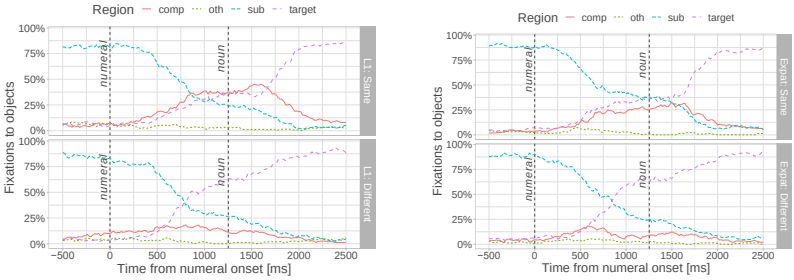
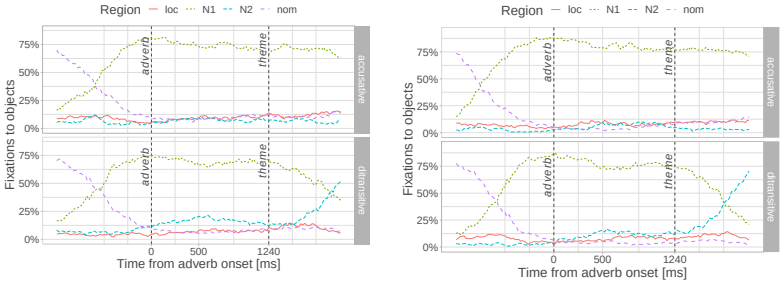


Fig 4. CASE experiment: Mean fixation proportions by group (L1: left, expats: right).



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Does reduced engagement in prediction lead to fewer false memories of predictable words in L2?

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Prediction, i.e., the pre-activation of language, constitutes a hallmark of language comprehension in native (L1) speakers [1, 2]. Second language (L2) learners on the other hand, are less likely to engage in prediction [3, 4]. Prediction may also have effects on memory: When sentences disconfirm predictions (e.g., “Be careful, the top of the stove is very dirty.”), predictable words (e.g., “hot”) elicit false remembering in tests of recognition memory [5], an effect that remains to be substantiated for L2 speakers [6]. However, it is currently unclear if such false memories are a consequence of prediction during sentence processing, or if they emerge during recognition when participants use the semantic features of the predictable words to reinstate the previously encoded sentences. Here we tested these two accounts with L1 and L2 speakers of German: If false remembering is a consequence of prediction, we expect to find a reduced false memory effect in L2 speakers, in light

of their limited engagement in prediction. If, however, false remembering is a consequence of semantic association, L1 and L2 speakers should show similar rates of false remembering.

We used a self-paced sentence reading (SPR, non-cumulative) and subsequent recognition memory test. During SPR, German L1 and L2 speakers (see Table 1) read 32 constraining German sentences (e.g., "At the hospital the nurse patches up quickly the …") which continued either in a predictable (e.g., "… wound in the room next door") or an unpredictable fashion (e.g., "pants in the room next door"). In the recognition memory task, participants saw German nouns appear on a screen and were asked to indicate whether the words were "old" (previously seen) or "new". There were four conditions: Previously seen predictable and unpredictable nouns (e.g., "wound", "pants"), genuinely new nouns (e.g., "paper") and lures (i.e., previously predictable but not encountered nouns; e.g., "wound" after reading "pants"). Participants additionally indicated their confidence about their recognition judgments; here, we report data from the high-confidence judgments [5, 7].

During SPR, unpredictable nouns elicited integration difficulty in both L1 and L2 speakers, with no differences in the size of the predictability effect between the two groups (Figure 1A). Results for the recognition memory task (Figure 1B) showed a false memory effect in both groups (i.e., more false alarms to lures vs new nouns), and, in line with the "prediction" view of false remembering, this effect was reduced in L2 compared to L1 speakers. However, more in line with the "semantic association" view, absolute rates of false remembering for lures did not differ between L1 and L2 speakers.

These findings could indicate that two distinct processes elicit false remembering: Predictions that become generated during initial sentence reading, and backward semantic associations that participants use in the recognition memory test to "jog" their memory of the previously read sentences. Even though L2 readers likely engage less in predictive processing during sentence encoding than L1 readers, they likely employ the same associative search strategies to reinstate their memory in the recognition task.

Table 1.
Demographic variables and language background for groups of German L2 and L1 speakers.

	L2		L1	
N	47		43	
	Mean	*Range*	*Mean*	*Range*
Age (in years)	25	18-38	27	20-37
Gender	25m, 22f		24m, 19f	
LexTale Score	68	49-89	88	47-98
AoA German (in years)	17	5-34	0.6	0-4
Immersion duration in German (in years)	4	0-21	-	
Self-rated overall proficiency (scale: 1-10)	7.60	4-10	-	

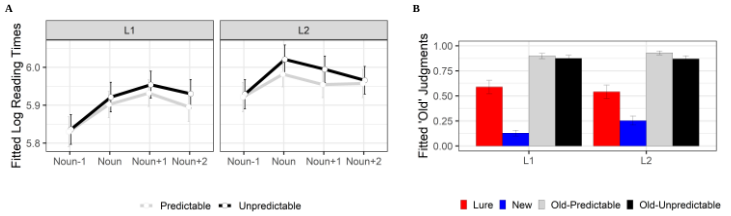

Figure 1A: Partial effects plot showing LMER-model estimated effects of condition (i.e., predictable and unpredictable, sum-coded) and group (i.e., L1 and L2, sum coded) on log-transformed reading times of words in the critical region. We ran separate models per single word; every model specified control predictors for trial number, word length, word frequency, RTs of the preceding word, and word position in the sentence. **B:** Partial effects plot showing GLMER-model estimated effects of condition (three contrasts: old vs new, lure vs new and old-unpredictable vs old-predictable, sum-coded) and group (sum-coded) on trial-by-trial "old" judgments in the recognition task. Lure: Words previously predicted but not seen. New: Genuinely new words, not previously seen during SPR. Old-Predictable/Old-Unpredictable: Old words previously seen during SPR. For old words, the bars show hits; for new and lure words, the bars show false alarms.

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Does structural priming differ between heritage speakers and late bilinguals? Evidence from reaction times for the Mandarin and English transitive alternation

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Structural priming studies show that syntactic repetition aids syntactic processing. In bilinguals, this can occur both within and between languages (Mahowald et al., 2016). The presence and magnitude of priming is impacted by the language of the prime/target (Loebell & Bock, 2003; Schoonbaert et al., 2007) as well as L2 proficiency: L2–L2 and between-language priming might be limited to higher-proficiency bilinguals (Hartsuiker & Bernolet, 2017). However, most of these studies assume bilinguals are dominant in the L1, so it is unclear whether L1 proficiency impacts priming similarly to L2 proficiency. Our priming study compares two groups of bilinguals who share an L1 and L2, but with opposite proficiency

patterns: namely, heritage speakers (HSs), who are L2-dominant, and late bilinguals (LBs), who are L1-dominant.

We recruited 37 L1-Mandarin, L2-English adult HSs and 53 L1-Mandarin, L2-English adult LBs for a timed aural grammaticality judgment task. They judged 72 targets and 72 fillers, in a mixture of Mandarin and English. The targets were three transitive alternations: active (**1a–b**), passive with preverbal agent (**2a–b**), and passive with postverbal agent (**3a–b**). Each passive was ungrammatical in one language. Each sentence was a potential prime for the next sentence. Prime–target pairs included L1–L1, L2–L2, L1–L2, and L2–L1. For this study, reaction times (RTs) were analyzed for priming. L1 and L2 proficiency, and dominance, were measured with sentence repetition tasks. Research questions were:

1. *How does group membership moderate structural priming?* Each group was expected to show stronger priming for their more proficient language, i.e., English for the HSs and Mandarin for the LBs.
2. *Does structural priming occur both within and between languages?* Every speaker was expected to demonstrate priming within at least one language. Between-language priming might only occur for speakers proficient in both languages.

The data were split into Mandarin-primed targets and English-primed targets and analyzed separately with linear mixed-effects models. For both models, we found a significant interaction between prime (repetition of the previous structure) and language match with the previous stimulus; pairwise comparisons indicated that for both models, the primed, language-matched condition had faster RTs than the primed, non-matched condition as well as the non-primed conditions (**Figure 1**). That is, only L1–L1 and L2–L2 priming occurred; L1–L2 and L2–L1 priming did not occur. There was no three-way interaction with group for either model, indicating the HSs and LBs did not differ. We also found a significant interaction of language match and group for both the Mandarin-primed and English-primed targets: each group slowed down when switching from their respective dominant to non-dominant language (i.e., L2–L1 for the HSs and L1–L2 for the LBs).

The results indicate the following: First, structural priming might not always differ between HSs and LBs, since both groups demonstrated L1–L1 and L2–L2 priming. Second, structural priming

occurs within languages, but not always between languages. The lack of between-language priming in our study may be explained by the relatively small proportion of bilinguals with high proficiency in both languages, or by the cost of language switching, resulting in slowdown.

Examples

1. a) The hero saved that city. *Active*
   b) Nainai chi le na-kuai dangao.
   grandma ate PFV that-CL cake
   'The grandma ate that cake.'

2. a) *That city was by the hero saved. *Passive, preverbal agent*
   b) Na-kuai dangao bei nainai chi le.
   that-CL cake BEI grandma eat PFV
   'That cake was eaten by the grandma.'

3. a) That city was saved by the hero. *Passive, postverbal agent*
   b) *Na-kuai dangao chi le bei nainai.
   that-CL cake eat PFV BEI grandma
   'That cake was eaten by the grandma.'

Figures

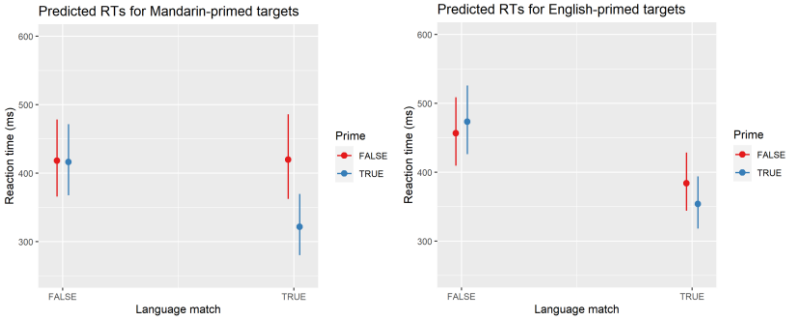

Figure 1: Mean predicted reaction times for Mandarin-primed targets (left) and English-primed targets (right), broken down by whether the previous stimulus was the same structure and same language as the target.

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Do multilingual children outperform monolingual children in a visual perspective taking task?
A replication of Fan et al. (2015)

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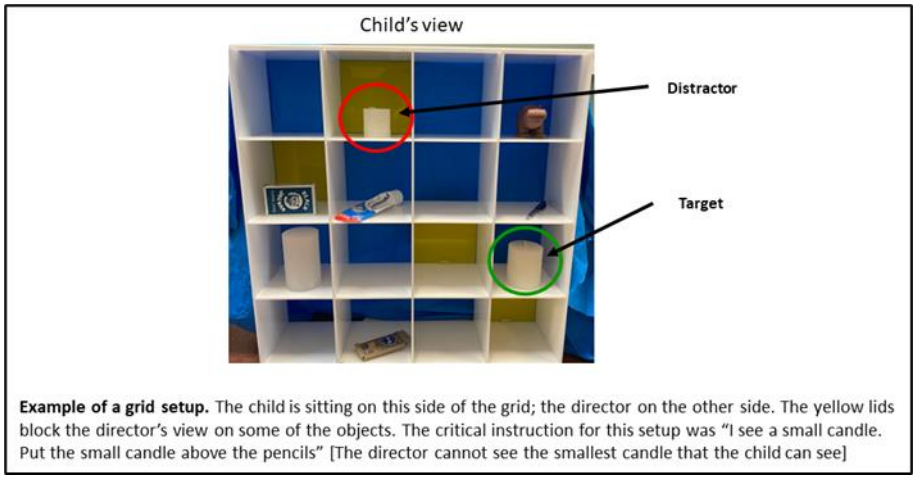
Recent studies have shown that exposure to multiple languages may enhance children's perspective taking skills (Fan et al, 2015; Liberman et al., 2017; Yow & Markman, 2015). Specifically, an oft-cited study by Fan et al. (2015) found that multilingual 4- to 6-year-olds outperformed monolingual peers in a task that required them to consider the speaker's visual perspective. In this task, a 'director' instructed children to move target objects in a grid in which distractor objects were present that were occluded from the director's view (see Figure 1). The results showed that multilingual children (both passive and active multilinguals (N = 24 per group)) outperformed monolingual peers (N = 24): they moved the target objects more often and showed fewer first looks towards the distractor objects. The authors concluded that multilingual children more often take another person's limited visual perspective into account.

In our study, we replicated Fan et al.'s study with a larger sample of monolingual and multilingual children in the Netherlands. The setup was the same as in the original study, except that children's looking behaviors were not only assessed through video cameras, but also through eye tracking glasses. The Dutch Peabody Picture Vocabulary Test was used to measure receptive vocabulary. Information about children's language exposure and use was obtained through a caregiver questionnaire. We addressed the same main question as in Fan et al. (2015): Do multilingual children outperform monolingual children on the perspective taking task?

At the moment of writing this abstract, we have collected data from 39 monolinguals (target N = 40, M_{age} = 5;2) and 28 multilinguals (target N = 80, M_{age} = 5;6). The monolingual children were only exposed to Dutch; the multilingual children to Dutch and one to three other languages. Preliminary results show that the multilinguals moved the target in 68% of the trials and the monolinguals in 61% of the trials. These accuracy rates are rather similar across the two groups, unlike in Fan et al. who obtained rates of 77% and 50%, respectively. Also, in our study, the number of children moving the target on all four critical trials was comparable across the multilinguals (29%) and monolinguals (28%), which again contrasts with the group difference in Fan et al. (60% vs. 21%).

Based on these preliminary results, we expect to not replicate Fan et al.'s original findings. However, we have not yet analyzed children's looking behaviors. Moreover, we intend to conduct additional analyses to explore whether perspective taking abilities are enhanced in specific types of multilinguals only, for example, children with relatively low vocabulary knowledge or with caregivers who do not understand some of the languages the child speaks. In so doing, we hope to shed light on the conditions under which any potential effects of multilingualism on perspective taking may or may not occur.



Example of a grid setup. The child is sitting on this side of the grid; the director on the other side. The yellow lids block the director's view on some of the objects. The critical instruction for this setup was "I see a small candle. Put the small candle above the pencils" [The director cannot see the smallest candle that the child can see]

Figure 1. *Description and picture of a sample trial*

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Educating "the next generation" of SLA researchers: Results of the UPSKILLS project

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For over ten years, the field of second language acquisition (SLA) has been characterised by growing methodological awareness, or a "methodological turn" (Byrnes, 2013). A heavy focus has been placed on research quality, especially in terms of study design, quantitative analysis and results reporting, and parallel attention has been devoted to researcher training, through workshops, summer schools and publications (e.g. Plonsky, 2015, 2020).

Following these trends, this paper presents the results of the Erasmus+ project *UPgrading the SKIlls of Linguistics and Language Students* (UPSKILLS), a three-year strategic partnership for higher education between institutions from Austria, Croatia, Italy, Malta, the Netherlands, Serbia and Switzerland, which was completed in August 2023. The aim of the project was to identify and tackle the gaps in the skills of linguistics and language students in order to make their university education more compatible with the requirements of the contemporary job market, as well as the trends in academic research. The project grew out of combined insights of academia and industry about the changes that big data and artificial intelligence are causing in the study of language(s).

Findings will be presented of a needs analysis, which comprised a survey of existing language and linguistics curricula across European universities, a corpus-driven study of job advertisements as well as questionnaires for and interviews with representatives of the language industry. These findings point to the need for developing, through language-related curricula, not only the disciplinary, intercultural and transversal knowledge and skills, but also the research-oriented, data-oriented, technical and organisational ones, such as those related to analytical thinking and problem solving, statistical analysis, text processing, corpus linguistics, programming, machine learning and project management. These knowledge and skills are included in the profile of *language data and project specialist* developed in the project (Miličević Petrović et al., 2021).

A set of open access teaching/learning materials will also be presented, which have been developed for areas identified as in need of improvement, and which are intended as supporting resources to be embedded in existing programmes of study, or as new curriculum components, at the BA and MA level. Special attention will be given to materials intended to develop student skills for designing experimental tasks grounded in linguistic theory (Kraš et al., 2023) and analysing the data statistically (Miličević Petrović et al., 2023) in the area of SLA research, which might be of particular interest to university teachers of SLA and related courses, but also practicing SLA researchers. The results of the piloting of some of these materials in the context of the UPSKILLS summer school held in July 2023 will also be presented.

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Effects of culture relatedness on bilingual emotional responses to words: Insights from word norms and event-related potentials (ERPs)

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This study introduces culture relatedness of words as a novel variable and explores its impact on emotional responses of English-Mandarin bilinguals living in the UK, where their second language (L2) is dominant. First, we conducted a norming study to identify emotive words related to participants' native (e.g., bamboo) and residential (e.g., scones) cultures. We then used event-related potentials (ERPs) to examine whether culture relatedness affects emotional responses to words presented in L1 and L2. We were particularly interested in investigating whether the well-established emotional distance from L2 may be due to cultural distance, and whether concepts related to one's native culture in L2 may enhance affective responses. Initial evidence from ongoing data analyses seems to suggest an interaction of culture relatedness and emotional valance on affective responses. This research offers new insights into the interplay of language, culture, and emotion in bilingual contexts, examining how cultural salience modulates emotional responses.

Explicitness of referring expressions in heritage speakers' majority English

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Previous research suggests that bilinguals are more explicit than monolinguals in the domain of reference. For example, bilingual children lexicalized more concepts in their narratives than monolinguals [1]. Late L2 speakers used full NPs instead of pronouns, compared to their L1 [2,3] and to L1 speakers of their L2 [3,4]. Concerning majority language of heritage speakers (HSs), the results have been mixed: on the one hand, adult Turkish HSs used more explicit referring expressions in their majority Dutch compared to Dutch monolingual speakers (MSs) [5]. On the other hand, adult Spanish HSs tended to produce less explicit referring expressions in their majority English compared to English MSs [6,7]. Given these conflicting findings, it is still unclear whether higher explicitness is characteristic of HSs' majority language.

Filling this gap, we compared referring expressions in elicited narratives produced by adolescent and adult German, Greek, Russian, and Turkish HSs and English MSs, all being US English dominant. We hypothesized that HSs would use more explicit referring expressions than English MSs, either due to their communication with L2 English speakers, who might benefit from extra detail [8] or due to more frequent input from L2 English speakers, who themselves might be more explicit [5].

Each speaker produced four narratives in two formalities and two modes (formal spoken and written, informal spoken and written). We annotated the narratives for 19 referents (e.g., WOMAN1, WOMAN2) and three types of referring expressions in order of explicitness - noun-headed NPs (*the woman had some groceries*), pronouns (*she got scared*) or null anaphora (*and Ø dropped her groceries*). Following previous research [5], we conducted two comparisons: (1) noun-headed NPs vs. pronouns (with 64 English MSs, 34 German, 65 Greek, 65 Russian, and 59 Turkish HSs), and (2) pronouns vs. null anaphora (with 40 English MSs, 42 Turkish and 40 Russian HSs). We expected HSs to use more noun-headed NPs than MSs in the first comparison and more pronouns in the second.

Analyses with linear mixed effects models did not indicate higher explicitness of HSs in the pronoun vs. null anaphor comparison. However, a significant difference was detected in the noun-headed NP vs. pronoun comparison (Figure 1) – Turkish HSs had significantly more noun-headed NPs than English MSs in informal written narratives (both in maintenance and reintroduction)

and in informal spoken narratives (in reintroduction). In addition, Russian HSs had more noun-headed NPs in the informal written narratives (in reintroduction).

In other words, HSs were not more explicit than English MSs across all contexts. However, Turkish and Russian HSs did show signs of higher explicitness in informal narratives, although not to the same extent in maintenance and reintroduction. This finding aligns well with the reasoning that HSs' higher explicitness can stem from their frequent communication with L2 speakers of the majority language – their family and other community members. These L2 speakers are likely to speak to HSs in informal contexts, and thus HSs exhibited the results of this communication in our informal elicitation setting. Not all HS groups used significantly more noun-headed NPs in the informal setting; however, all of them trended towards higher explicitness – the predicted probabilities of a noun-headed NP in the informal narratives are almost always higher for HSs than for English MSs (except for German HSs in informal spoken maintenance, Figure 1). Overall, our findings confirm HSs' higher explicitness in some majority language areas compared to MSs, although the effect appears limited to certain phenomena and speaker groups.

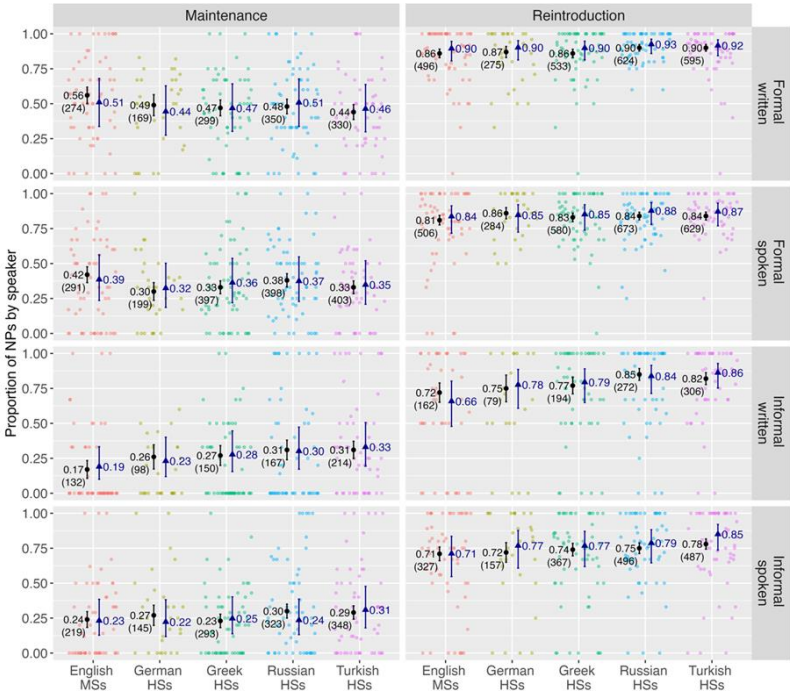

Figure 1. Predicted Probabilities, Raw Group Proportions and Raw By-Speaker Proportions of Noun-headed NPs (Error bars represent 95% CIs; blue triangles show predicted probabilities, black circles raw group proportions, colored circles raw by-speaker proportions; observation numbers are in parentheses).

Referent tracking type	Previous clause	Current clause	Explanation
Maintenance	Subject *<u>The dog</u> ran.* Non-subject *The driver saw <u>the dog</u>.*	Any syntactic role *The driver saw <u>it</u>.* Non-subject *He almost hit <u>it</u>.*	Referent *dog* in current clause is maintained
Reintroduction	Non-subject *The driver saw <u>the dog</u>.* Absent *The driver turned right.*	Subject *<u>The dog</u> ran.* Any syntactic role *He saw <u>the dog</u>.*	Referent *dog* in current clause is reintroduced

Table 1. Definitions and Examples of Maintenance and Reintroduction for Given Referents (based on 9, 10, 11).

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Exploring the link between multilingual experiences, genetic risk factors for Alzheimer's Disease and cognitive performance in middle-aged adults

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Aging is associated with a decline in cognitive functioning (Ferguson et al., 2021). Different lifestyle factors have been found to improve the brain's resilience against (age-related) cognitive decline (i.e., cognitive reserve, CR). Strikingly, multilingualism has been identified as one of these factors, and has been associated with CR and an attenuation of Alzheimer's Disease (AD) symptoms by approximately 4-5 years (e.g., Anderson et al., 2020).

Recently, research has been mindful of individual differences in multilingual experiences. Such multilingual experiences have, for example, been related to individual differences in neurocognition (e.g. DeLuca et al., 2019, 2020). Research has so far focused predominantly on the younger and older lifespan, but to fully understand how CR builds up as a function of multilingual life experiences, we need a broader lifespan perspective and thus need to include middle-aged individuals, which are crucially underrepresented in the present literature. In addition to modifiable lifestyle factors, such as multilingualism, genetic predisposition may make someone more or less susceptible to cognitive impairment in later life, for instance in AD manifestation (Alzheimer's Association, 2023). To understand the mechanism underlying the contributions of multilingual experiences to CR and to understand its implication for AD symptom attenuation, we also need to explore the role of genetic risk factors for AD in the age group that just precedes later life.

The present project examines how individual multilingual experiences of middle-aged adults (45 to 65 years-old) affect neurocognitive outcomes, including behavioral performance on cognitive tasks and functional brain activity (measured via functional Near-Infrared Spectroscopy (fNIRS) and electroencephalography (EEG)). Crucially, we explore how familial risk for AD modulates the effect of multilingual experiences on neurocognition. In this presentation, we outline the method that forms the basis of the project and present preliminary behavioral results. Herein, we focus

on performance on a Stroop Arrows task (adapted from Giezen et al., 2015) and Colour-Shape Switching task (adapted from Prior & MacWhinney, 2009). Task performance of our cohort will also be regressed against their individual multilingual experiences, captured using the Language History Questionnaire (Li et al., 2019).

In line with previous research, we predict that greater degrees of multilingual engagement (i.e., more frequent language use in different contexts, less language dominance) will induce smaller Stroop, facilitation, and inhibition effects, and a smaller switching cost (Freeman et al., 2022; Prior & MacWhinney, 2009). To the best of our knowledge, this is one of the first multilingualism studies that actively investigates the middle-age lifespan and includes genetic risk factors for AD. In this way, we are not only able to uniquely relate individual multilingual experiences to cognitive performance in middle adulthood, but we can also explore how familial genetic risk factors modulate this association.

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Gray matter volume correlates with language proficiency in the right angular gyrus of early cultural bilinguals

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Introduction. Two decades ago, Mechelli et al., investigated the relationship between neuroanatomy and second-language proficiency, thereby offering insights into the anatomical *consequences* associated with learning a second language (2004). They found a positive correlation between gray matter and second-language proficiency in adult bilinguals in left inferior parietal lobule, a region associated with language. Participants were mostly late bilinguals (having learned their second language in later childhood, adolescence, or adulthood), raising the question whether such a relationship exists in cultural early bilinguals who learn their languages obligatorily as a result of their heritage/environment at a young age. This sets them apart from late second-language learners, whose dual language acquisition may be (innately) driven by a propensity for language learning. Generally, cultural early bilinguals attain high levels of proficiency in both languages yet individually, there is variability in proficiency for both their "weaker" and "stronger" languages.

Methods.Here we measured by both gray matter volume (GMV) and cortical thickness (CT) in early cultural bilinguals and correlated each with language proficiency in the "weaker" and the "stronger" language in forty-six early Spanish-English bilingual children and adults (average age 16.7 ± 6.65 years; range = 7.7-28.6 years; 31 females). All participants were exposed to both languages prior to or at six years of age, with about one-third being exposed to both languages since birth. All reported using both languages daily. Language proficiency was gauged using analogous standardized test of oral reading ability in Spanish (Identificación de Letras, Muñoz-Sandoval et al., 2005) and in English (Letter Word Identification, Woodcock et al., 2001). Reading ability was in the average or above average range for all participants in both languages. The language with the lower score was assigned as "weaker" and the higher score as "stronger". Structural magnetic resonance images were acquired on a 3T system (voxel size $1mm^3$). For GMV analysis, we used standard voxel-based morphometry preprocessing in SPM12 (Ashburner et al., 2000), and entered total GMV and age as covariates of no interest; and for CT analysis, we used CAT12

(Dahnke et al., 2013). Statistical thresholds were voxel-wise height threshold $p < 0.005$ uncorrected, cluster-level extent threshold $p < 0.05$ FDR.

Results. Correlations for GMV revealed more GMV in the right inferior parietal lobule (angular gyrus; BA 39) the more proficient a bilingual was in their weaker language, but there were no relationships with the stronger language. There were no relationships between CT and either the weaker or stronger language.

Conclusion. In cultural early Spanish-English bilinguals, the only relationship between neuroanatomy and language proficiency was in the right inferior parietal (IPL) lobule where more GMV correlated with greater proficiency in the "weaker" language. This suggests that bilinguals who acquired their languages in early childhood as part of their culture (rather than due to a propensity for learning languages), higher proficiency in the weaker language is not related to language regions (e.g. left IPL), but to the right IPL, which is associated with attentional control. In other words, when dual-language learning is mandatory, its success may depend on domain-general processes.

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Higher level of biliteracy is associated with better executive function in Greek-English bilingual children

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Background. Recent research demonstrates that higher engagement in bilingual language environments boosts some features of cognition, including executive function, among bilinguals. Most studies however have explored cognitive effects of bilingualism by examining mainly the role of language use and proficiency without taking into account bilinguals' literacy experience in both languages. Biliteracy is a crucial aspect of bilingual development that requires acquiring but segregating distinct orthographic, phonological and grammatical rules. Previous research suggests a strong relationship between level of dual language proficiency/use and cognition (e.g., Smith & Briggs Baffoe-Djan, 2019). Extending this premise to the context of biliteracy, the current study examines whether bilingual children with a higher level of biliteracy have better executive function (EF) abilities than bilinguals with lower level of biliteracy. In contrast to previous studies (e.g., Andreou, 2015), we examine biliteracy effects using a range of EF tasks and measure children's reading abilities directly.

Method. Twenty-eight English-Greek bilingual children, exposed to both languages within the first 5 years of life (age M±SD = 10.1±1.2 years 19 females) were tested on Greek and English measures of literacy and online executive function measures. The literacy measures comprised decoding, reading comprehension and reading rate (DADA reading test for Greek and YARC reading test for English). Expressive English and Greek vocabulary (Crichton vocabulary scale) were also assessed. Based on those measures, we constructed three biliteracy indices (mean, cumulative percentage, and difference) for the three literacy measures (decoding, reading rate and reading comprehension) of each language, resulting in nine indices. The executive function measures include the Hearts & Flowers (H&F), Flanker, Corsi span and the CELF-4 Digit Span. Children additionally completed the Raven's Progressive Matrices (nonverbal reasoning test). Bayesian model comparisons were performed with uninformative priors to test the associations between the biliteracy indices and cognitive performance.

Results. Higher biliteracy decoding mean was associated with faster performance in the incongruent condition of the H&F (BF=1.83). Better biliteracy reading comprehension mean was associated with higher Corsi forward span (BF=1.55). The model

with the strongest evidential strength comprised the biliteracy decoding in predicting reaction time (Flowers – Hearts) in the H&F task (BF=16.4, strong). This model remained the most supported when tested against others which included age, gender, reasoning ability, Greek and English vocabulary.

Conclusions. Our findings suggest that, in school-aged bilingual children, better biliteracy decoding ability is associated with decreased slowing related to increased inhibitory and switching task demands, indicating enhanced efficiency. Secondly, better biliteracy reading comprehension mean is associated with higher nonverbal memory. These results support earlier research studies with monolingual young readers in showing an association between executive function and bilingual reading abilities (e.g., Spencer & Cutting, 2020; Ober, Brooks, Homer & Rindskopf, 2020). Overall, these preliminary findings indicate a mutually beneficial effect of biliteracy and EF development in childhood.

How does language proficiency mediate prediction skills of early bilingual children and adults?

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Prediction skills of monolingual children and adult second language (L2) learners have been found to be modulated by their language proficiency as measured by, for instance, their vocabulary knowledge (e.g., Mani & Huettig, 2012) and their knowledge of the target

structure (e.g., Brouwer et al., 2017; Hopp, 2013). However, less is known about prediction skills of early bilinguals who acquired their two languages simultaneously, which might provide new insight into the role of language proficiency in predictive processing that neither monolinguals nor adult L2 speakers can (e.g., Karaca et al., 2021). Therefore, this study investigated to what extent prediction skills of early bilingual speakers as well as monolingual speakers are modulated by their language proficiency.

Thirty Turkish-Dutch bilingual children (M_{age}=90 months, *SD*=12), 25 Turkish-Dutch bilingual adults (M_{age}=26.72 years, *SD*=5.22), 49 monolingual Turkish-speaking children (M_{age}=83 months, *SD*=6), and 24 monolingual Turkish-speaking adults (M_{age}=27.04 years, *SD*=6.14) participated in this study. To measure their prediction skills, we used a visual world eye-tracking experiment in which participants listened to simple Turkish sentences in which case-marking on the first noun (NP1) (accusative, nominative) and the verb position (sentence-medial, sentence-final) were manipulated (Table 1). The sentences were coupled with a visual display of three images: NP1, an agent and a patient (e.g., rabbit, fox, carrot) (e.g., Özge et al., 2019). Based on their eye fixations in the predictive time window, participants' prediction skills were calculated. To measure their proficiency skills in Turkish, we asked participants to narrate a wordless picture book (Frog, where are you?, Mayer, 1969). Based on their narrations, three proficiency measures were calculated: overall accuracy, clausal complexity, and lexical diversity. Furthermore, we administered a sentence repetition task and a vocabulary task in Turkish only with monolingual and bilingual children to measure their proficiency more comprehensively.

The results of multiple linear regression models showed that overall accuracy, clausal complexity, and lexical diversity did not significantly modulate prediction skills in any groups. Bilingual children's performance in the sentence repetition task, however, significantly and positively modulated their prediction skills in the verb-final sentences (β=0.171, *SE*=0.048, *z*=3.557, *p*=0.002, adjusted *p*= 0.008) while their performance in the vocabulary task did not.

These results revealed that certain aspects of language proficiency may not play a role in monolingual and bilingual speakers' prediction skills as measured by simple sentence structures, while some others might still do (e.g., performance in the sentence repetition task). These findings highlight the complex

relationship between language proficiency and prediction in a bilingual mind.

#	Case Marking	Verb Position	Word Order	Sentence
1	Accusative	Final	OSV	Hızlı tavşan**ı** birazdan şuradaki tilki**Ø** **yiyecek** Speedy rabbit**ACC** soon there fox**NOM** **eat** *"The fox over there will soon eat the speedy rabbit"*
2	Nominative	Final	SOV	Hızlı**Ø** tavşan birazdan şuradaki havuc**u** **yiyecek** Speedy rabbit**NOM** soon there carrot**ACC** **eat** *"Speedy rabbit will soon eat the carrot over there"*
3	Accusative	Medial	OVS	Hızlı tavşan**ı** birazdan **yiyecek** şuradaki tilki**Ø** Speedy rabbit**ACC** soon **eat** there fox**NOM** *"The fox over there will soon eat the speedy rabbit"*
4	Nominative	Medial	SVO	Hızlı**Ø** tavşan birazdan **yiyecek** şuradaki havuc**u** Speedy rabbit**NOM** soon **eat** there carrot**ACC** *"Speedy rabbit will soon eat the carrot over there"*

Table 1. Overview of the manipulations of the experimental sentences

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How L2 Accented Speech Influences Grammatical and Natural Gender Prediction

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Research on predictive processing shows that language users modulate their predictions by top-down assumptions and bottom-up evidence about their utility [1]. In a bilingual context, we examine how native listeners modulate their gender predictions according to the perceived reliability of an L2 speaker. L1 Dutch listeners exhibit no ERP response to gender agreement errors when made by an L2

speaker [2], presumably because L1 speakers have top-down knowledge that L2 speakers struggle with grammatical gender. Similarly, when hearing native input with grammatical gender errors, L1 speakers stop predicting nouns based on gender encoded on the article [3]. However, no studies have investigated whether L1 speakers attenuate predictions with L2 speech that does *not* contain grammatical gender errors or when L2 speakers use natural gender (2), for which L2ers are less likely to make errors [4]. Using the visual-world paradigm, we investigate whether L1 German speakers show differences in predicting upcoming nouns based on natural or grammatical gender cues when listening to error-free L1- and L2-accented speech.

L1 German listeners (*N*=58) listened to L1 German-accented German and L2 American-accented German, while looking at a display of four images (Fig. 1). In "different" condition trials, the gender marking on the article uniquely identified the target object, while in "same" condition trials, the article had the same gender for several objects in the display. We tested whether looks to the target noun occur earlier for "different" than "same" trials, indicating that participants used the gender-marked article to predict the target noun.

(1)	Wo	ist	der$_{MASC}$	gelbe	Käse$_{MASC}$?
	Where	is	the	yellow	cheese?
(2)	Wo	ist	die$_{FEM}$	blonde	Tänzerin$_{FEM}$?
	Where	is	the	blonde	dancer?

"Where is the yellow cheese/blonde dancer?"

Divergence point analyses [5] revealed more predictive looks in "different" versus "same" conditions for natural gender sentences, with similar divergence points for both L1- and L2-accented speech, based on overlapping bootstrapped CIs. For grammatical gender sentences, there was no difference in looks to the target prior to noun onset for "same" versus "different" conditions with either L1- or L2-accented speech. Yet, a difference after target noun onset with L2-accented speech indicates participants used grammatical gender predictively, albeit delayed (Fig. 2). Thus, listeners engaged in predictive processing based on natural gender with both L1- and L2-accented speech, yet they engaged in delayed predictive processing for grammatical gender.

In sum, listeners relied on natural gender as a predictive cue in L2-accented speech, presumably since they expect it to be reliable.

For grammatical gender, listeners may anticipate gender errors in L2 speech. We hypothesize that when faced with errorless L2 speech, L1 speakers' surprisal at the speaker's accuracy may lead to greater use of grammatical gender for prediction. Listeners thus modulate their predictions both according to top-down knowledge and bottom-up evidence in bilingual contexts.

Figures

Figure 1a. Image display for a "different" trial for the grammatical gender condition

Figure 1b. Image display for a "different" trial for the natural gender condition

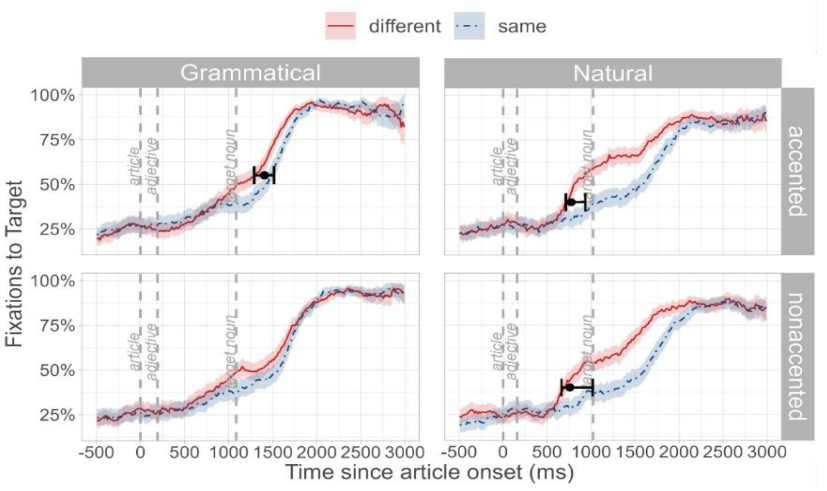

Figure 2. L1 speakers' fixations to target noun in grammatical and natural gender sentences for accented and non-accented conditions. Divergence points (with bootstrapped 95% confidence intervals) in black.

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Integration of Multiple Speech Cues for Native and L2 Listeners during Online Speech Processing with Visual-World Eye-Tracking Paradigm

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Speech processing and comprehension involve the integration of both acoustic-phonetic elements, such as segmental and suprasegmental cues, and semantic and discourse pragmatic information. Listeners must attend to both sources of information, incorporating them in real-time. This study employed a visual-world eye-tracking paradigm to examine the how native and non-native listeners adopt different perceptual strategies during online speech processing, specifi- cally how they allocate their attention to multiple speech cues and integrate prosodic cues and verb semantic information. The study particularly focused on prosodic cues, verb semantics, and whether information is given or new in a broader discourse context. The participants' eye movements were recorded while they listened to sentences within a brief discourse context. They were then asked to click on the object named in the second sentence, such as the underlined *"cabbage"* in *Here is a [cabbage/captain]. Susan is going to [shred/drink] the*

[cabbage/CABBAGE] after school. These sentences varied in three binary factors: prosodic accent location (Neutral accent on *cabbage* vs. Contrastive pitch accent on *cabbage*), target object information status (*Cabbage* as new information in ...*captain..cabbage* vs. *Cabbage* as old information in ...*cabbage...cabbage*), and the semantic alignment between the verb and the target object (Appropriate verb in *shred cabbage* vs. Inappropriate verb *drink cabbage*). English and Mandarin stimuli comprised two parts of experiment. Listener groups included native English listeners and native Mandarin listeners learning English as L2 for English stimuli, and native Mandarin listeners and native English listeners learning Mandarin as L2 for Mandarin stimuli. Results showed a complex three-way interaction among L1, prosody, and verb semantics. With both English and Mandarin stimuli, when processing sentences containing old information, non-native listeners tended to adopt perceptual strategies similar to those of native listeners. Specifically, both native and non-native listeners in both languages showed an interaction between prosody and semantics and also exhibited an effect of verb appropriateness, which was exaggerated under the target accent. However, when processing sentences containing new information, non-native and native listeners exhibited divergence. Native listeners can interactively combine both high- and low-level information across a variety of contexts. Non-native listeners can also do this, but only with familiar repeated information. In contexts when they must handle new information, their ability to utilize and integrate different speech cues is reduced.

Keywords: Eye movements; Prosodic cues; Pitch accent; Verb semantics; Information status; Native speech perception; L2 speech perception; Speech Processing

Investigating language effects on cognition using three-gendered languages: the case of Ukrainian simultaneous bilinguals

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Does language modulate our cognition? Latest studies argue the need to move beyond this binary question and instead focus on the specific circumstances under which language-related effects emerge (Athanasopoulos & Casaponsa, 2020), while doing so in the context of multilingual speakers (Bassetti & Filipović, 2022). The current study attempts to do both. We attempt to analyse the effects, if any, that two contrasting three-gendered grammatical systems (e.g., Ukrainian and Russian) have on cognition, as well as introduce simultaneous bilinguals into the linguistic relativity research. It extends the previously dominating focus on sequential bilinguals with a distinct L1 and a later acquired L2, as well as explores whether the effects of language vary between the two types of bilingualism. To do so, we adapted a similarity judgment paradigm, presented in a seminal experiment from Phillips and Boroditsky

(2003). The current paradigm was employed due to its explicit association with grammatical gender, before further investigating more implicit gender effects of two three-gendered grammatical systems on cognition.

37 English monolinguals and 63 Ukrainian-Russian bilinguals were recruited for the current study. Participants were asked to provide similarity ratings for 100 pairs of stimuli, comprising depicted conceptually neutral nouns, presented alongside a picture of a male or female character (e.g., a ballerina and a notebook) on a 9-point Likert scale (1 – "Not similar", 9 – "Very similar"). Our stimulus set included objects with opposite grammatical genders in Ukrainian and Russian (masculine in Ukrainian and feminine in Russian, and vice versa), and nouns with matching genders in both languages (i.e., masculine, feminine, and neuter in both Ukrainian and Russian). Two key predictions were tested using linear mixed models. Firstly, for nouns with matching grammatical gender in both Ukrainian and Russian, we expected to find a more pronounced language effect compared to English monolinguals, with Ukrainian participants providing higher ratings for pairs where biological sex of the character and grammatical gender of the object were congruent in both Ukrainian and Russian. Secondly, for nouns with mismatching genders in Ukrainian and Russian, we anticipated observing an effect driven by the most proficient language within the Ukrainian participant group (i.e., higher ratings to pairs where biological sex of the character and object's grammatical gender were congruent in their most proficient language).

Analysis revealed that gender congruence of object-character pairs had no statistically significant impact on similarity ratings. Moreover, Ukrainian participants consistently rated objects as less similar than their English monolingual counterparts across all conditions. As for the second prediction, we found no difference between the ratings of pairs that are congruent and incongruent in participants' most proficient language. Therefore, we propose a further investigation of both explicit and implicit behavioural measures. Additionally, we suggest extending the study and compare the responses when neuter gender is omitted.

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Language choice and naming difficulty: Evidence from bilingual degraded picture naming

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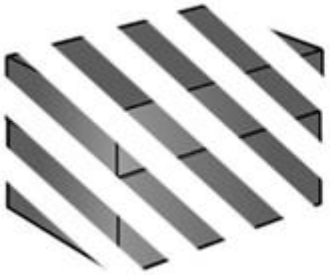
When bilingual interlocutors share the same languages, speakers can use and switch between them as they please. What determines their language choices in contexts like these? Studies on voluntary language switching have shown there are several language-internal factors that affect language choice. For example, speakers may select their non-dominant language for easily accessible words (e.g., more frequent or shorter words; Gollan & Ferreira, 2009) and their dominant language for harder-to-access words. Additionally, since even voluntarily switching between languages can incur a cognitive cost (e.g., de Bruin et al., 2018), bilinguals may switch between languages less when naming is more difficult.

This study investigated how anticipated difficulty in naming may affect voluntary language choice and switching behaviour. We manipulated the early, non-linguistic stages of the word production process to be easy or difficult using image degradation, which is known to slow down the conceptual stages of word production (Meyer et al., 2007).

For the first experiment, 86 Dutch-English highly proficient bilinguals performed an online picture naming task (116 items) in which they were free to choose the language for each trial. Half of all pictures were degraded using a superimposed mask of white diagonal lines (see fig. 1). We hypothesised participants would use English

(their non-dominant language) and switch languages less on degraded- versus intact-image trials. Response times indicate the manipulation was successful: we found significantly slower naming for degraded than intact images, as predicted, as well as a reverse-dominance effect (e.g., Verhoef et al., 2010) and a voluntary switch cost, both of which are commonly found in bilingual picture naming. Crucially, though, logistic multi-level models refuted our other predictions: there was no effect of image degradation on either language choice or switch choice. As a result, we can be reasonably confident that difficulty in naming alone does not affect voluntary language selection.

If this is a true effect, these data support modular theories of language production, meaning language decisions at the lexical stage occur independently from the visual processing or conceptual stages (e.g., Levelt et al., 1999). We ran a follow-up experiment on a larger scale to further test this, in which we formalised the variable of word frequency. This enabled us to investigate the potential interaction between image degradation and a linguistic factor with a previously attested effect on language choice. Data from 105 Dutch-English bilinguals show largely the same effects as found in study 1: there was no effect of image degradation on language choice or switching, but bilinguals were more likely to name highly frequent words in their L2 and stick to their L1 for lower-frequency words. Just like in study 1, there were effects of degradation and reverse dominance on naming latencies. Speakers were also faster to name higher-frequency words, but there were no interactions between word frequency and image degradation in the binomial measures or response times. These results further support the hypothesis that conceptual effects at the pre-linguistic stages of production do not "leak" into the lexical and language decision stages.



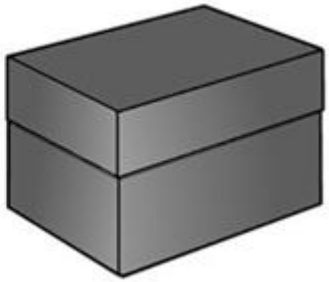


Figure 1 Example stimuli: degraded (left) and intact (right), based on Snodgrass & Vanderwart (1980).

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Language learning as a non-pharmacological intervention in older adults with (past) depression

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Lifelong bilingualism has been found to delay the onset of Alzheimer's disease (Woumans et al., 2015), but bilingual experiences later in life have also (i.e., later-life language learning) has also been proposed as a non-pharmacological intervention to promote healthy aging (Antoniou et al., 2013). In this paper we present a study into the effects of language learning specifically for older adults with a history of depression. Cognitive dysfunction is prevalent in this population, even after remission (Bhalla et al., 2006), and those with past depression are also at higher risk of developing Alzheimer's disease (Butters et al., 2007). We studied the effects of a three-month English language course on psychosocial well-being, cognitive functioning, and English skills in Dutch older adults with (past) depression and a control group.

To this end, an intervention study was conducted in the Netherlands with 34 older adults (19 with (past) depression; 15 in the control group). Participants were functionally monolingual Dutch speaking older adults (aged ≥65; M = 70). Participants followed English group lessons through video conferencing (due to COVID-19) every other week, and were asked to study independently for 45 mins/day, for 5 days/week. Data were collected before and after the intervention, and at four-month follow-up. The test battery included indices of psychosocial well-being (e.g., depression symptoms, loneliness), cognitive functioning (e.g., cognitive flexibility, working memory), and language outcomes (e.g,. IELTS, PPVT, can-do scales). Multivariate multiple mixed effects regression models were used to assess changes over time.

Participation in the intervention was associated with significant decreases in apathy, social loneliness, and cognitive

failures, and improvements in associative memory and global cognition in those with (past) depression. The control group improved on episodic memory and letter-number sequencing. Both groups improved in linguistic self-confidence and lexical access to English, while the group with (past) depression also improved on IELTS measures.

Our results suggest that a short language course has some immediate benefits for cognition and psychosocial well-being. The reductions in apathy and loneliness are especially salient, as this could mean that group-based learning interventions (like later-life language learning) may build up social and motivational reserves (cf. Forstmeijer et al., 2021) over a longer period of time, potentially protecting against psychosocial risk factors of developing dementia such as social isolation.

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L1 attrition in instructed L1 Spanish-L2 English bilinguals: Evidence from relative clause attachment preferences

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Traditional second language acquisition (SLA) research has focused on bilinguals' second language (L2) as modulated by their first language (L1). However, more recent studies have challenged this unidirectional influence, suggesting that the L1 may also undergo adjustments due to extensive L2 use and exposure (Chamorro et al., 2016; Dussias & Sagarra, 2007), a phenomenon termed L1 attrition. This evidence mostly comes from studies on long-immersed bilinguals in naturalistic settings, but there is scarce data on the potential influence of other L2 exposure types like instructed settings (i.e., classroom settings). This study aims to bridge this gap by investigating potential attrition in bilinguals living in an L1 environment but extensively exposed to formal L2 instruction.

The present investigation explores L1 attrition related to relative clause attachment (RCA) ambiguities, given the crosslinguistic variation observed in monolingual speakers of different L1s. For instance, the relative pronoun *who* in (1) may refer to either *el alumno/the student*, i.e. high attachment (HA), or *la científica/the scientist*, i.e., low attachment (LA). Native Spanish shows a tendency for HA, whereas native English speakers seem to favour LA (Dussias, 2003; Fernández, 2002; Jegerski et al., 2016).

(1) *Mira al alumno$_i$ de la científica$_j$* ***que$_{i/j}$*** *lee un libro atentamente*
Look at the student$_i$ of the scientist$_j$ ***who$_{i/j}$*** *reads a book carefully*

Thus, this study focuses on: (1) the RCA disambiguation preferences of L1 Spanish-L2 English bilinguals in their L1 as modulated by extensive L2 instructed exposure and (2) whether attrition occurs solely in processing or also in offline comprehension.

To do so, three groups were tested: advanced L1 Spanish-L2 English bilingual students of English Studies in Spain (N=44),

Spanish functional monolinguals (N=50), and English functional monolinguals (N=49). Data were collected from a picture selection task, an auditory sentence-picture verification task, and a visual-world eye-tracking experiment to address both offline comprehension and online processing preferences. All participants were tested in their L1, and target sentences were manipulated to create three conditions (i.e., HA-bias, LA-bias and ambiguous) by manipulating the relative pronoun gender as in (2).

(2) Mira al alumno$_i$ de la científica$_j$ ***el cual$_i$ / la cual$_j$ / que$_{i/j}$*** *lee un libro atentamente*

Look at the student$_i$ (masc) of the scientist$_j$ (fem) ***who$_{i/j}$*** *reads a book carefully*

When comparing the bilingual group vs. the Spanish monolingual group, results from the picture selection task and their reaction times show that L2 instructed exposure seems to influence bilinguals' comprehension and processing of RCA in their L1 Spanish. While a clear HA preference is observed for Spanish monolinguals, bilinguals show more optionality (cf. **Error! Reference source not found.**), suggesting higher acceptance of the L1 dispreferred strategy (i.e., LA). Additionally, with ambiguous sentences, bilinguals are significantly slower than Spanish monolinguals in the final interpretation of the sentence (cf. **Error! Reference source not found.**).

FIGURES

Figure 1: Percentage of HA choices in bilinguals and Spanish functional monolinguals

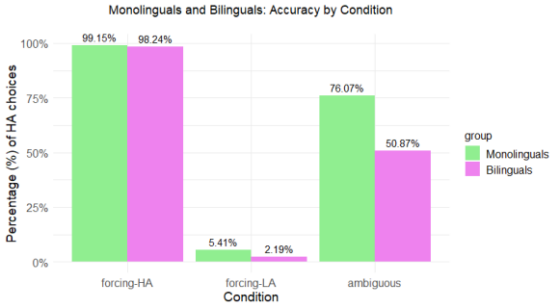
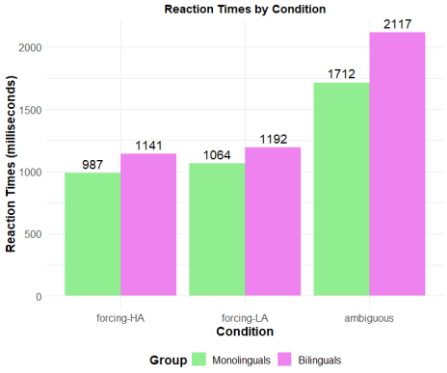


Figure 2: RTs in bilinguals and Spanish functional monolinguals



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L1 German /eː/-/ɛː/ overlap and its effect on the acquisition of L2 English /ɛ/-/æ/[1]

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Although standard German distinguishes between /ɛː/ (*Dänen*, /ˈdɛːnən/, '(the) Danish') and /eː/ (*dehnen*, /ˈdeːnən/, '(to) stretch'), speakers realize the distinction to different degrees, some maintain it (= /eː/-/ɛː/ maintainers), others merge the two vowels to /eː/ (= /eː/-/ɛː/ mergers). Hence, both groups have (short) /ɛ/ (*Kette*, /ˈkɛtə/, 'chain') in their vowel inventory, but only /eː/-/ɛː/ maintainers have (long) /ɛː/. Standard varieties of English, in turn, distinguish between /ɛ/ (*pen*, /pɛn/) and /æ/ (*pan*, /pæn/), whose formants (F1, F2) and duration differ (/æ/ is longer than /ɛ/). Consequently, English /ɛ/ should not pose difficulties to L1 German learners of English (since it exists in German). English /æ/, however, does not occur in German and therefore typically represents a burden for learners of English. Here, we aim at investigating whether the degree of distinctiveness of /eː/-/ɛː/ in German (L1) has an impact on how individuals perceive the English vowel contrast /ɛ/-/æ/ (L2). Could keeping /eː/ and /ɛː/ apart (in production) in the L1 German facilitate the perception of the L2 English contrast /ɛ/-/æ/? This question is related to how L1 German speakers might deal with /æ/: Although neither /eː/-/ɛː/ maintainers nor /eː/-/ɛː/ mergers are familiar with /æ/ from their L1, /eː/-/ɛː/ maintainers might benefit from their capacity to differentiate between two vowels ((short) /ɛ/ versus (long) /ɛː/) in a similar area of the vowel space (/eː/-/ɛː/ mergers only have (short) /ɛ/).

We tested 56 L1 German speakers and relied on two /ɛ/-/æ/ minimal pairs (*pen*/*pan* and *pedal*/*paddle*). For each pair, a spectral continuum of eleven steps was created (Step 1 = extreme /æ/; Step 11 = extreme /ɛ/). Each spectral step was crossed with the vowel durations short (representing the duration of /ɛ/), middle, and long (representing the duration of /æ/). In an identification task, participants saw two pictures, heard a sound file, and pointed via button press to the picture they associated with the sound (2 pairs, 3 duration types, 11 steps). In a discrimination task, participants heard

[1] For more details and for references, see Schlechtweg et al. (2023).

two sound files and indicated whether the two were the same or different (2 pairs, 3 duration types, distance between the two files was 0, 1, 2, or 3 steps of the continuum).

The major independent variable was the German Pillai score, which relied on F1/F2 values and indicated the degree of overlap of /eː/ and /ɛː/ for a specific person. These values were obtained in a production experiment on German, where words like *Dänen* and *dehnen* were examined. Pillai values range from 0 (absolute overlap of two vowels) to 1 (clear separation). While the results of the discrimination task remained inconclusive, the identification task revealed, among other things, significant interactions GermanPillai*Step and GermanPillai*Duration (Accuracy), indicating that maintaining the vowel contrast in the L1 German led to a more native-like identification of the English /æ/. We will discuss our findings against the background of the role variation in the L1 plays during L2 acquisition.

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L3 Processing of Verbal Aspect in English by Russian-German Bilingual Children: Evidence from Eye-Tracking

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A growing body of experimental studies has suggested that grammatical representations from both previously acquired languages are likely to influence the development of a third language (see [1] for a review). Two recent studies, [2] and [3], investigated the acquisition of L3 English by bilingual Norwegian-Russian and German-Russian adolescents in comparison to age- and proficiency-matched monolinguals (Norwegian, German, and Russian). Both studies found that the L3 learners differed significantly from both L2 control groups, suggesting combined CLI from both previously acquired languages. The current study continues this line of research adding a processing dimension to L3 research.

We use Visual World eye-tracking to investigate processing of English aspectual forms by 2L1 German-Russian children in comparison to age- and proficiency-matched monolinguals. The aspectual systems differ in the three languages involved in the study. In Russian, there is a strict grammatical opposition between perfective and imperfective verbs with speakers uniformly associating perfective forms with completed events, and imperfective forms with ongoing events (see [4]). German lacks verbal aspect and doesn't grammatically encode the contrast between completed and ongoing events. Finally, English employs a specialized progressive form to refer to ongoing events, while the so-called simple past forms are equally compatible with ongoing and completed event interpretations (see Fig. 1 representing processing data collected with L1 English speakers, from [4]). Ermolina [5] adapted the eye-tracking paradigm developed in [4] to investigate the processing of L2 English Past Progressive (PP) and Simple Past (SP) forms by speakers of L1 Russian and L1 Norwegian (Norwegian is similar to German in that it doesn't encode grammatical aspect). The results revealed that L1 Russians interpreted English SP forms as denoting completed events, while L1 Norwegians favored ongoing event interpretations (see Fig. 2b from [5]). Both groups showed a similar preference for ongoing events when they heard PP forms (see Fig. 2a). We adapted the paradigm from [4] and tested whether bilingual Russian-German adolescents would be influenced by aspectual systems from both of their languages when processing L3 English. Data collection with 50 bilinguals (8-13 y.o., tested in Berlin) has been completed. The results indicate that when the learners heard PP forms, they preferred looking at

pictures of ongoing events - more than when they were listening to SP forms (see Fig. 3). Data collection with L1 German controls is ongoing, and the results will be presented at the conference.

Examples of experimental stimuli:

(a) Grandma was knitting a new jumper. **(b) Grandma knitted a new jumper.**

Ongoing event

Completed event

An experimental trial included an audio preamble which located the narrative in the past (e.g. *It was a rainy day*), followed by a sentence-picture matching task where the participants were presented with a pair of pictures on a screen: one representing an Ongoing Event (OE), i.e. an action in progress, and one representing a Completed Event (CE), see examples (a-b) from the English task. Each experiment included 24 filers and 24 test trials (12 Past Progressive and 12 Simple Past) involving 48 verbs/event types and visual stimuli. Eye-movements were recorded.

Figures:

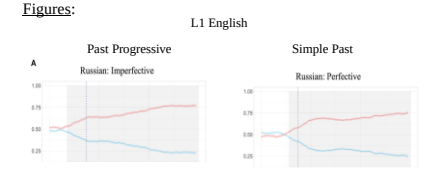


Fig. 1. **L1 English data**. Proportions of looks to the Completed vs Ongoing Event picture in 50 ms time bins from the verb onset in the Past Progressive and Simple Past. Vertical blue lines represent the average verb offset.

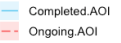
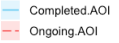
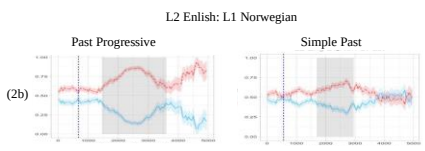


Fig. 2. **L2 English data**. Proportions of looks to the Completed vs Ongoing Event picture in 50 ms time bins from the verb onset in the Past Progressive and Simple Past conditions in two groups of L2 English speakers: L1 Russian (Fig.2a) and L1 Norwegian (Fig.2b). Vertical blue lines represent the average verb offset.





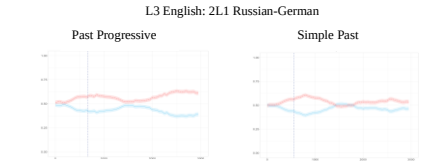
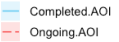


Fig. 3. **L3 English data (2L1 Russian-German)**. Proportions of looks to the Completed vs Ongoing Event picture in 50 ms time bins starting from the verb onset in the Past Progressive and Simple Past.



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Although there is ample evidence for cross-linguistic influence in bilingual children, it is still not well understood when and why cross-linguistic influence occurs. In a recent meta-analysis (van Dijk et al., 2022), we found robust evidence for a small to moderate effect of cross-linguistic influence on the level of morphosyntax in simultaneous and early sequential bilingual children (Hedges' g = 0.39 [0.21;0.56]). We also found evidence for an effect of language dominance, operationalized as societal language, on the strength of cross-linguistic influence. However, the exact mechanism behind cross-linguistic influence and the role of potential predictors, such as language dominance and language overlap, remains under debate. One of the reasons for this is that most studies conducted to date have been underpowered, which means that many more studies are needed to draw reliable conclusions (i.e., many more than the 26 studies analyzed in van Dijk et al., 2022). Another reason is that studies differ widely in their design, the linguistic property under investigation, and the operationalization of both cross-linguistic influence and its potential predictors, making it difficult to pinpoint the exact circumstances under which cross-linguistic influence occurs.

In our meta-analysis, we argued that in order to obtain a comprehensive picture of cross-linguistic influence, the research community on child bilingualism should work together and combine results from individual - possibly underpowered - studies. To facilitate this, we propose the use of a community-augmented meta-analysis that will continuously update and extend our meta-analysis on structural cross-linguistic influence in bilingual children. For this purpose, we recently developed a web application called Meta-CLI, accessible via https://cls.ru.nl/meta-CLI/. Meta-CLI has two goals. The first goal is to provide an up-to-date meta-analysis by allowing researchers to add their experimental results to the database from our meta-analysis (van Dijk et al., 2022). The second goal is to allow researchers to conduct and visualize their own meta-analyses on (subsets of) the database, by allowing users to (i) filter the database on 10 different variables, including target language, linguistic

property under investigation, and children's age, and (ii) select one of these 10 variables as a predictor in a meta-regression analysis. Results of these analyses will not only further our understanding of cross-linguistic influence, they can also be used by researchers to perform power analyses when designing future studies. In short, Meta-CLI is a collaborative tool for researchers in the field of child bilingualism where they can share and use experimental data on cross-linguistic influence to overcome the limitations of individual studies. With the current poster we would like to introduce Meta-CLI, demonstrate its functionality and gauge the interest of potential users and contributors.

Negation processing and working memory in Mandarin-Italian bilingual children

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It is well known that negation processing is cognitively demanding, which is challenging for typically developing children (e.g., Bloom, 1970, 1993; Nordmeyer & Frank, 2014). The findings are less clear with respect to the bilingual children (Hu et al., 2018; Schelletter, 2000). The current study aims to understand the processing of negation in Mandarin-Italian bilingual children, and establish the relationship of children's working memory capacity and their processing of negation.

50 Mandarin-Italian bilingual children (MeanAge = 9;4, SD = 1.15), 24 Mandarin controls (MA = 9;8, SD = 1.13) and 16 Italian controls (MA = 9;7, SD = 1.03) completed a truth-value judgment task using E-Prime 2.0. The task was manipulated with Sentence Polarity (affirmative vs. negative) and Truth-value (true vs. false), resulting in four conditions: True affirmative, False affirmative, True negative and False negative. In addition, all the bilingual children completed standardized tests of working memory, i.e., forward digit span and backward digit span tasks (Gong & Cai, 1994; Wechsler, 2005).

First, negative sentences were harder to process than affirmative ones in all the groups, and True negatives were significantly more difficult than the other conditions in both languages. Second, in Mandarin there was no significant difference between the bilinguals and the Mandarin controls in accuracy (e.g., 74% vs. 72% in True negatives), but the bilinguals were significantly slower than the Mandarin controls (e.g., 3861 ms vs. 3404 ms in True negatives). Third, in Italian the bilinguals were more accurate than the Italian controls, especially in True negatives (70% vs. 33%), but there was no significant difference in response latency between the two groups (e.g., 4336 ms vs. 4128 ms in True negative). Fourth, bilingual children's working memory capacity was positively correlated with negation processing, regardless of whether the language is Mandarin or Italian.

The finding confirms the existence of the asymmetry between affirmative and negative sentences, and the greater difficulties in the process of True negatives, indicating that the difficulties in the processing of negation, in the relevant experimental conditions, have a general validity across the monolingual and

bilingual children. This result can be readily interpreted in the light of the "experiential" theories of negation processing, by means of the two-step simulation hypothesis (Kaup et al. 2005, 2006, 2007). Our results confirmed that negation processing is cognitively demanding, requiring a richness of computational resources in terms of memory processing. Finally, it should be emphasized that bilingual children were more accurate in the comprehension of Italian True negatives than Italian monolingual children, a finding that deserves further investigation.

Prediction-based grammatical learning in L2 processing

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In English, most ditransitive verbs can take both double-object dative (DO) and prepositional-object dative (PO). This optionality is constrained by gradient selectional restrictions on the type of their

complements: DO-bias verbs, e.g., *pay*, tend to occur more frequently with DO, while PO-bias verbs, e.g., *send*, show a probabilistic tendency to prefer PO [1]. Research on priming in L1 comprehension indicates that the magnitude of structural priming increases when the prime structure goes against its verb's bias [2-3]. Such surprisal effects of verb bias among child L1 learners and adult L1 speakers are in line with implicit learning models, claiming that prediction error is a key mechanism underlying structural priming [4]. However, it is an open question whether prediction-error-driven implicit learning accounts of priming extend to L2 learners.

Against this backdrop, we probe whether prediction error constitutes a mechanism of structural priming also in a late-learnt L2. In two experiments combining priming and visual world eye-tracking, we first test whether prediction error, occasioned by verb bias, affects structural priming in L2 comprehension. Second, we examine whether structural priming occurs in the absence of prediction error.

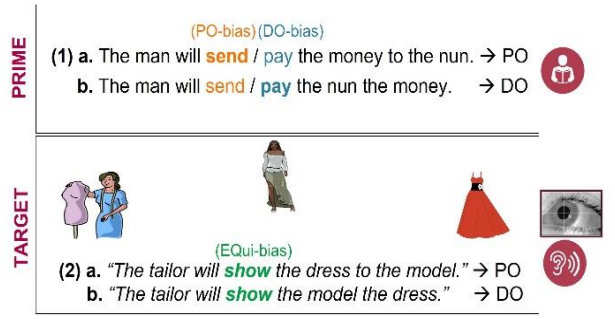
In Experiment 1, adult L1 German intermediate to advanced L2 learners of English (n = 48) first read aloud written prime sentences crossing Verb Bias (DO-bias vs. PO-bias) and Structure Type (DO vs. PO). Subsequently, they listened to spoken target sentences – with non-biased verbs (e.g., *show*) – while viewing visual scenes with an agent referent (*the tailor*), a theme referent (*the dress*), and a recipient referent (*the model*); see Figure 1. Cluster-based permutation analyses revealed PO-priming, as evidenced by more looks to the theme than to the recipient during the post-verbal temporal region in target sentences following PO (vs. DO) prime sentences (Figure 2a). Further, PO-priming was modulated by surprisal effects of verb bias, as priming was larger when the prime structure mismatched the bias of prime verb, i.e., after PO prime sentence with DO-bias verbs (Figure 2b). These effects show that L2 learners adapt to the structure of the recently processed prime sentence through learning from their prediction errors.

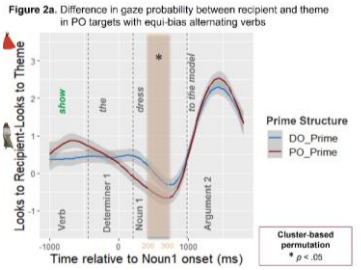
In Experiment 2 with a comparable group of L1-German–L2-English learners (n = 48), the materials were the same as in Experiment 1, except that prime sentences were preceded by a context sentence introducing the themes and recipients. Moreover, the full noun-phrase themes and recipients in PO prime sentences were replaced by their pronominal counterparts (Figure 3). DO-bias prime verbs thus elicited no prediction error, given that PO is the only possible structure for any ditransitive verb with two pronominal complements. Unlike in Experiment 1, PO-priming did not reach

significance in Experiment 2 (Figure 4). This suggests that, when there is no prediction error to learn from, structural priming may not be strong enough to affect L2 learners' processing of the target sentences.

The findings from Experiments 1 and 2 demonstrate that priming in L2 comprehension is driven by prediction error like in L1 comprehension, and further point to an error-based prediction mechanism underpinning L2 structural priming.

Figure 1. An example of prime-target pairs from Experiment 1





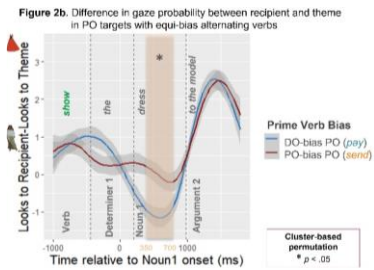


Figure 3. An example of prime-target pairs from Experiment 2

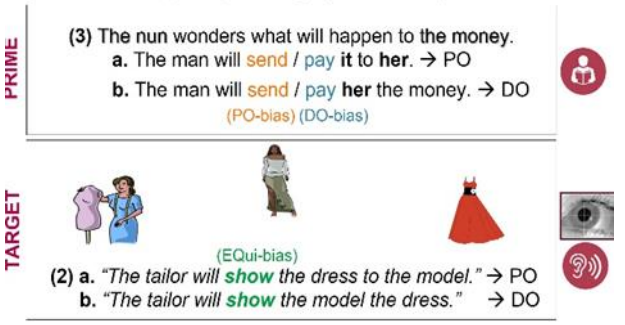
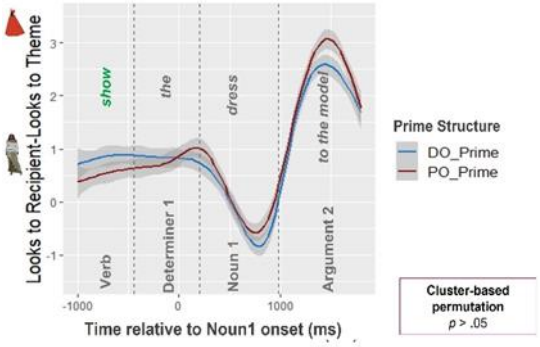


Figure 4. Difference in gaze probability between recipient and theme in PO targets with equi-bias alternating verbs



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Predicting production: Individual differences and possible sources of cross-linguistic influence in a third language

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Learners of a second language (L2) will often fail to achieve a native-like pronunciation, due to the influence of their L1 phonology. For instance, the Speech Learning Model or SLM (Flege, 1995)

claims that if a speaker perceives an L1-L2 sound pair as similar (e.g., /d/ in Spanish *dolor* "pain" vs. English *dollar*), learning is unlikely to occur: speakers will produce the L2 sound by substituting the closest L1 equivalent. This study extends this paradigm to L3 acquisition: what is the source of "accent" when multiple phonologies already exist? Studies of L3 pronunciation have yielded mixed findings, with some showing transfer from the L1 (Llama & López-Morelos, 2016), others from the L2 (Llama et al., 2010), and still others from both L1 and L2 (Sypiańska, 2016).

This study examines the possible sources of cross-linguistic transfer in L3 speakers while also addressing the relationship between perceptual sensitivity and production accuracy. Listeners have been shown to differ in their baseline sensitivity to subphonemic (within-category) differences (Kapnoula et al., 2017, Apfelbaum et al., 2022), with higher sensitivity in the L1 predicting vocabulary size in a non-native language (Kapnoula & Samuel, in press). We ask if *perceptual* sensitivity in the L2/L3 predicts L3 *production* accuracy.To test these questions, we examine sibilant fricatives (see Figure) in L1 Spanish - L2 Basque - L3 English speakers. While English has a two-way sibilant contrast (Collins & Mees, 2003), Basque has a typologically rare 3-way contrast (Hualde et al., 2010). The sound missing from the English inventory (written <s> in Basque) is typically described in the literature as apical (involving the tongue tip) (Hualde et al., 2010), and is the same sound as the <s> in Castilian Spanish (Martínez Celdrán et al., 2003). Crucially, it differs from the English <s>: the latter is laminal (involving the tongue blade), sharing place of articulation with Basque <z>.

We present preliminary results from 20 early Spanish-Basque bilingual speakers of L3 English, living in Donostia-San Sebastian, Spain. We assessed production by obtaining acoustic measures (center of gravity) of these sounds in each language, and assessed perceptual sensitivity by testing listeners' perception of phonetic fricative continua in Basque and English (e.g., ship → sip), and then measuring the slope of each listeners' categorization function to obtain a measure of sensitivity (Kapnoula et al., 2017). Group-level results show distinct patterns in the acoustic realization of L3 English <sh> and <s>: speakers substitute Basque <x> for English <sh>, but produce English <s> with center of gravity between Basque <x> and <s>. However, individual-level results reveal distinct patterns of transfer across speakers. We discuss these differences in terms of the acoustic similarity of Basque and English

sibilants, as well individual speakers' perceptual sensitivity to within-phoneme differences.

Articulation	Sound	Spanish	Basque	English
palato-alveolar	[ʃ]	✘	✔ <x>	✔ <sh>
apical alveolar	[s̺]	✔ <s>	✔ <s>	✘
laminal alveolar	[s̻]	✘	✔ <z>	✔ <s>

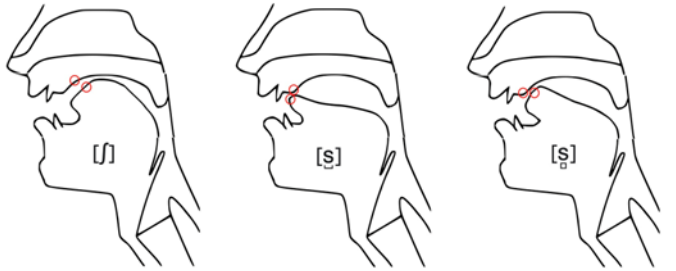

Figure. Mid-sagittal diagrams of sibilant fricatives in Spanish, Basque, and English.

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Priming ditransitives in L2 Mandarin leads to adjustments in production but not in predictive processing

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Using a visual world structural priming (VWSP) paradigm, Arai et al. (2007) and Thothathiri & Snedeker (2008a, 2008b) found that reading a double object (DO) or prepositional (PO) dative can lead to subsequent prediction of the same dative construction in real-time comprehension among adult and child native speakers of English. Chen et al. (2022) replicated these findings with native Mandarin speakers; additionally, an inverse frequency effect indicated that priming effects were stronger after DO primes with PO-biased verbs (the unexpected combinations) than with DO biased verbs. Şafak & Hopp (under review) extended the inquiry to L1 German L2 English learners and replicated the construction-level priming effects and inverse frequency effects. These studies support error-driven learning (EDL) accounts for the dative alternation (e.g., Chang et al., 2006;

Goldberg, 2019), which suggest that language users predict based on dative verb bias and adjust their linguistic knowledge after encounters of prediction error. None of these VWSP studies, however, included baseline or post-priming phases assessing real-time verb-based prediction in the absence of immediate priming. It thus remains unclear whether these immediate comprehension priming effects translate into longer-term adaptation, as would be expected under EDL accounts. In the present study, we use a pretest-priming-posttest design to address whether structural priming can lead L1 and L2 Mandarin speakers to adapt (1) their predictions in real-time comprehension, and (2) their production of dative constructions.

Method. L1 (N=65) and intermediate-to-advanced proficiency L2 (N=64, MLEXTALE_CH = 61.3/90, range=39-78, SD=10.1) participants completed a VWSP task where they took turns reading aloud sentences (prime trials) and listening to sentences while looking at visual scenes (target trials) containing three entities (agent, theme, goal, for experimental trials; Fig.1). In the priming phase (but not in baseline and posttest), all primes were DO sentences. The experimental target sentences were DO or PO paired with PO-biased verbs. No lexical boost was utilized. Participants also completed written picture description tasks eliciting ditransitives one day before and after the VWSP task to assess longer-term priming.

Results. We used LMER models to examine the likelihood of participants looking at the theme vs. goal (log-ratio) during two ambiguous time windows (CR1=verb; CR2=perfective +numeral+ classifier; Fig.1). We interpret changes from CR1 to CR2 as evidence of prediction based on verb information. Neither L1ers nor L2ers showed evidence of prediction based on verb bias at any phase of the task, nor did their looking patterns change from baseline to posttest (Fig.2). However, logistic regression models of the production data indicated both groups produced more DO datives one day after priming (b=1.88, p<.001, Fig.3), and L1ers' increase (b=2.07, p<.001) was significantly larger than L2ers' (b=1.97, p=.003).

Unlike previous VWSP studies (but see also Chen & Hartsuiker, 2023), we observed no immediate priming effects in real-time comprehension, nor longer-term adaptation of real-time prediction. Nevertheless, the priming treatment led to adaptation in production from pre- to posttest. Notably, the same pattern of change was observed in L1 and L2 speakers. Implications for priming as a learning mechanism in L1 and L2 will be discussed.

Fig.1. *Illustration of experimental item (PRF = perfective marker; CL = general classifier)*

	CR1		CR2						
Nanren	song	le		yi	ge	daxuesheng	yi	ge	shafa.
Man	give	PRF		one	CL	college student	one	CL	sofa

"The man gave a college student a sofa.

Note. Both CRs are fully ambiguous.

Fig.2. *Proportion looks for* ***PO-biased*** *verbs under* ***DO priming*** *by condition in VWSP*

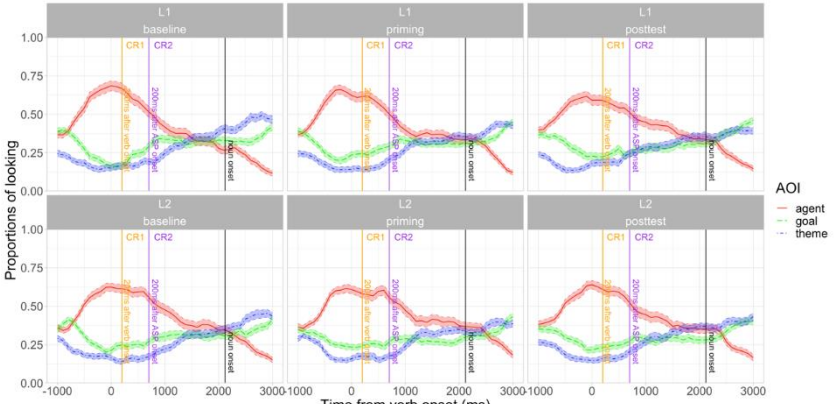
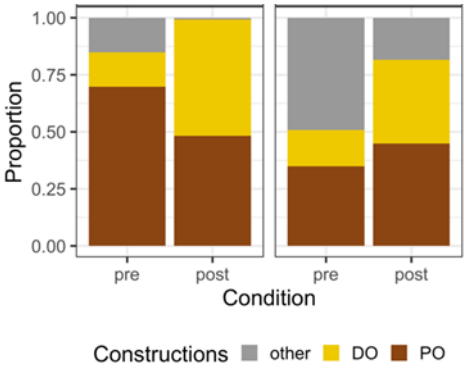


Fig.3. *Productions with* ***PO-biased*** *verbs pre- vs. post-DO-priming*



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Processing Differences in Early and Late Bilinguals as Revealed from Linguistic and Neurolinguistic Data

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Language proficiency assessment has conventionally targeted language learners' performance based on such aspects as complexity, accuracy, fluency, and vocabulary. Meanwhile, the last 3 decades have witnessed a rapid advancement in technology, which enables linguists to obtain neuro-linguistic data using fMRI, ERP, and eye-tracking data alongside linguistic data. To date, however, there has been scant research reporting on both aspects of a language learners' performance, that is, the inclusion of linguistic and neuro-linguistic data. The present study attempts to fill the gap by collecting both linguistic and neuro-linguistic data and examining the correlation between them.

An early Japanese-English bilingual and a highly advanced Japanese learner of English (both females in their thirties) participated in this study. For linguistic analysis, spontaneous narrative and written data were collected, using 'Frog, where are you?' (Mayer, 1969) and the Test of Written Languages III (Hammill and Larsen, 1996), respectively. For the neuro-linguistic analysis, fNIRS, ERP, and eye-tracking data were collected while the participants were engaged in four tasks – three production tasks and one comprehension task. They include i) a verbal fluency task, ii) a bilingual Stroop test, and iii) oral and written consecutive interpretation for production along with iv) Garden Path sentence comprehension. The preliminary analysis revealed the possibility of brain activation data being a precursor to linguistic changes. The full results are discussed in terms of language processing similarities and differences between the two types of bilinguals (early vs late) by

examining the two types of data (linguistic vs psycho-physiological).

Processing Gender Stereotypes in the Bilingual Brain

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Research has shown that children being brought up bilingual show less racial bias than their monolingual peers (Singh et al., 2019; 2020). In addition, Singh et al. (2021) found that implicit racial bias was predicted by better cognitive flexibility in bilinguals. It raises the question whether this can also be found in young adults who are either sequential or simultaneous bilinguals, respectively. Moreover, it would be interesting to investigate whether other aspects of social cognition, such as gender stereotyping, can also be predicted by cognitive flexibility.

Psycholinguistic EEG research using the event-related brain potential (ERP) technique has shown that gender stereotypes are a relevant cue during language processing, for example, when establishing coherence in pronoun resolution, such as in "Our aerobics instructor gave *himself* a break." (p. 284, Osterhout et al., 1997). Findings have shown that in the case of pronoun resolution, participants tend to perceive gender stereotype violations as grammatical mistake, even though the sentences were grammatical, by showing a P600 effect (typically elicited for morphosyntactic violations). For pronoun resolution in general, individual differences were observed on whether a P600 or Nref (a component typically elicited for ambiguous pronouns) is elicited based on working memory abilities (Nieuwland & van Berkum, 2006). The aim of this project is to investigate gender stereotype violations during pronoun resolution of simultaneous and sequential bilingual young adults with different L1 backgrounds. A secondary aim of this project is to examine individual language processing patterns as past gender stereotype studies found, for example, that participants who score low on sexism tend to show reduced amplitudes in the course of the

ERP experiment (Grant et al., 2020). Recent research has also shown that interesting individual ERP patters may become lost when only looking at ERP effects on a group level (Grey, 2023).

We tested 66 university students who were either Dutch or Spanish L1 speakers, using an English reading task. All of our participants were sequential English L2 learners, and around half of our participants were, in addition, Dutch-Frisian (n = 16), or Spanish-Catalan (n = 14) simultaneous bilinguals. The stimuli sentences were sentences with both personal, and reflexive pronouns as critical words (e.g., "The lifeguard threw *himself* into the water."). The collected background variables consisted of for instance the language and social background, the LexTale English proficiency score, but also scores in ambivalent sexism (a scale that measures hostile and benevolent sexism), in social dominance (the preference of strong hierarchies in society), or attitudes towards gender equality. Performance in working memory was measured with a Corsi blocks task, and cognitive flexibility with a color-shape switch task.

We hypothesize that abilities in working memory will affect how the pronoun violations will be processed, with higher ERP amplitudes for reflexive in comparison to personal pronouns. We expect that attitudes towards sexism and gender equality will lead to higher and more stable ERP amplitudes. Additionally, we think that cognitive flexibility will correlate with gender stereotyping, and that simultaneous bilinguals will show higher cognitive flexibility.

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This study investigates the sensitivity of Turkish heritage speakers residing in Norway to prosody and overt case marking cues in interpreting verb-medial sentences using a visual world eye-tracking paradigm. We examine how the human parser utilizes various linguistic cues—such as morphological case marking, argument order, and prosody—during predictive language processing. While prior research has primarily focused on the interaction between case marking and word order, our study extends the inquiry to include the role of prosody in argument interpretation, both independently and collectively.

Participants in this study include school-aged heritage speakers and their input providers, as well as age-matched monolingual peers and adults. We piloted the experiment with 25 adult monolingual Turkish speakers who were presented with images depicting characters (a monster and an alien) performing reversible actions, described in accompanying audio recordings. The experiment featured five critical conditions: Prosodic-SVObiasing, Prosodic-OVSbiasing, Neutral, Neutral-NP1acc marked, and Neutral-NP2acc marked.

Pilot data reveal that monolingual Turkish adults rely on overt case marking as a cue, directing their gaze to the correct image post-NP1 in the NP1acc marked condition and post-verb in the NP2acc marked condition. Their offline accuracy scores corroborate these observations, consistent with previous studies that underscore the reliability of accusative marking in Turkish. Prosodic cues also emerged as significant, particularly in the SVO biasing condition where a clear effect was noted immediately after NP1 upon hearing rising intonation. This pattern mirrors that seen in the NPacc marked condition, suggesting that prosody may function similarly to overt case marking in real-time sentence interpretation. Conversely, the OVS-biasing prosodic condition showed only a transient effect, with no sustained difference in attention between the target and competitor images.

As the study progresses, we will refine our experimental design based on these findings and expand our data collection to include both monolingual and heritage speakers in the forthcoming months.

Keywords: Prosody, Overt Case Marking, Predictive Processing, Heritage Language, Eye-Tracking, Turkish

Pronoun resolution in adult L2 learners of German by speakers of null- and overt-subject languages: Cross-linguistic influence or a learning mechanism?

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Research on pronoun resolution by native speakers of null subject languages (NSLs) who acquire a non-null subject language (NNSL) as a second language (L2) have shown mixed findings: some report similar preferences in L2 learners and L1 speakers (e.g., Cunnings et al., 2017), whereas others reveal differences between the two groups (e.g., Roberts et al., 2008). To date, no studies have investigated if the different outcomes are due to cross-linguistic influence from the L1 to the L2, due to an L2 learning mechanism, or due to a different reason. Our study fills this gap by investigating whether L1 speakers of NSLs (Greek, Italian) and L1 speakers of NNSLs (English, Dutch) transfer resolution preferences to their L2 German (NNSL) or apply a learner mechanism and therefore perform similarly to each other irrespective of their L1s.

In ambiguous contexts, German allows for two different third-person singular masculine pronouns to resolve ambiguity: the personal pronoun *er* and the demonstrative pronoun (henceforth d-pronoun) *der*, (1). L1 speakers of German show a strong preference to resolve the d-pronoun towards the object and a moderate preference to resolve the personal pronoun towards the subject (Schumacher et al., 2017). We included an additional condition that has not been investigated before to test the role of prosody, i.e., whether stressing the personal pronoun reverses the resolution preferences from the subject to the object (Féry, 2017).

1) Der **Tiger**$_{j}$ will den **Igel**$_{k}$ … küssen. Aber **er**$_{(j)}$/**der**$_{(k)}$/**ER**$_{(k?)}$ kann nicht stillstehen.
   The tiger wants the hedgehog … kiss. But he cannot hold still.

We tested pronoun resolution preferences in 171 L2 learners of German in four groups: 29 L1-Greek, 29 L1-Italian, 29 L1-English, 19 L1-Dutch (data collection ongoing), and 65 L1-German (controls). In an online picture selection task, participants listened to sentences that contained two competing characters, followed by an ambiguous third-person singular masculine pronoun (*er*, *der*, stressed-*er*), see (1). While listening to the sentences, participants saw three images, representing the subject, the object and a distractor. After each sentence, participants answered a comprehension question that forced them to interpret the pronoun

towards the subject or object by clicking on the image of the respective character.

Results showed a significant ($p < 0.001$) difference between the L2 learners and L1 controls, see Figure 1. Both NSL groups resolved the personal pronoun and the d-pronoun at chance. The two NNSL groups differed significantly from each other ($p < 0.001$), but showed a tendency in resolving both the personal and d-pronoun towards the subject. Finally, the stressed pronoun was resolved by all learner groups towards the object, unlike the L1 controls who showed no preference. Our study indicates that despite some similarities in resolution preferences based on L1 properties (NSL vs. NNSL) there is no evidence that pronoun resolution is driven only by cross-linguistic influence or by a universal learner strategy across the board. Hence, earlier contradictory findings cannot be reduced to a transfer effect of L1 features. Rather, both seem to play a role, jointly shaping learners' performance in complex ways.

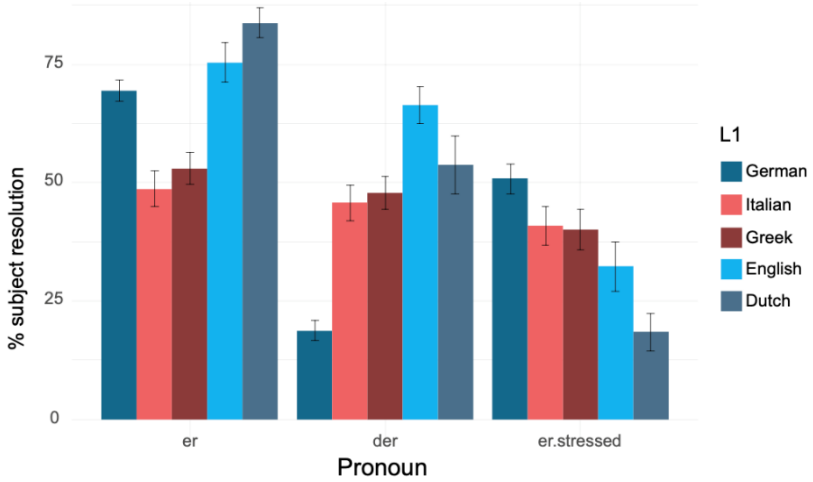

Figure 1: Subject resolution in L2 learners of German for the personal pronoun *er*, the d-pronoun *der*, and the stressed personal pronoun *er*.

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Testing the Switching Experience and Environment Questionnaire (SEEQ): A measure of bilingual switching behaviours

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Language switching is one of the most important aspects of bilingualism believed to be important for neural and behavioural adaptations (e.g. UBET; DeLuca et al., 2020). It has been measured in various questionnaires. But no questionnaire captures all aspects that have been argued to be of importance. Hartanto & Yang's (2016; 2020) Code-Switching and Interactional Contexts Questionnaire captures language switching tendencies between-sentences and within-sentences across different daily environments, but does not capture whether these switches were intentional (controlled) or unintentional. Neither does it capture the broader interactional contexts as defined in the Adaptive Control Hypothesis (ACH, Green & Abutalebi, 2013). Rodriguez-Fornells et al.'s (2012) Bilingual Switching Questionnaire captures the reason for language switching, i.e., whether it is contextually relevant (thus, produced in a fully controlled manner) or whether it is produced by mistake, due to lack of control over the other language. Finally, Anderson et al.'s (2017) LSBQ is an excellent instrument for measuring language usage and proficiency, but measures language switching only in three selected contexts (with family, with friends and on social media). It does not distinguish the type, frequency or intentionality of switching.

Consequently, we created a new questionnaire, the Switching Experience and Environment Questionnaire (SEEQ), incorporating what we deemed as the strengths of each of the three questionnaires above, in order to compile an instrument that would better suit bilingualism researchers, particularly those interested in language switching and executive control. Hence, the SEEQ measures type of interactional environment (as defined in the ACH), intentionality (control) and contextuality of the switch, frequency, and type of dense code-switch across four different daily-life contexts. In order to better characterize the bilingual individual, we also included proficiency as well as contextual and life-long usage variables from the LSBQ (Anderson et al., 2017).

We next tested whether the SEEQ captures theoretically important factors of the ACH (Green & Abutalebi, 2013) and the Unified Bilingual Experience Trajectory Model (UBET; DeLuca et al., 2020), namely *Dominance/Duration of Bilingualism*, *Intensity/Diversity of Language Use*, *Dual-Language Environment* and *Dense Code-Switching Environment*. The *Dominance/Duration*

of Bilingualism factor contained the amount of time a person has been bilingual, as well as their relative proficiency and early-life usage of the two languages. The *Intensity/Diversity of Language Use* factor contained usage-related variables, such as the usage balance between the two languages. The *Dual-Language Environment* factor contained a measure of using both languages but in different contexts or with different speakers, while the *Dense Code-Switching Environment* factor included measures of different types of code-switching, different social contexts of language switching, and unintentional switching. We collected responses from a diverse sample of 231 healthy bilinguals (aged 18-30) and performed a confirmatory factor analysis with our four factors. We found that the model converged well (CFI = 0.870, TLI = 0.853, RMSEA = 0.082. SRMR = 0.125). The SEEQ therefore provides an excellent measure of bilingual language switching, capturing theoretically important aspects of language switching and serving as a tool to test effects of language switching on executive control or brain adaptations.

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The acquisition of gender in adolescent German learners of Spanish: Evidence from production and perception

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The acquisition of L2 gender assignment and agreement is a well-known challenge. Even highly proficient L2 learners often struggle with the spontaneous production of gender agreement markings (Dewaele/Véronique 2001; Franceschina 2005; Ayoun 2018). Previous research has identified the transparency and salience of the agreement assignment and marking system in the respective L2 (Arnon/Ramscar 2012) as an important factor of influence.

The current study looks at German-speaking instructed adolescent learners of Spanish, and focuses on salience of different agreement targets, as well as on the relation between language perception and production. We ask:

- whether agreement errors are more likely to disrupt processing when they are marked both on an adjective and an article, using an eyetracking-during-reading paradigm.
- whether markings that appear not to be salient during reading are more error-prone in spontaneous written production.
- whether learners who show more sensitivity to agreement markings during reading produce a higher number of correct markings in a gender production task.

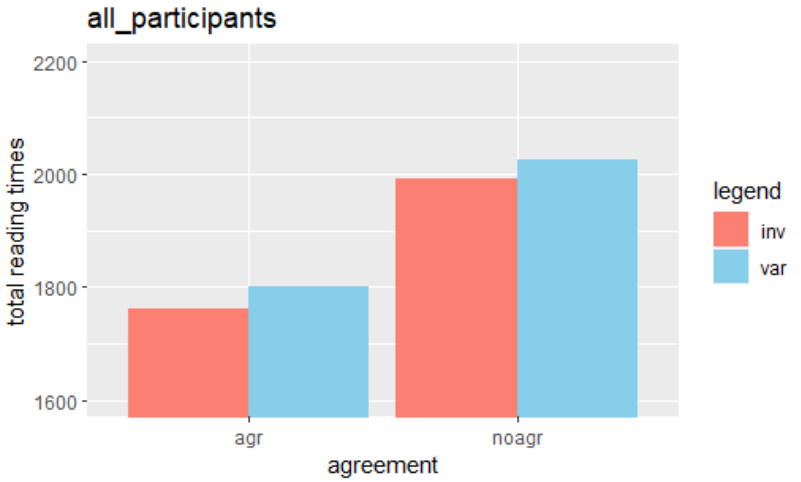
To address these questions, we collected written frog story retellings in a group of adolescent learners of Spanish (n = 51). In a second study targeting the same population, adolescent learners of Spanish (n = 22 so far, data collection is ongoing) read short paragraphs of texts while their eye movements were registered, and completed a written gender assignment and agreement task with lexical items different from the reading task. In the stimuli of the reading task, we manipulated whether critical noun phrases (underlined) contained an agreement error (conditions 2,4) or not (conditions 1,3), and whether agreement was marked on the article only (conditions 1,2) or also on an adjective (conditions 3,4). Note that all items contained nouns with highly regular endings, so that gender assignment should not be an issue.

1) agreement, adjective invariable
Allí el escritor triste caminó durante dos horas.
2) no agreement, adjective invariable
Allí *la escritor triste caminó durante dos horas.
3) agreement, adjective variable
Allí el escritor lindo caminó durante dos horas.
4) no agreement, adjective variable
Allí *la escritor *linda caminó durante dos horas.
"There the$_{MASC/FEM}$ sad$_{INVARIABLE}$ /cute$_{MASC/FEM}$ writer$_{MASC}$ walked for two hours."

Preliminary analyses of data from twenty learners suggest that agreement errors lead to significantly longer first-pass and total reading times on the critical region, and that this effect was not modulated by the presence of agreement on the adjective. Moreover, there was a moderate positive relation between individual learner's difference score (reading times for ungrammatical minus grammatical items) and performance in the production task. Finally, in line with the eyetracking results, a corpus analysis of the frog story data revealed particular high variability and error rates on adjectives.

We conclude that article-noun combinations are salient markers of agreement in L2 Spanish, and that learners who are sensitive to violations during reading also tend to be more successful in producing correct gender markings. We will discuss these results in light of different models of gender acquisition, and will also relate them to results from an ongoing parallel data collection on L2 French.

Figures



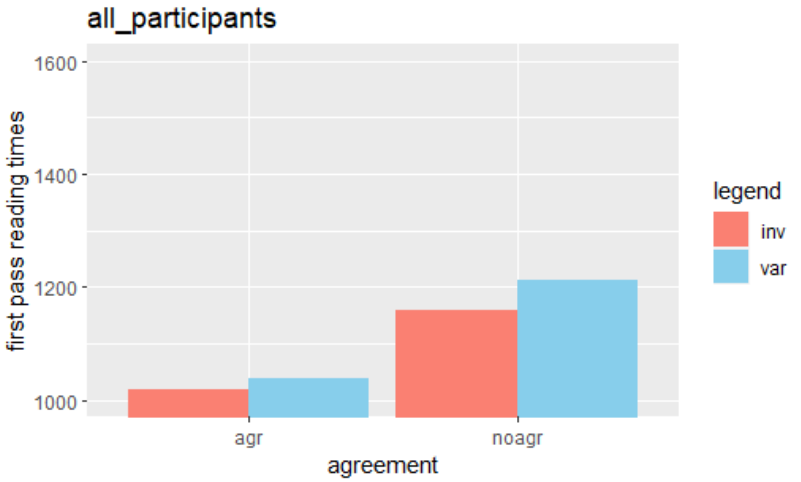


Figure 1: First-pass and total reading times in four experimental conditions. *Note:* Left-side bars in each diagram represent conditions with agreement, right-side bars represent conditions without agreement. Conditions with invariable adjectives are marked in red, and those with variable adjectives in blue.

Figure 2: Relation between difference score in total reading times and performance in a gender production task.

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The effect of L1 on the acquisition of definiteness in L2: Evidence from L1-English and L1-Russian bilinguals acquiring L2-Hebrew

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Definite use can serve various functions such as anaphoric (maintaining a previously mentioned referent), bridging (assuming part-whole relationships in given information) (Ariel, 1990), or

context-dependent (pragmatic enrichment of new information using definite nouns under specific restrictions) (Roberts, 2003). Previous studies show cross-linguistic effects, i.e., effects of L1 properties, for the acquisition of articles in L2-Enlgish (see Ionin et al., 2022; Zdorenko & Paradis, 2008, 2012). The present study investigates the impact of L1 properties on the acquisition of definiteness marking in the second language (L2) by looking into L2-Hebrew of bilingual children with L1-Enlgish and L1-Russian as compared to Hebrew-speaking monolingual child and adult controls.

The three languages (Hebrew, Russian, and English) vary with respect to definiteness marking. Hebrew marks only definite nouns using the article *ha-* and the object marker *et* that precedes only definite objects (Danon, 2001). English has indefinite articles for count nouns *a/an*, and the definite article *the* marks count, mass and plural nouns (e.g., Schaeffer & Matthewson, 2005). Russian has no articles in its grammatical system (e.g., Nichols, 1988). Previous studies on definiteness marking in Hebrew show that monolingual children exhibit adultlike production by age 3;6 (Uziel-Karl, 2015; Zur, 1983). English-Hebrew bilingual children were shown to have relatively few article omissions in Hebrew (Altman et al., 2016). For Russian-Hebrew bilinguals the results are mixed; while some studies report omissions of definite articles (e.g., Meir et al., 2017), others report similar proportion of (in)definite use in narratives in typically developing monolinguals and bilinguals (e.g., Fichman et al., 2022).

Using the "Baby bird" narrative in Hebrew of the Multilingual Assessment Instrument for Narratives (MAIN) (Gagarina et al., 2012), definiteness use was evaluated in four groups: (1) Monolingual Hebrew-speaking adults (N=20), (2) Monolingual Hebrew-speaking children (N=20, ages 5-8), (3) English-Hebrew-speaking bilinguals (N=21, ages 5-10), and (4) Russian-Hebrew-speaking children (N=27, ages 5-8). Narratives were transcribed using the CHILDES project (MacWhinney & Snow, 1990). Coding scheme included Definiteness (+/-), Type of definiteness use (Anaphoric, Bridging, or context), and target use (1/0) (see Table 1).

Using mixed-effect modelling with Participant as a random effect, the findings show that monolingual children were adult-like (see Fig 1-3), while both bilingual groups were less accurate than adult controls. Furthermore, pairwise comparisons showed that bilinguals with L1-English were on par with monolingual Hebrew-speaking children, while bilinguals with L1-Russian lagged behind. Further error pattern analysis showed that Russian-Hebrew bilinguals

were more likely to omit definite article compared to their monolingual Hebrew- and English-Hebrew-speaking peers, specifically in anaphoric environments, corroborating previous findings (e.g., Meir et al., 2017).

To conclude, the present study corroborates findings of the adultlike production of (in)definiteness system by monolingual Hebrew-speaking children (Uziel-Karl, 2015; Zur, 1983). Furthermore, the study provides evidence for the effects of cross-linguistic influence in L2 article acquisition, showing that L2-Hebrew definiteness is shaped by L1 properties, in line with previous studies for L2-English acquisition (e.g., Ionin et al., 2022; Zdorenko & Paradis, 2008, 2012).

	Def.	Type	Correct use	Context
cipor	-		1	*Pa'am cipor halxa letayel.*
'a bird'				'Once upon a time a bird went for a walk.'
et ha-cipor	+	ANA	1	*Hu tafas* ***et ha****-cipor*
ACC-DEF-bird				He caught **ACC DEF**-bird
et ha-zanav	+	BRID	1	*Hu mashax* ***et ha****-zanav shel ha-xatul*
ACC DEF-tail				'He pulled **ACC DEF** -tail of the cat.'
al ha-ec	+	CONTEXT	1	*Hu tipes al* ***ha****-ec*
on DEF-tree				He climbed on **DEF** -tree

Table 1. Examples of different coding scheme (adapted from Ficham & Altman, 2019)

Fig 1. Target (in)definite use per Group

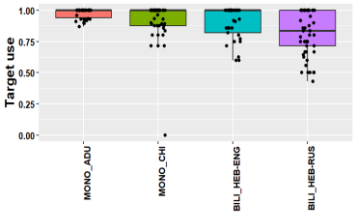
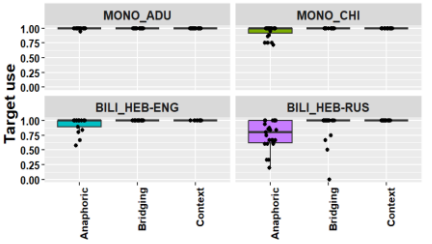


Fig 2. Target definite use per Type and Group



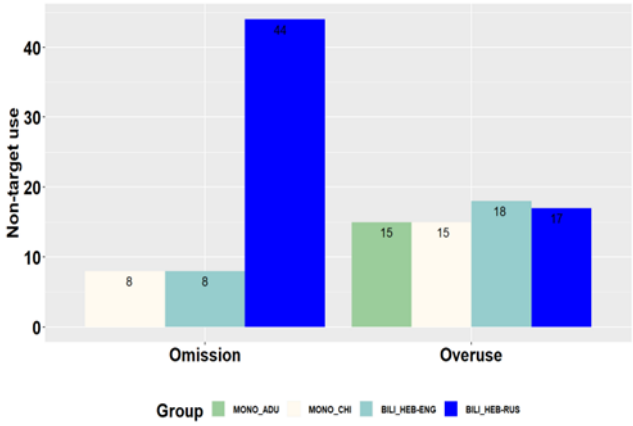


Fig 3. Non-target use per Group.

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The Effect of Metalinguistic Awareness on Theory of Mind – preliminary findings

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Objective. Bilingual children have precocious Theory of Mind (ToM) skills, that is skills to distinguish between one's own and other's knowledge, desires and intentions (Schroeder, 2018; Diaz & Farrar, 2018). It has been argued that this is due to enhanced metalinguistic awareness, that is bilinguals' experience to link two representations for the same referent (two names for the same object). This study examined the effect of metalinguistic awareness training on ToM.

Methods. We tested 32 participants (target: 34) three- to four-year-old monolingual children in the United Kingdom. They took part in a pre-test, a training period of eight sessions (twice per week for 4 weeks) and a post-test. For the pre- and post-test, children were tested on three ToM tasks (Director task, Sally Anne, Unexpected content), an executive function (EF) task (Blue dog/red dog), vocabulary (British Picture Vocabulary Scale), and number knowledge (Numeral identification). For the training sessions,

children were randomly assigned to either metalinguistic training (experimental group) or numerical training (active control group). For the metalinguistic training, we used the Synonym Judgement task, which had previously been found to be related to enhanced ToM skills (Diaz & Farrar, 2018; Fan et al., 2015; Hsin & Snow, 2017). For the numerical training, we used "the Great Race" task (Ramani & Siegler, 2011). We expected metalinguistic awareness training to improve ToM, with EF and vocabulary knowledge as potential moderators.

Results. Tables 1 show preliminary results. A two-way ANOVA was carried out on the Director Task, the Sally Anne, and the Unexpected Content task with group as between-subject factor and timepoint as within-subject factor. For the Sally Anne task we found a significant effect of group (F (1) = 9.54 p = .003), with children in the metalinguistic training group scoring higher at both time points. For the Director task, we found a significant effect of time (F (1) = 9.99, p = .003), with lower scores post training compared to pre training. For the Unexpected content task, we found neither an effect of group (F (1) = 2.66, p = .11) nor time (F (1) = 0.001, p = .97). In addition, there was no significant interaction between groups and time on any of the tasks.

Conclusion. These preliminary results suggest that metalinguistic awareness training does not lead to increased ToM skills. But our training might not have been extensive enough to lead to changes, especially when compared to the extensive experience of a bilingual child.

Further analyses will investigate whether children improve on the training task across sessions and whether improvement on the training task is related to changes between pre- and post-test. We will also test whether children who followed the numerical trained exhibit improvements in numeral knowledge. Furthermore, we will investigate whether inhibitory or vocabulary skills pre-intervention might interact with the effect of the intervention, and whether improvements in ToM (or numeral knowledge) might be related to improvements in inhibitory or vocabulary skills.

Keywords: ToM, Metalinguistic Awareness, Executive Function, Preschool children, Monolinguals

	Metalinguistic Group *M* (*SD*), *N* = 17	Numerical Group *M* (*SD*), *N* = 15
Director task (pre)	1.82 (1.01)	1.86 (0.86)
Director task (post)	0.93 (1.10)	1.00 (1.29)
Sally Anne (pre)	2.41 (0.71)	1.79 (0.58)
Sally Anne (post)	2.33 (0.98)	1.77 (0.60)
Unexpected content (pre)	1.53 (0.80)	1.14 (0.54)
Unexpected content (post)	1.47 (0.74)	1.23 (0.83)

Table 1. Descriptive Statistics for Metalinguistic and Numerical Training Group at Pre- and Post-test.

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The Multilingual Picture Database

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The growing interdisciplinary research field of psycholinguistics is in constant need of new and up-to-date tools which will allow researchers to answer complex questions, but also expand on languages other than English, which dominates the field. One type of such tools are picture datasets which provide naming norms for everyday objects. However, existing databases tend to be small in terms of the number of items they include, and have also been normed in a limited number of languages, despite the recent boom in multilingualism research. In this paper we present the Multilingual Picture (Multipic) database, containing naming norms and familiarity scores for 500 coloured pictures, in thirty-three languages or language varieties from around the world (Table 1). The data was validated with standard methods that have been used for existing picture datasets. This is the first dataset to provide naming norms, and translation equivalents, for such a variety of languages; as such,

it will be of particular value to psycholinguists and other interested researchers. The dataset has been made freely available. We welcome expressions of interest to norm Multipic in more languages and language varieties.

Table 1- Languages in Multipic

Languages with available Multipic norms			**Forthcoming**
Arabic (Lebanese)	**Finnish**	**Portuguese**	**Albanian**
Basque	**French**	**Russian**	**Brazilian Portuguese**
Catalan	Metropolitan	**Serbian**	**Galician**
Chinese	Québécois	**Slovak**	**Japanese**
Cantonese	**German**	**Spanish**	**Latvian**
Mandarin	**Greek**	Peninsular	**Maltese**
Czech	Standard	Rioplatense	**Maltese English**
Dutch	Cypriot	**Turkish**	**Scottish Gaelic**
Standard	**Hebrew**	**Welsh**	**Slovenian**
Flemish	**Hungarian**		**Vietnamese**
English	**Italian**		
American	**Korean**		
Australian	**Malay**		
British	**Norwegian**		
Malay	**Polish**		

The presence of orthography enhances regressive crosslinguistic influence in Spanish-Basque-English trilinguals

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Orthography is omnipresent in instructed language learning, and its effects on L2 speech production receive growing attention. Orthography facilitates word learning and phonological accuracy but hinders phonetic accuracy when L1 and L2 sound-letter mappings mismatch (for a recent review: Hayes-Harb & Barrios, 2021). No research has yet investigated orthographic influence in trilingual speech production, which is an important topic considering that virtually all adult participants in research studies are literate and that the majority of high school students in the European Union speaks at least two non-native languages (Eurostat, 2021). However, it is established that trilinguals' languages interact progressively (L1/L2→L3) or regressively (L3→L1/L2). In regressive crosslinguistic influence (rCLI), L3→L2 influence is stronger than L3→L1 influence (Cabrelli Amaro, 2017a, 2017b). In the present study, we combined the research fields on orthographic effects on speech production and rCLI by testing whether the speech elicitation method affected rCLI in 55 Spanish-Basque-English trilinguals. Participants were young adults (M_{age}=25.15 years) who acquired Spanish from birth, Basque in early childhood ($M_{AoABasque}$=2.8 years) and English as a third language slightly later ($M_{AoAEnglish}$=5.8 years). We measured voice onset time (VOT) production elicited in two tasks: picture naming and reading aloud. Spanish and Basque have similar VOT (prevoiced voiced plosives; short lag voiceless plosives), while English has longer VOT (short lag voiced plosives; aspirated voiceless plosives). Importantly, Spanish, Basque, and English plosives map onto the same letters. If the presence of

orthography modulates rCLI from English, it would result in longer VOT in L2-Basque in the reading aloud task than in the picture naming task. We analyzed all data in mixed-effects models in RStudio (RStudio Team, 2022). As expected, in the picture naming task, participants produced prevoiced voiced plosives in Spanish (94% prevoiced) and Basque (94% prevoiced) and fewer prevoiced voiced plosives in English (73% prevoiced); and voiceless plosives with short positive VOT in Spanish (29 ms) and Basque (30 ms) and significantly longer VOT in English (42 ms). In the reading aloud task, VOT of voiceless plosives increased in all languages compared to the picture naming task (Spanish=30 ms; Basque=31 ms; English=45 ms), showing a language-independent task effect. Furthermore, in the reading aloud task, participants produced fewer L2-Basque voiced plosives with prevoicing (91%) than in the picture naming task, while no between-task differences were observed for L1-Spanish or L3-English. This means that L2-Basque voiced plosives were produced less native-like in the reading aloud task than in the picture naming task. These results suggest that the online influence of orthography increases rCLI from L3-English to L2-Basque, but that rCLI appears limited to less stable phonetic categories, as no rCLI was observed in voiceless plosives. We argue that voiced plosives are relatively less stable than voiceless plosives in Spanish and Basque due to their allophonic variation and later acquisition age (Hualde, 1991; Macken & Barton, 1980). We discuss the methodological implications of these findings and how they inform two research fields: 1) orthographic effects in L2/L3 production and 2) multilingual crosslinguistic interactions.

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Pronoun comprehension can be challenging for second language (L2) speakers, especially in contexts where the referent for the pronoun is ambiguous, for instance, where a pronoun can grammatically refer to either of two potential antecedents in the preceding discourse (Roberts, Gullberg & Indefrey, 2008). Most L2 acquisition studies have focused on speakers of a non-pro-drop language, such as English, with obligatory overt pronouns, who are learning a pro-drop system, with null pronouns (e.g., Chinese). In languages that allow pronoun omission, explicit pronouns often signal a shift in discussion topic (Shibata & Yashima, 2014), a feature not typical in non-pro-drop languages. Yet, studies investigating pronoun resolution with L2 speakers from a pro-drop first language (L1) background acquiring the assumed less complex non-pro-drop system are limited and yield mixed results. Some studies find that L2 learners employ native-like strategies effectively in straightforward contexts (e.g., "John met Paul while he was in high school"), but struggle in more complex scenarios where equally prominent antecedents are presented through conjunctions (e.g., "Carlos and Martin are at the office. While Carlos is working, he is eating lunch"), leading to variability in pronoun resolution (Contemori, Asiri & Perea Irigoyen, 2019; Contemori & Dussias, 2020; Cunnings, Fotiadou & Tsimpli, 2017; Roberts et al., 2008). This study focuses on 50 native Mandarin Chinese speakers, who are L1-pro-drop users, and compares them with 50 native English speakers using distinct methods: the eye-tracking during a visual world paradigm tapping into real-time processing and implicit knowledge, and a picture selection task to assess non-real-time comprehension and the explicit knowledge of pronouns. Participants first listen to 24 sets of critical sentences while viewing corresponding displays where two possible antecedents of pronouns and a distracted item/launch pad are introduced, and following each item, they are prompted to answer follow-up questions by selecting pictures of referents on the screen. 72 filler sentences are included, with half of these followed by yes/no questions. The research also explores to what extent the order of mention and the dynamics of topic continuity or topic shift impacts pronoun resolution (sample materials provided below).

Stimuli Samples

(1) Mother Sentence: The doctor (female) and the president (female) are in the office.

a. First Mention: While the doctor is working on the report, she is listening to a song.

b. Second Mention: While the president is working on the report, she is listening to a song.

(2) Mother Sentence: The doctor (male) and the president (female) are in the office.

a. Topic continuation: While the doctor is working on the report, he is listening to a song.

b. Topic shift: While the doctor is working on the report, she is listening to a song.

Figure 1 Visual display for [1a&1b]

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Although English articles (a[an]/the) are arguably one of the hardest features to acquire for second language (L2) learners, research suggests that learners from first language (L1) backgrounds that also grammaticalise articles, can be highly accurate at article suppliance even at lower proficiencies (Ionin et al., 2008). However, apart from the L1, not much is known about which other individual characteristics facilitate L2 English article acquisition. Studies in other areas of SLA suggest that gains in the declarative memory subserve semantic learning (e.g., the mental lexicon) while gains in the procedural memory aid syntactic learning (Morgan-Short, 2014), but the role of the declarative/procedural memory has never been studied in relation to L2 English article acquisition.

Here we present preliminary findings of a larger study (pre-registration) with 70 L1 Spanish L2 English learners (whose L1 has articles) and 40 L1 English controls to contribute to our understanding of (1) whether L1 Spanish L2 English learners benefit form L1 transfer and are sensitive to online article violations already at intermediate proficiency, and (2) to what extent the declarative/procedural memory systems facilitate this online processing of L2 English articles. The explicit and implicit knowledge of English articles (both omission: *I saw cat*., and substitution: *I saw a/the cat*.) was assessed using acceptability judgement (AJ) and self-paced reading (SPR) tasks. For the SPR and AJ tasks, we developed 48 scenarios (24 indefinite and 24 definite) with the critical item consisting of singular noun in anaphoric direct object position. The individual differences in declarative and procedural memory were assessed via yes/no vocabulary size test (Meara & Miralpeix, 2017), and Tower of Hanoi respectively.

The preliminary data for 28 L1 Spanish L2 English participants have been analysed using mixed-effects regression with by-participant and -item random slopes for within- measures and intercepts for between- measures (Barr, 2013).

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The role of lexical overlap and cognate facilitation in initial child foreign language speech segmentation

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Adults initially struggle to segment word forms from continuous speech in a foreign language (FL) before they have systematic exposure to it, but do better when words partially overlap in form and meaning with their L1 equivalents (i.e. cognates: English: /bʌtər/; German: /bʊtɐ/; noncognates: English: /mɪrər/; German: /ʃpi:gl/; Shoemaker & Rast, 2013). The listener already has a representation for the sequence of sounds from their L1, which may facilitate segmentation and recognition of the form-similar FL word. Lexical access improves with age (e.g. Kim & Na, 2008), making it more likely that adults can take advantage of their existing representations to segment foreign speech. To assess the extent to which developing L1 knowledge affects segmentation, we examine whether L1 lexical overlap facilitates the segmentation of English speech among German 6- to 9-year-old primary-school students before they receive instruction in English.

In a word recognition study, English-German cognate and noncognate word pairs (n = 160) were embedded into an otherwise identical English sentence frame (*You pushed some butter/mirror mustom to the exit*). 113 German 6- to 9-year-olds listened to the sentence followed by an isolated probe-word that either did (target) or did not (lure) appear in the sentence. Participants indicated via button press whether they had heard the probe word in the sentence (word acceptance).

A general-linear mixed model revealed a main effect of word status (target vs. lure; $\beta = 1.18$, SE = 0.04, $p < .001$) but no main effect of or interaction with cognate status (p's > .05). Word acceptance was higher for target compared with lure probe words (Figure 1) but this pattern did not differ between cognate and noncognate words. Word acceptance for both targets (*EMM* = -0.27, *SE* = 0.12, $p = .02$) and lures was significantly below chance (*EMM* = -1.46, *SE* = 0.12, $p < .0001$).

Although word acceptance was higher for targets compared with lures, this difference was driven by high performance in rejecting the lures as words, suggesting that memory traces of the strings are sufficient to recognize the mismatch with lure words, but not to recognize the match with the target words. This interpretation is supported by the lack of facilitated recognition for cognate words, suggesting that listeners did not activate L1 lexical representations purely on the basis of phonological overlap.

In a follow-up experiment we will examine whether first activating the L1 German lexical entry will strengthen the

representation for segmented cognate words and facilitate recognition. Participants will first preview a pair of pictures before completing the segmentation task. The pictures will depict the cognate and noncognate targets in the paired English sentence frames. We expect that participants will implicitly activate the label for these objects in German (Meyer et al., 2007). If we find improved recognition of target cognate words, relative to chance and non-cognate targets, it may indicate that early FL learners rely on L1 lexical entries in initial FL segmentation, but only when these entries have been preactivated, thus narrowing the candidate set of L1 words.

Keywords: foreign language learning, speech segmentation, lexical overlap

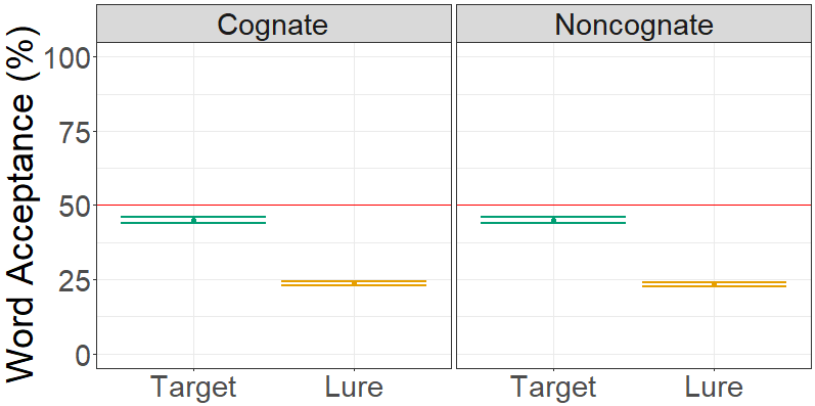

Figure 1. Word acceptance (%) for cognate and non-cognate target and lure words.

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Verb aspect processing in monolingual and bilingual heritage speakers of Turkish

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Introduction. We explore the incremental processing of grammatical aspect in Turkish among monolinguals and bilingual heritage speakers, conceptually replicating recent Visual World Paradigm

(VWP) eye-tracking studies that demonstrated incremental sub-word level processing in monolingual English, Russian and Spanish (Minor et al., 2022, 2023). In addition, we ask whether aspectual distinctions will be recognized by heritage speakers of Turkish who have shown reduced sensitivity to TAM-morphology in previous studies (Arslan et al., 2017; Coşkun Kunduz, 2018). We also included language proficiency (C-tests and self-rating assessment) and processing speed (WAIS-IV subtest) to account for the expected individual variation.

Hypotheses. We expect a substantial difference in how aspect is processed in Turkish. Participants will favor perfective aspect for completed events whereas imperfective aspect will be preferred for ongoing events. Additionally, we anticipate that Turkish heritage speakers will show a reduced effect in comparison to monolinguals. We also predict that processing speed and proficiency levels will be able to predict how participants process and comprehend aspectual information.

Methods. We conducted a picture selection task and VWP eye-tracking using the same design as Minor et al. (2022, 2023). Twenty-five bilingual heritage speakers and 28 monolingual speakers saw images of completed and ongoing events side by side. There were 24 critical stimuli sentences in two conditions (Perfective and Imperfective), and 20 unrelated fillers. After each item, participants were asked to select the image that corresponded to the sentence.

Results. Monolinguals achieved 95.5% mean accuracy (SD=1.8%) and heritage speakers 89.9% (SD=3.2%). Analysis using binomial Generalized Linear Mixed-Effects models (bGLMM) to predict accuracy found significant effects of Aspect β=-2.1 (SE=0.7, $p<0.01$) and Proficiency β=0.1 (SE=0.05, $p<0.05$). This indicates that participants' accuracy drops in the perfective condition compared to the imperfective condition. Cluster-based permutation analysis confirmed incremental processing of aspectual information (Figure 1), but it also points to a reduced effect compared to monolinguals. We ran an additional bGLMM which shows that participants with higher processing speed and proficiency levels were more sensitive to aspectual differences.

Discussion. Monolingual and heritage speakers process and comprehend overt marking in the imperfective better than the default unmarked perfective. This study broadens our understanding of incremental processing in heritage speakers

who show more variance than monolinguals which can be explained by individual proficiency levels and processing speed.

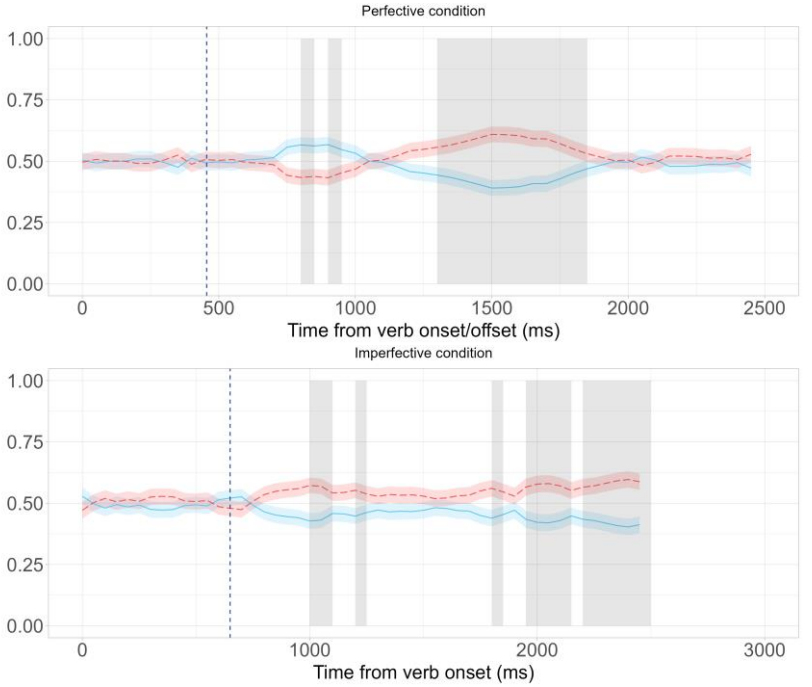

Figure 1. The subfigures show the eye-tracking results for the heritage speaker group as looks to the Target and Competitor images under the Perfective and Imperfective conditions. The grey shading highlights significant clusters of time bins. The red line represents looks to the Target, and the blue line represents looks to the Competitor. The dashed vertical line indicates the mean verb offsets.

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Verb-bias effects in L1-to-L2 and L2-to-L1 cross-linguistic structural priming

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Introduction. Structural priming, the tendency of speakers to repeat a structure they just heard (e.g., Bock, 1986) has been found to be long-lasting, indicative of learning (e.g., Jaeger & Snider, 2013). A key piece of evidence of learning is that less preferred structures

prime more strongly and therefore yield more learning (i.e. inverse-preference effects; Ferreira & Bock, 2006). Whilst there is some evidence that structural priming *between* languages can be longer-lasting as well (Ahn & Ferreira, 2023; Hwang & Shin, 2019) it is unclear to what extent structural preferences affect cross-linguistic priming and whether their effects are different in L1-to-L2 priming compared to L2-to-L1 priming. In this study, we investigated and compared L1-to-L2 and L2-to-L1 priming of ditransitive structures in German and in English native speakers in a German-to-English cross-linguistic priming task. Both languages allow for prepositional object (PO; *the clown mails a postcard to the pirate*) and double object structures (DO; *the clown mails the pirate a postcard*). To test for preference effects on priming, we manipulated the structural biases of the German prime verbs. To test for learning we investigated cumulative priming effects over the course of the experiment and changes in participants' production of ditransitive structures in a post-test compared to a baseline task. We asked the following research questions:

RQ1) Do prime verb biases modulate immediate L1-to-L2 and L2-to-L1 structural priming?
RQ2) Does L1-to-L2 and L2-to-L1 priming of ditransitive structures result in learning?

Method. Ninety-two L1-German-L2-English adults and 89 L1-English-L2-German adults participated. In a German-to-English priming task, a spoken DO or PO prime preceded each picture description. There were 4 English target verbs, 4 strongly-DO-biased and 4 weakly-DO-biased German prime verbs which were PO-biased in their English translation (Şafak & Hopp, 2023). Baseline tasks measured PO/DO production preferences for English and German ditransitive prime and target verbs through picture descriptions. A post-test measured English DO/PO production afterwards. We predicted stronger immediate PO priming the more DO-biased German prime verbs were. Furthermore, we expected adaptation towards the less preferred PO structure over the course of the experiment, and we expected this adaptation to persist in the post-test.

Results. Generalized linear mixed effects models showed verb biases to modulate immediate priming effects in both the L1 German and the L1 English group. However, for the L1 German group, prime-verb biases in German predicted short-term priming,

while, for the L1 English group, the prime-verbs' translation-equivalents' biases in English predicted short-term priming. In addition, cumulative priming held for PO structures in the L1 German group and for DO structures in the L1 English group. In sync with cumulative priming, longer-term learning from baseline to post-test was observed in terms of increased production of POs in the L1 German group and increased production of DOs in the L1 English group. (see Figure 1).

Discussion. Our results show that verb biases modulated immediate L1-to-L2 and L2-to-L1 priming. For both groups, what mattered were participants' verb biases in their dominant L1, even when they were primed in their L2. Participants were found to adapt towards the structure they initially preferred less as per their L1 verb biases. Such cumulative priming carried over to an unprimed post-test, indicative of learning. Our results are largely in line with within-language priming studies (e.g., Bernolet & Hartsuiker, 2010; Kaan & Chun, 2018) and suggest that (longer-term) cross-linguistic structural priming both from L1-to-L2 and L2-to-L1 reflects an implicit error-based learning mechanism (e.g., Chang et al., 2006). Critically, even though the same priming mechanisms underlie learning and the two groups received the same input in the priming phase, the two groups adapted to opposite structures as a consequence of their different L1 biases: more POs for the L1 German group, and more DOs for the L1 English group. Hence, this study shows that different preferences push cross-linguistic priming with the same primes in opposite directions, leading to substantially different learning outcomes.

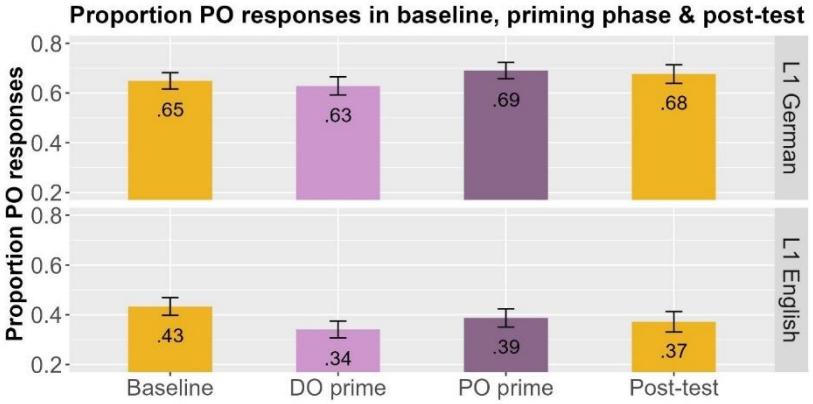

Figure 1. Mean proportions (in numbers on the bars) and standard errors of L1-English and L1-German participants' PO productions in the baseline (pre-test), priming phase (after PO versus DO primes) and post-test.

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Visual Event Representation Facilitates the Processing of Grammatical Case by Russian-German Bilingual Children

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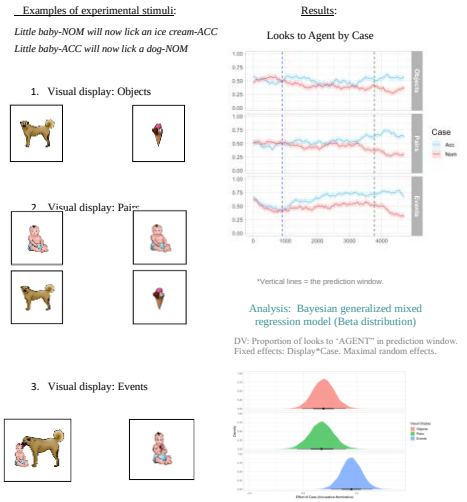
The development of psycholinguistic methods over the last decades has allowed for a deeper and qualitatively new understanding of language processing as it unfolds in real time. Converging evidence suggests that language processing is highly incremental and involves interconnected sub-systems or 'modules' (phonological, syntactic, lexical, etc.) which are activated in parallel to decode and anticipate the incoming linguistic signal (Brodbeck et al. 2022; Hagoort 2008; Huettig 2015). However, less is known about the parallel processing of linguistic and non-linguistic information, especially the interaction between non-linguistic (e.g., visual) and grammatical cues.

In this study, we investigate how subtle changes in visual representations can affect the processing of grammatical case cues in heritage Russian by German-Russian bilingual children (N=50, 8-13 y.o.). The linguistic manipulation followed previous designs

(Kamide et al. 2003) contrasting SVO sentences – with NP1 marked with nominative case and NP2 marked with accusative, and OVS sentences – where the case marking was reversed. For example, 1) 'The hare (acc) will now find the fox (nom)'; 2) 'The hare (nom) will now find the cabbage (acc)'.

Unlike previous studies, we contrasted three types of visual displays: representing **individual referents** (potential agents/themes of the action; e.g., 'the fox' vs 'the cabbage'), **pairs of referents** (the referent of NP1 + potential agent/theme; e.g., 'the hare + the fox' vs 'the hare + the cabbage'), and **events** (representing interactions between the referent of NP1 and the potential agent/theme; e.g., 'the fox finding the hare' vs 'the hare finding the cabbage'). We found that the participants were significantly more sensitive to the case manipulation when they viewed depictions of **events** compared to the other types of visual display. No significant differences in effect size were observed between the displays representing individual referents vs pairs of referents. This suggests that the participants were able to quickly integrate the thematic role information signalled by grammatical case with the visual cues in the **event representations**, facilitating the identification of the target picture. On the other hand, just co-presenting the pairs of referents together doesn't lead to facilitation in grammatical case processing (as opposed to presenting them in an event representation with clear visual cues to thematic roles).



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Well-being and motivation in later life intervention studies – a pilot study comparing language learning and a combined physical-cognitive course

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Investigating ways of promoting healthy aging has never been more pressing than in our rapidly aging society. An emergent field is now dedicated to investigating the impact of later life language learning, due to the influence that life-long bilingualism has been shown to have on cognitive reserve (for a review see Berkes, & Bialystok, 2022). In the absence of lifelong bilingualism, novel language learning has been proposed as a particularly effective later life training to enhance cognition, as the activated brain regions overlap with areas often affected by age-related cognitive decline or indeed brain apathy (Antoniou et al. 2013; Antoniou, & Wright, 2017). To date, investigations into later life language learning and the cognitive effects to ensue from it have produced mixed results, pointing to a

need for replication to increase comparability across studies (for a review see Pot et al., 2019; van der Ploeg et al., 2020).

Later life language learning also appears to be a promising method for increasing overall well-being in elderly due to being a socially and cognitively stimulating experience. However, little is known about the modulating factors as well as the link between well-being and motivation in (language) interventions for later life learners. Alongside high self-reported well-being, the motivation of the participants of the 4-week intensive English course for beginners in the study of Pfenninger, & Polz (2018) increased continuously over the timespan of the intervention. In the study of van der Ploeg et al. (2023), motivation did not significantly change over the course of a 3-month online English language intervention for later life learners, but an increase in well-being was registered in the daily diary data.

Though some studies have started comparing later life language learning to other interventions to enhance cognition, it remains unclear which type of intervention is most beneficial and feasible for elderly people as well as most effective in increasing well-being.

In our pilot study, we investigated the effect of a 4-week language intervention (n=3; learning English in a non-anglophone environment) compared to a combined physical and cognitive training (n=4; playing cognitively demanding board games and movement) on cognition and well-being in elderly with varying degrees of cognitive decline. We report findings from the WHO quality of life questionnaire as well as data from a daily survey (tapping into well-being, motivation, and perceived positive impact of the course), where we find a connection between fluctuations in well-being and motivation.

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What you hear is not what you see: irony comprehension in monolingual and multilingual children

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Research suggests that multilingual children are more sensitive than their monolingual peers to non-verbal information, such as eye gaze and tone of voice, at least in referential communication tasks (e.g., Verhagen, Grassman & Kuntay, 2017; Yow & Markman, 2011a, 2011b). Irony provides an interesting case to examine whether and to what degree comprehension of another speaker is facilitated by heightened sensitivity to non-verbal cues. In an ironic sentence, the verbal message is in contradiction with the non-verbal information (i.e., when you say "What a delicious ice cream" while looking angry or disappointed). To understand an ironic sentence, a listener must thus interpret and integrate both verbal and non-verbal information.

In the current study, we investigate whether multilingual children comprehend irony more readily than monolingual peers due to a potentially higher sensitivity to non-verbal information in multilingual children. We also investigate whether comprehension is modulated by familiarity with speaker behavior. 60 Monolingual Dutch and 60 multilingual (Dutch + other language(s)) children between the ages of 5 and 7 completed an irony judgement task. In this task, the children watched videos of 4 speakers producing utterances of the type 'What a + adjective + noun' (e.g., 'What a

beautiful car!') in either an ironic or non-ironic manner and indicated for each video whether the speaker was being ironic or not. The experiment contained 2 main blocks with 2 speakers each, and an intervening speaker familiarization block that contained only ironic (or only non-ironic) utterances by one of the speakers that would appear shortly after in the second main block. We measured accuracy and response latencies. In addition, all children performed a set of tasks measuring receptive vocabulary, basic emotion recognition, detection of real and apparent emotions, response inhibition and working memory. A caregiver questionnaire was administered to the children's parents to measure language use and exposure.

In contrast to our hypothesis, preliminary results (based on 100 children) reveal that monolingual children were faster and more accurate than multilingual children in processing ironic but not non-ironic sentences. Second, previous exposure to a speaker improved the ability to read their intention, but only when earlier encounters were purely ironic. This effect did not differ between monolinguals and multilinguals. In conclusion, multilingual children's enhanced sensitivity to non-verbal cues in referential communication tasks does not seem to extend to their understanding of ironic sentences. However, we have not yet analyzed performance on the additional tasks in relation to irony comprehension in monolinguals and multilinguals. The results from this study contribute to a better understanding of the different factors underlying irony comprehension, and whether or not exposure to multiple languages plays a role in understanding non-literal language.

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When the dative becomes less reliable – L1 attrition in a multilingual context

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In two experiments, we investigated the use of morphological case for argument interpretation in a group of German L1 speakers (n=34) in Norway. All expats were regularly exposed to their later-learned languages Norwegian (~43%) and English (~30%). Unlike German, both Norwegian and English lack case marking on full NPs, and word order is a reliable cue to argument interpretation. Like in German, [+definite] is realized on pre-nominal articles in English, while in Norwegian it is realized post-nominally as a suffix; see overview below.

pre-nominal articles:	German, English, Norwegian
pre-nominal definite articles:	German, English
case marking on articles:	German

Following models such as the *Competition Model* [1] or the *Attrition via Acquisition* model [2], cross-linguistic influence from additional languages on the L1 should occur especially in contact situations in which languages display similar, but also slightly different, properties.

Participants were presented with two event scenes, one showing an event as described by a transitive or ditransitive sentence, see Table 1, and another showing the same event, but the roles of agent and patient (transitive events) or recipient and theme (ditransitive events) were reversed. The task was to select the target scene. Picture selection was combined with the recording of eye movements (Experiment 1) or mouse movements (Experiment 2). In both experiments, we found no strong evidence of an influence from

Norwegian and/or English, that is, no overreliance on word order. When presented with an OVS sentence, participants used the case cue to revise any initial expectation towards an NP1-as-agent interpretation. Experiment 1 showed that the expats used accusative case in transitive and ditransitive sentences to predictively fixate on the target scene. However, unlike a previously tested group of L1 speakers in Germany [3], they did not or to a limited extent use dative case as a predictive cue, indicating effects of attrition specific to dative morphology. For an illustration, see Figure 1.

Our finding that dative morphology is prone to L1 attrition is in line with previous research showing a specific vulnerability of the dative in (child) L2 attrition [4] as well as heritage German [e.g., 5]. Importantly, unlike in previous research, in our study this cannot be explained in terms of incomplete or differential acquisition, as our participants were adults when they moved away from a German-speaking environment.

Table 1. Example items for the transitive and ditransitive structure set: The critical time window for a prediction effect in the eye-tracking experiment is indicated in grey.

Transitive structure set			
Subject-verb-object (SVO)	*Der Prinz* The$_{NOM}$ prince	*besiegt schließlich*	*den Drachen* the$_{ACC}$ dragon$_{ACC}$
Object-verb-subject (OVS)	*Den Prinzen* The$_{ACC}$ prince$_{ACC}$	defeats finally	*der Drache* the$_{NOM}$ dragon
Ditransitive structure set			
Der Krankenpfleger bringt .../ The (male) nurse brings …			
Indirect object-direct object (IO-DO)	*der* the$_{DAT}$	*Ärztin morgens*	*den Patienten* the$_{ACC}$ patient
Direct object-indirect object (DO-IO)	*die* the$_{ACC}$	doctor in the morning	*dem Patienten* the$_{DAT}$ patient

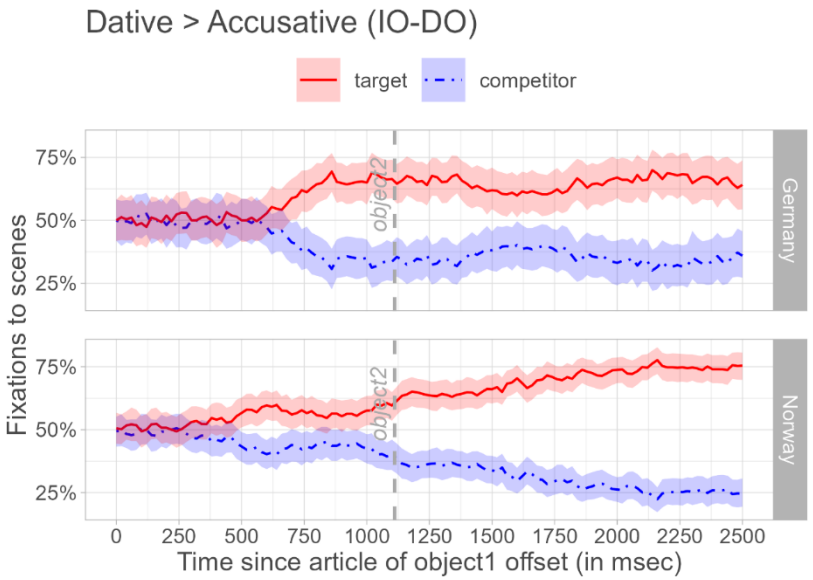

Figure 1. Fixations to the target (solid, red) and competitor scenes (dot dashed, blue) from article of object1 offset (i.e., *der*) for the previously tested L1 group in Germany (top) and the L1 group in Norway (bottom). Dashed vertical lines indicate the average onset of object2.

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Within and Across-Language Priming and the Lexical Boost Across Development in a Structurally Biased Language

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Abstract priming is the tendency to reproduce previously heard structures (Bock, 1986) and is enhanced when the verb is repeated across prime and target (i.e., *lexical boost*; Pickering & Branigan, 1998). Further, priming can lead to structural adaptation across time (i.e., *cumulative priming*; Jaeger & Snider). However, there is extremely little research on these core priming effects across development in bilingual children both within and across languages as well as conflicting research in monolingual children. Besides, we lack research on these effects in languages where the two structural alternatives behave differently in bias strength leading to prediction error for infrequent structures (Chang et al., 2000; 2006).

In the present study, we studied core priming effects across growing age (3-4, 5-6, 7-8 and adults) in German speakers (N=193), in early bilingual German L2 speakers with a different L1 (N=164) within German and, extended this study to prime English-German speaking bilinguals across the two languages. We have gathered data from English-German speaking adults (N=30) by now and are currently recruiting English-German speaking children in the same age ranges. The participants described video clips in turns with the experimenter with double object datives (*Dora sent Boots the rabbit – DO*) or prepositional object datives (*Dora sent the rabbit to Boots - PO*) either in German or from English to German. We manipulated verb condition by presenting primes and targets either in the same (SV) or different verb (DV) condition to test for the *lexical boost effect* (within language) and *the translation equivalent boost* (across-languages). Crucially, in contrast to English, German is a DO biased language in which children hardly ever produce POs. We tested this by implementing a baseline session prior to priming.

Within German, we found a strong DO bias in monolingual participants (~80%) and a somewhat weaker DO bias in bilingual children (~70%). In line with Chang et al. (2000; 2006), both groups showed abstract priming and cumulative priming effects (which decreased with growing age) across all ages for the PO but not for the DO structure. Interestingly, we found a significantly higher

priming effect in the youngest monolingual children compared to the older groups due to the initially strongest DO bias (90%) which must have caused stronger prediction error. The lexical boost effect also emerged across development in both groups but developed somewhat earlier in the bilingual group (see Figure 1).

Preliminary results for priming from English to German in adults show the opposite pattern: more adaptation for the DO structure immediately and across time which is the somewhat less preferred option in English. We also find a translation equivalent boost effect (see Figure 2). By the time of the conference, we intend to acquire bilingual child data and answer the following questions: will English-German speaking children show 1) similar priming trajectories as monolingual and bilingual children do within German? 2) a translation equivalent boost effect which will also grow across age? We intend to discuss our results within the framework of current priming accounts in children and adults.

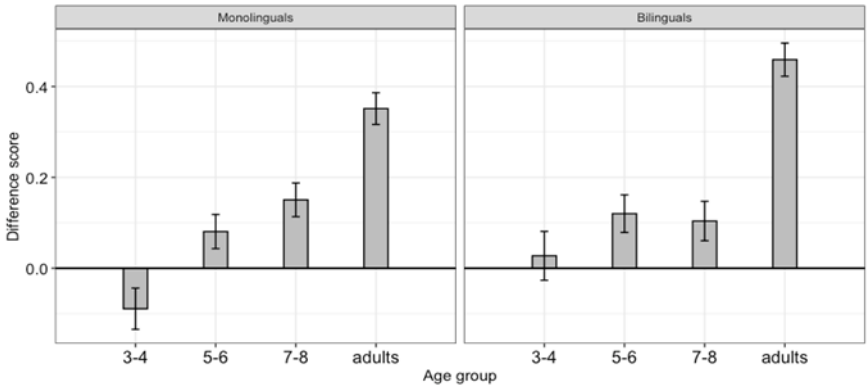

Figure 1: Lexical boost effect within German across development in monolingual (German L1) and early bilingual (any L1 and German L1/L2) children and adults.

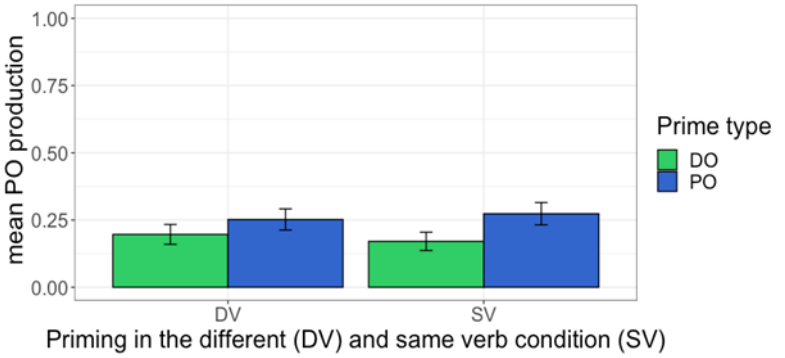

Figure 2: Priming effects (PO production after PO prime compared to DO prime) from English to German in bilingual adults (N=30).

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