Campus Map

6th Annual Conference of the Mathematical Cognition and Learning Society

5-8 June 2023 | Loughborough

www.the-mcls.org/mcls-2023

SIXTH ANNUAL MCLS CONFERENCE LOUGHBOROUGH 2023

Loughborough University

Centre for Mathematical Cognition

GENERAL INFORMATION

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Conference Programme

A digital version of this Programme Booklet and the Book of Abstracts can be found at **https://www.the-mcls.org/conferences/programme**

Registration

Registration takes place in the Exhibition Area. The reception desk will act as a point of assistance throughout the conference.

Quiet/Lactation Room

If you need a quiet room, please just ask at the reception desk.

Wi-Fi Access

Wi-Fi is available anywhere on campus. If you have an existing Eduroam account, you should automatically connect.
Alternatively, you can connect using the Imago network (register with your email address and the code 8362 for activation).

Refreshments

Lunch and coffee/tea will be provided in the Exhibition Area.

Bars, Pubs, and Restaurants

If you wish to get off campus for the evening, there are a variety of bars/ restaurants in the town centre. Make sure to check out our special MCLS Pub Guide at: **https://tinyurl.com/yhu9x2j6**

Slide/Poster Upload

We encourage presenters to upload their slides/ posters ahead of their presentation to**: https://tinyurl.com/43pfarzc**

Bus

The town centre is around a 25-minute walk from the conference venue. The Kinch Sprint bus (term time timetable) operates between the university, town centre, and train station.
http://kinchbus.co.uk/services/sprint

Taxis

There are several taxi companies in Loughborough. If arriving by train, taxis are usually available on the rank. Your hotel will be able to provide additional taxi numbers if required.
ADT Taxis 01509 260000; TK Taxis 01509 231313; Uber (https://www.uber.com/)

Parking on Campus

Parking on campus is free of charge. As you come past the security gatehouse, please inform them you are attending the MCLS conference in the James France Building and you will be given a visitor parking pass to display. We recommend Car Park 18/19.
https://maps.lboro.ac.uk

Pre-Conference Workshops

Three parallel workshops take place on Monday, 5 June, 14:00-17:30.

Data visualisation (Krzysztof Cipora, CC013)

Computing statistical power in R using simulations (Hugues Lortie-Forgues, CC012)

How to make a research lab accessible (Erin Maloney & Fraulein Retanal, CC021)

Trainee Social Event

All trainees are invited to join the social event on Monday evening (18:00) at The Jam Garden to kick off the conference. There will be a walking group to here following the pre-conference workshops.
https://www.jamgardenloughborough.co.uk

Conference Reception

The conference reception will be held on Tuesday, 6 June, in the Edward Herbert Building from 18:00 (food and drinks are included).

Mentoring Lunch

The MCLS Trainee Board is excited to invite you to the mentoring lunch on Tuesday, 6 June, 12:00-13:00 at the room under the terrace. This event is designed to provide an opportunity for attendees to connect with their mentor, mentee, or buddy. During the event, attendees are encouraged to pair up with another mentoring pair to share experiences, learn from each other, and build professional relationships. We will provide discussion prompts to facilitate conversation at **https://tinyurl.com/bdcpjmxj.**

If you don't have a mentor/mentee/buddy yet and you would like to find one, sign up at **https://tinyurl.com/4h57hxpf** for the mentoring program or stop by during the mentoring lunch.

Our goal is to create an inclusive and welcoming environment for all attendees, so please don't hesitate to get in touch with us if you have any questions.

The MCLS trainee board

MCLS Business Meeting

All MCLS members are invited to join the business meeting on Wednesday, 7 June, 15:45-16:45.

WELCOME

Loughborough University
Centre for Mathematical Cognition

As host of this year's international conference of the Mathematical Cognition and Learning Society, the Centre for Mathematical Cognition at Loughborough University sends out a very warm welcome to all attendees and supporters.

We want to thank MCLS for giving us the opportunity to host this year's conference allowing us to play a part in further progressing our field. With 50 symposia, 154 posters, 20 open submission talks, and close to 400 delegates from all around the world, this year's conference is further testament to a growing and flourishing mathematical cognition and learning community.

A few exciting days lie ahead of us: We are looking forward to stimulating discussions, opportunities to learn from each other, and meeting old friends and making new ones!

The Organising Committee

MCLS

On behalf of the MCLS, it is our utmost pleasure to welcome you all to this highly anticipated conference. As we gather here from around the world, we are united by our shared passion for exploring the intricate connections between mathematics, cognition, and education. This conference is not just an avenue for intellectual growth and knowledge dissemination; it is also an opportunity to network, build lasting connections, and share experiences with like-minded individuals who are equally passionate about advancing mathematical cognition and learning. Over the next few days, we have meticulously curated an exciting line-up of workshops, symposiums, and poster presentations that span a diverse range of topics, encompassing mathematical thinking, cognitive processes, home numeracy environments, instructional practices, and much more. We encourage you to actively participate in the various interactive sessions, engage in stimulating conversations, and forge collaborations that will pave the way for transformative advancements in the field. May this conference be a source of inspiration, enlightenment, and fruitful collaborations!

The MCLS Governing Board

ACKNOWLEDGEMENTS

We would like to give special acknowledgement to the Centre for Mathematical Cognition for sponsoring the evening reception on Tuesday 6 June. We are very grateful for the centre's support.

We want to thank **Fondry10** who sponsored additional travel awards for trainees traditionally underrepresented in research careers.

Tuesday 6th June

	Room under the terrace	CC021	CC013	CC012	CC011
8:00 - 9.00	**Registration and Welcome** *(Exhibition area)*				
9:00 -10.15	Learning arithmetic and literacy: Common dynamics and cognitive underpinnings in typical and atypical samples *Chair: Chiara Banfi*	Design and delivery of mathematics intervention in schools *Chair: Sarah Powell*	Emotions, attitudes and beliefs in math learning: new insights from implicit and explicit measures *Chair: Maria Chiara Passolunghi*	Investigating home math environments: Looking beyond mothers' inputs in relation to children's math skills *Chair: Xiao Zhang*	ManyNumbers: A planned multi-lab investigation of the conceptual foundations of early number development *Chair: Melissa Libertus*
10:15 - 10.45	**Coffee Break** *(Exhibition area)*				
10:45 - 12.00	Using real-time data of mathematical thinking and learning processes as a basis for adaptive cognitive and affective support *Chair: Anselm Strohmaier*	More than nothing? Empirical insights into children and adults' conceptions of "zero" *Chair: Nicholas Vest*	Assessing advanced mathematical understanding *Chair: Ian Jones*	Nothing works in isolation: How Mathematics Anxiety Influences Children's Mathematics Achievement *Chair: Serena Rossi*	The impact of language experience on mathematical abilities: Evidence from deaf and hard of hearing children and adults *Chair: Stacee Santos*
12:00 - 13:.00	**Lunch** *(Exhibition area)* & **Mentoring Lunch** *(Room under the terrace)*				
13:00 - 14:00	**Poster Session 1** *(Exhibition area)*				
14:00 - 15:15	Big ideas for little kids: Early conceptual foundations in mathematics *Chair: Alexandria A. Viegut*	Numerical and mathematical cognition among neurodivergent children *Chair: Arcan Altinar*	How much and where: Conceptualizing and measuring different types of children's mathematical language *Chair: Lauren Westerberg*	Mathematical brain before school entry *Chair: Elizaveta Ivanova*	Look what you made me do: Registered reports on early mathematics interventions *Chair: David Purpura*
15:15 - 15:45	**Coffee Break** *(Exhibition area)*				
15:45 - 16:45	**Poster Session 2** *(Exhibition area)*				
16:45 - 18:00	Exploring the underlying mechanisms of number processing and math cognition *Chair: Xueying Ren*	Dyscalculia – early detection and prevention of neuromyths *Chair: Karin Kucian*	Mathematical explanations *Chair: Matthew Inglis*	Measurement and impact of parent-child interactions for mathematical learning in the home environment *Chair: Colette Duncan*	Equity-focused programs to measure and promote math learning and executive functioning *Chair: Geetha Ramani*
18:00	**Reception** *(Edward Herbert Building)*				

Wednesday 7th June

	Room under the terrace	CC021	CC013	CC012	CC011
8:30 - 9.00	**Registration** *(Exhibition area)*				
9:00 -10.15	How is numerical syntax complex, and why is it hard? *Chair: Michal Pinhas*	Early algebraic thinking *Chair: Ulises Xolocotzin*	Risk assessment for mathematics difficulties and disabilities *Chair: Patrick Ehrman*	Children's strategies in arithmetic *Chair: Catherine Thevenot & Jérôme Prado*	Beyond the surface: Which features of instructional materials help or hinder mathematical learning *Chair: Megan Foulkes & Suzanne Splinter*
10:15 - 10.45	**Coffee Break** *(Exhibition area)*				
			Open Submission talks		
10:45 - 12.00	Math attitude/anxiety & gender Enrica Donolato Michael Slipenkyj Maristella Lunardon Shuyuan Yu	Struggling learners & intervention Madison Cook Franz Wortha Syeda Sharjina Akther Lauren E. Anthony	Numerosity, perception & rational numbers Chuyan Qu Nathan T.T. Lau Isabella Starling-Alves Eva Redican	Early math skills & home envrionment Dominic Kelly Shirley Duong Alexa Ellis Tanya Paes	Arithmetic & strategies Nicolas Masson Joshua Jaffe Katarina Gvozdic Asya Istomina
12:00 - 13:.00	**Lunch** *(Exhibition area)* **& Board Meetings** *(trainee board: room under the teraace & governing borad: CC21)*				
13:00 - 14:00	**Poster Session 3** *(Exhibition area)*				
14:00 - 15:15	Numerical development and applied mathematics – from kindergarten to primary school. *Chair: Yarden Gliksman*	Integrating perspectives on adults' and children's math anxiety *Chair: Carlo Tomasetto*	Evidencing the approximate system - findings from different research perspectives *Chair: Anita Lopez-Pedersen*	Parent Language Input, Math Attitudes, and Family Contexts in Children's Math Learning *Chair: Yu Zhang*	"Everything I know I learned after I was thirty.": the past, the present, and the future of Spatial-Numerical Associations *Chair: Krzysztof Cipora*
15:15 - 15:45	**Coffee Break** *(Exhibition area)*				
15:45 - 16:45	**MCLS business meeting** *(CC011)*				
16:45 - 18:00	Foundational Number Skills and Early Assessment *Chair: Heather Douglas*	The multiple aspects of dyscalculia and calculation difficulties *Chair: Dror Dotan*	Algorithmic foundations of mathematical development *Chair: Joshua Rule*	Gesture's role in numerical development *Chair: Madeleine Oswald*	Numerical cognition in healthy and pathological aging *Chair: Hannah D. Loenneker*

Thursday 8th June

	Room under the terrace	CC021	CC013	CC012	CC011
9:00 -10.15	The role of perception in arithmetic cognition *Chair: Josh Medrano*	Mathematics attitudes and performance: importance of self-concept and self-efficacy *Chair: Ann Dowker*	Symbolic and non-symbolic number processing in dyscalculia *Chair: Michael Andres*	Data based individualization in mathematics for struggling learners *Chair: Stephanie Hopkins*	The role of inhibitory control in mathematics: Beyond correlations *Chair: Lucy Cragg*
10:15 - 10.45	**Coffee Break** *(Exhibition area)*				
10:45 - 12.00	Automatic number processing: Features, measurement, and links to individual characteristics *Chair: Lilly Roth*	Developmental pathways of mathematical abilities: Evidence from typical and atypically developing populations *Chair: Jo Van Herwegen*	Perspectives and influences on math engagement in early childhood: The role of family math *Chair: Mary DePascale*	Number games in the real world: Factors influencing play-based interventions at home and school *Chair: Francesco Sella*	Early math and motor skills: Evidence from around the world *Chair: Carolina Jiménez-Lira*
12:00 - 13:.00	**Lunch** *(Exhibition area)*				
13:00 - 14:00	**Poster session 4** *(Exhibition area)*				
14:00 - 15:15	Learning environments contributing to early numeracy and literacy skills *Chair: Jenni Salminen*	Post-stroke numerical deficit (Acalculia): Prevalence, impact, assessment and interventions *Chair: Yael Benn*	Word problems? No problem! School-based interventions for students with word-problem difficulty *Chair: Katherine Berry*	Cognitive, affective, and developmental factors in the spatial and ordinal understanding of numbers *Chair: Chang Xu*	Understanding the interplay of attention, executive function and mathematics by embracing complexity: From theory, to diversity, to intervention… and back to theory again *Chair: Gaia Scerif*
15:15 - 15:45	**Coffee Break & Closing** *(Exhibition area)*				

POSTER SESSION 1 – Tuesday 6 June 2023, 13:00 – 14:00

1. **Parental mathematical talk in the home environment in the UK and Mexico**
   Abbie Cahoon*[1], Carolina Jiménez Lira[2], Elia Verónica Benavides Pando[2], Daniela Susana Paz García[2], Victoria Simms[1]
   [1] Ulster University [2] Universidad Autònoma de Chihuahua
2. **Spatial language in bilingual families across three activities**
   Fernanda Ahumada*
   University College London
3. **A month-long parent-led spatial intervention**
   Jing Tian*, Grace Bennett-Pierre, Nadia Tavassolie, Xinhe Zhang, Emily D'Antonio, Lexi Sylverne, Nora Newcombe, Marsha Weinraub, Annemarie Hindeman, Kristie Newton, Elizabeth Gunderson
   Temple University
4. **Early numeracy and mathematics development: A longitudinal meta-analysis on the prediction nature of early numeracy**
   Yuting Liu*, Peng Peng
   University of Texas, Austin
5. **Math anxiety predicts aversion to social comparison in classroom mathematical contexts**
   Raeanne Martell*[1], Ian Lyons[1], Pierpaolo Dondio[2]
   [1] Georgetown University [2] Technological University Dublin
6. **Building word-problem solving and working memory capacity: A randomized controlled trial**
   Lynn Fuchs, Douglas Fuchs*, Marcia Barnes
   Vanderbilt University
7. **A synthesis of pre-algebraic reasoning interventions for middle-school students with mathematics difficulty**
   Danielle O. Lariviere*, Syeda Sharjina Akther
   The University of Texas at Austin
8. **Neural substrates for fast numerical and non-numerical magnitude averaging**
   Chenxi He*, Daniel Ansari, Blake Butler
   University of Western Ontario
9. **Classroom peer effects on preschool children's mathematics learning**
   Can Carkoglu*[1], Robert J. Duncan[1], Sarah H. Eason[1], David J. Purpura[1], Sara Schmitt[2]
   [1] Purdue University [2] University of Oregon
10. **Fraction interventions for secondary students with mathematics difficulty: A research synthesis**
    Jessica Mao*
    The University of Texas at Austin
11. **Using books to improve mental rotation skills in 4- and 5-year-old children**
    Nadia Tavassolie*, Lexi Sylverne, Nora Newcombe, Marsha Weinraub, Elizabeth Gunderson Temple University
12. **Assessing young children's understanding of length measurement units**
    Yawei Yang*, Xiao Zhang, Kong Xiangzi Ouyang
    The University of Hong
13. **Assessing the association between math talk and math performance: A meta-analysis**
    Alex Silver[1], Daniela Alvarez-Vargas*[2], Drew Bailey[2], Melissa Libertus[1]
    [1] University of Pittsburgh [2] University of California, Irvine

14. **The effects of caregiver involvement on early childhood mathematics achievement: A research synthesis**
    Mackenna Vander Tuin*
    The University of Texas at Austin
15. **What counts as math? How adults view the importance of children's everyday activities**
    Megan Merrick*, Giulia Borriello, Emily Fyfe
    Indiana University-Bloomington
16. **Do preschool children use spatial coding for serial order in working memory: a replication study**
    Tânia Ramos*, Carrie Georges, Christine Schiltz
    University of Luxembourg
17. **Symbolic ordering task performance with retrospective reports and its relation to arithmetic skills in children**
    Natalia Dubinkina*[1], Francesco Sella[2], Bert Reynvoet[1]
    [1] KU Leuven [2] Loughborough University
18. **Semantic priming across domains: from language to mathematics**
    Miguel Ayala-Cuesta*[1], Sofía Castro[2], Daniela Paolieri[1], Teresa Bajó[1], Pedro Macizo[1]
    [1] University of Granada [2] Jagiellonian University
19. **Effects of differing degrees of direct parental support during arithmetic problem solving on children's performance**
    Analia Marzoratti[1], Gus Sjobeck[2], Steve Boker[1], Tanya Evans*[1]
    [1] University of Virginia [2] University of Pittsburgh [3] University of Virginia
20. **Examining the interplay between the cognitive and emotional elements of spatial processing.**
    Cynthia Fioriti*[1], Raeanne Martell[1], Richard Daker[1], Gerardo Ramirez[2], Erin Maloney[3], Adam Green[1], Ian Lyons[1]
    [1] Georgetown University, Washington, DC [2] Ball State University, Muncie [3] University of Ottawa
21. **Reliability and validity of commonly-used measures of attention in preschool children and their associations with preschool and kindergarten math ability**
    Anna H. Miller*[1], Vishakha Agrawal[1], Marcia A. Barnes[1], Greg Roberts[2]
    [1] Vanderbilt University [2] University of Texas at Austin
22. **Developmental associations of skills and self-concept of ability in reading and math across grades 1-9**
    Heidi Korpipää*[1], Asko Tolvanen[1], Kati Vasalampi[1], Jaana Viljaranta[2], Minna Torppa[1], Kaisa Aunola[1], Marja-Kristiina Lerkkanen[1], Anna-Maija Poikkeus[1]
    [1] University of Jyväskylä [2] University of Eastern Finalnd
23. **Gender differences in parents' beliefs and engagement in home mathematics activities**
    Suzanne Varnell*[1], Patrick Ehrman[1], Alexa Ellis[2], David Purpura[1]
    [1] Purdue University [2] University of Alabama
24. **The relationship between math performance and math anxiety: Insights from application of the quantile regression method to data from a large-scale international assessment**
    Chin-Yuan Chang, Wen-Chi Chiang*
    Chung Cheng University
25. **Collaborating with educators to co-develop an early years mathematics and executive function intervention: Steps taken and lessons learnt.**
    Rosemary O'Connor*[1], Sylvia Gattas[1], Rebecca Merkley[2], Gaia Scerif[1]
    [1] University of Oxford [2] Carleton University

26. **Conceptual interference in mathematics: Associations with mathematical competencies and inhibition processes**
Roland H. Grabner[1], Susanne Dögnitz[2], Thomas Krohn[2], Silvia Schöneburg-Lehnert[2], Michael Schneider[3], Stephan E. Vogel*[1]
[1] University of Graz [2] University of Leipzig [3] University of Trier

27. **Learning opportunities for numerical skills in tabletop games identified from game and learning mechanics**
Nicoletta Perini*[1], Tim Jay[1], Manuel Ninaus[2], Korbinian Moeller[1]
[1] Loughborough University [2] University of Graz

28. **A systematic review and meta-analysis of the relation between frequency of home mathematical activities and early mathematical achievement**
Ella James-Brabham*[1], Emma Blakey[2], Claudia von Baston[2]
[1] Loughborough University [2] University of Sheffield

29. **Domain-general and domain-specific factors explaining the multiplication skill**
Jarno Rautiainen, Tuija Aro, Mikko Aro, Asko Tolvanen, Tuire Koponen
University of Jyväskylä

30. **Strategic use of quantifiers in reporting statistics**
Vinicius Macuch Silva*, Alexandra Lorson, Bodo Winter
University of Birmingham

31. **Perceptions of calculation mediate the relation between math anxiety and performance on SAT math problems**
Alexander Avdellas*, Yixuan Zhao, Ian Lyons
Georgetown University

32. **Associations of fraction number line estimation accuracy with gray matter volume: a voxel-based morphometry analysis**
Silke Wortha*[1], Elise Klein[2], Korbinian Moeller[1], Manuel Ninaus[3]
[1] Loughborough University [2] Université Paris Cité, CNRS [3] University of Graz

33. **Diversity in bilingual proficiency development for math and cognition among Latine dual language learners in the U.S.**
Matthew Foster*[1], López Lisa[1], Karen Nylund-Gibson[2], Shaunacy Sutter[1], Dina Arch[2]
[1] University of South Florida [2] University of California, Santa Barbara

34. **Exploring the causal relation between spatial skills and math competence through a game-based spatial skills training: A randomized controlled trial (P)**
Terry Tin-Yau Wong*
University of Hong Kong

35. **Assessing the causal role of the home numeracy environment on children's mathematical skills. A pre-registered study of a familial intervention in preschool children (P)**
Cléa Girard*, Stien Callens, Angie De Lamper, Bert De Smedt
KU Leuven

36. **Ordinal and cardinal acquisition in children with Developmental Language Disorder (P)**
Heleen de Vries*, Caitlin Meyer, Judith Rispens, Alla Peeters-Podgaevskaja
University of Amsterdam

37. **Neurocognitive mechanisms of fraction processing in primary school children in South Africa(P)**
Kathleen Fonseca[1], Elizabeth Henning[1], Candida Barreto[1], Mojtaba Soltanlou[2]
[1] University of Johannesburg [2] University of Surrey

38. **The role of working memory in the relation between spatial abilities and math performance (P)**
Chloe Oi Ying Leung*, Marian Hickendorff, Christine Espin, Dietsje Jolles
Leiden University

POSTER SESSION 2 – Tuesday 6 June 2023, 15:45 – 16:45

1. **COVID-19 infection and children's mathematics learning**
Annie Yixun Li, Catherine Capio, Derwin K.C. Chan, Sum Kwing Cheung*
The Education University of Hong Kong

2. **"In math class, I am confident in solving word problems": Creating a strengths-based mathematics survey**
Gillian Grose*[1], Martin Buschkuehl[2], Yi Feng [3], Susanne M. Jaeggi[3], Mary DePascale[4], Geetha Ramani[1]
[1] University of Maryland [2] MIND Research Institute [3] University of California, Irvine [4] Boston College

3. **Does executive function moderate and/or mediate the spatial-math link?**
Elyssa A. Geer*[1], Brianna L. Devlin[1], Irem Korucu[2], Lindsey Bryant[3], David Purpura[4], Robert Duncan[4], Sara A. Schmitt[1]
[1] University of Oregon [2] Yale School of Medicine [3] Mathematica [4] Purdue University

4. **Children's gender stereotypes about the relative roles of effort and talent in math achievement**
Jillian Lauer*
University of Cambridge

5. **Frequency and adaptivity of children's subtraction by addition use: The role of conceptual knowledge**
Stijn Van Der Auwera*, Joke Torbeyns, Bert De Smedt, Lieven Verschaffel
KU Leuven

6. **Family support professionals as models of early mathematical dialogue: More questions than answers?**
Sarah Pan*, Alisha Wackerle-Hollman, Michele Mazzocco
University of Minnesota

7. **Impact of manipulatives on 3rd-grade students' performance in math tasks: The case of money as a manipulative material in math education**
Styliani Politi*, Christine Schiltz
University of Luxembourg

8. **A person-centered analysis of the relations between motivation, math achievement, and STEM career interests among Black high school students**
Rebecca Adler*[1], Bethany Rittle-Johnson[1], Marian Hickendorff[2], Kelley Durkin[1]
[1] Vanderbilt University [2] Leiden University

9. **Schema instruction for word-problem solving in the early grades: A research synthesis**
Alison Hardy*
The University of Texas at Austin

10. **The prediction of mathematical creativity scores: Mathematical abilities, personality and creative self-beliefs**
Michaela Meier*, Stephan Vogel, Roland Grabner
University of Graz

11. **A mathematics-writing synthesis: Kindergarten through 12th grade mathematics-writing efficacy and instructional methods**
Tessa Arsenault*
The University of Texas at Austin

12. **Development of Maths Whartels intervention programme using play as part of a neuropsychological approach to improve maths achievement in different cultural contexts of United Kingdom and South Africa**
Wandile Tsabedze*, Petro Erasmus
North-West University

13. **Children's use of the inversion principle in arithmetic problems**
Celine Poletti*[1], Sylvain Braconnier[2], Catherine Thevenot[1]
[1] University of Lausanne [2] Ministere de l'Education Nationale France

14. **The impact of number length and numerical value on multi-digit number processing**
Nadav Neumann*, Michal Pinhas
Ariel University

15. **A Novel task for measuring spontaneous focus on numerals among adults: A psychometric investigation**
Shachar Hochman*[1], Mattan S. Ben-Shachar[2], Avishai Henik[2]
[1] University of Surrey [2] Ben-Gurion University of the Negev

16. **Two processes across two domains: Shared global-holistic and componential-analytical mechanisms in language and numerical cognition**
Filip Andras*, Pedro Macizo
University of Granada & Mind, Brain and Behavior Research Center (CIMCYC), Granada

17. **Do children show spatial asymmetrical choice in an ordinal-spatial task with a landmark? A pilot study**
Annamaria Porru*, Emma Visibelli, Daniela Lucangeli, Silvia Benavides-Varela, Rosa Rugani
University of Padova

18. **Parent spatial talk complexity during spatial play is associated with toddlers' spatial relation comprehension**
Danielle Fox*, Heather Bachman, Elizabeth Votruba-Drzal, Melissa Libertus
University of Pittsburgh

19. **Investigating affective mimicry in math anxious individuals**
Rachel Pizzie[1], Christina Kim*[1], Rachel Sortino[1], Rachel Inghram[1], Taylor Delorme[1], Thalia Guettler[1], Bridget Lam[1], David Kraemer[2]
[1] Gallaudet University [2] Dartmouth College, Hanover

20. **Exploring the development of children's ordinality knowledge**
Jake Kaufman, Bethany Rittle-Johnson*
Vanderbilt University

21. **Association Between Relational Reasoning and Mathematical Achievement: Mediating Roles of Arithmetic Principle Understanding and Word Problem Representation**
Eason Sai-Kit Yip*, Terry Tin-Yau Wong
The University of Hong Kong

22. **Word problems, item difficulty and low performers**
Pernille Bødtker Sunde*[1,2], Mette Bjerre[1], Peter Sunde[3], Pernille Pind[4]
[1] VIA University College [2] KU Leuven [3] Aarhus University [4] Forlaget Pind og Bjerre

23. **Need for better standardization of ANS acuity and 'mathematical ability' measures**
Marco Carlo Ziegler*, Carolin Marx
Justus Liebig University Giessen

24. **Novel symbol learning and transfer to mental arithmetic problem-solving: a pilot study**
Jacob Paul*
University of Melbourne

25. **Potential factors determining the small number bias in random number generation**
Mauro Murgia*[1], Serena Mingolo[1], Alberto Mariconda[1], Tiziano Agostini[1], Sors Fabrizio[1], Valter Prpic[2]
[1] University of Trieste [2] University of Bologna

26. **Mathematics and emotions in young in 3-6 year-old children, what's the link?**
Laura Alaria*[1], Carol Berger[1], Edouard Gentaz[2], Anne Lafay[1]
[1] University Savoie Mont Blanc [2] University of Geneva

27. **Professional architects reveal a smaller distance effect than controls in the angle magnitude classification task, but none of them display an association between angle magnitude and response side**
Mateusz Hohol*[1], Piotr Szymanek[1], Bartosz Baran[1], Krzysztof Cipora[2]
[1] Jagiellonian University [2] Loughborough University

28. **Effect of gender on math anxiety: Insights from the frAMAS study**
Laurie Geers*, Mauro Pesenti, Michael Andres
UC Louvain

29. **Can individualized math instruction improve the social participation of students with special educational needs?**
Michael Grosche[1], Miriam Balt*[1], Janine Schledjewski[1], Katrin Böhme[2], Monja Schmitt[3], Amelie Labsch[3], Cornelia Gresch[4]
[1] University of Wuppertal [2] University of Potsdam [3] Leibniz Institute for Educational Trajectories, Bamberg [4] Humboldt-Universität zu Berlin

30. **Crossmodal recognition of layout geometry in house cricket Acheta domesticus**
Bartosz Baran*[1], Jacek Francikowski[1], Mateusz Hohol[2]
[1] University of Silesia [2] Jagiellonian University

31. **Should self-efficacy align with one's actual math skills? The case of low performing children**
Pilvi Peura*, Tuire Koponen, Tuija Aro, Mikko Aro
University of Jyväskylä

32. **Calibration effect on estimation in 7-year-old children and adults**
Fanny Gimbert*[1], Edouard Gentaz[2], Karine Mazens[1]
[1] University Grenoble Alpes [2] University of Geneva

33. **Does the number of opportunities to learn mathematical language differ based on the representation of the quantity (e.g., symbolic vs non-symbolic)?**
Rene Grimes*
Tennessee Tech University

34. **Game elements increase perceived self-efficacy in children with dyscalculia**
Manuel Ninaus[1], Verena Dresen[2], Isabella Kreilinger[3], Antero Lindstedt[4], Kristian Kiili[4], Korbinian Moeller*[5]
[1] University of Graz [2] University of Innsbruck [3] Private University for Health Sciences and Health Technology, Hall in Tirol [4] Tampere University [5] Loughborough University

35. **Characterizing how the brain encodes symbolic and nonsymbolic numerical quantities; an fmri study. (P)**
Nidhi Shah*
Western University

36. **Parent-based maths apps in the home learning environment: A randomised control trial.(P)**
Laura A. Outhwaite*[1], Jo Van Herwegen
University College London

37. **The association between gray matter volume and mathematical performance in 5-year-old children. (P)**
Davina Van den Broek*, Floor Vandecruys, Bert De Smedt
KU Leuven

38. **Effects of multisensory input on numerical representations of diverse-SES preschoolers. (P)**
Kerry Jordan*
Utah State University

POSTER SESSION 3 – Wednesday 7 June 2023, 13:00 – 14:00

1. **Look at it this way: Equal sign position and blank position in multiplication problems affect reaction time**
Taylor-Paige Guba*
University of Delaware

2. **The effect of problem format on arithmetic problem-solving**
Iro Xenidou-Dervou*[1], Emine Simsek[1], Sara Rashid[2], Ilona Friso-van den Bos[3], Menno van der Schoot[4], Ruth Trundley[5], Ernest C.D.M. van Lieshout[4]
[1] Loughborough University [2] Cambridge University [3] University of Twente [4] Vrije Universiteit Amsterdam [5] Devon Education Services

3. **The role of creativity in arithmetic word problem-solving**
Gabriella Daroczy*, Hans-Christoph Nuerk
University of Tübingen

4. **Executive function and mathematical skills correlate differently for science and non-science secondary school students**
Konstantinos G. Tsigaridis*, Rui Wang, Michelle R. Ellefson
University of Cambridge

5. **Co-development among math, reading, science, and working memory in the elementary stage: For whom and what triggers?**
Peng Peng*
The University of Texas at Austin

6. **Symbolic and non-symbolic number format integration in adults and children probed with frequency tagged EEG**
Mila Marinova*, Christine Schiltz
University of Luxembourg

7. **Short-term storage of working memory mediates the relation between math anxiety and arithmetic performance**
Shiqiao Shen*, Wei Wei
Zhejiang University

8. **Assessment of maths anxiety in early schooling: Emergence, stability and SES differences**
Dawn Short*, Janet McLean
Abertay University

9. **Using cognitive predictors to predict poor mathematics performance in 7 and 8-year-old children: a feasibility study**
Katie Allen*[1], Steve Higgins[1], John Adams[1]
[1] Durham University [2] The Open University

10. **Validating a measure of growing pattern understanding in preschool children**
Xueliang Chen*, Xiao Zhang
The University of Hong Kong

11. **What do teachers in training know about children's conceptual understanding of arithmetic?**
Katherine M. Robinson*, Shae Sackman
University of Regina

12. **Worried about transitioning to secondary school? The influence of mathematical skill, confidence and anxiety.**
Tatjana Zimasa*[1], Amber Bonser[1], Silke Göbel[1,2]
[1] University of York [2] University of Oslo

13. **Diagnosing specific learning disorder in mathematics in a multilingual education context**
Vera Hilger*, Sonja Ugen, Linda Romanovska, Christine Schiltz
University of Luxembourg

14. **Do additional magnitude cues benefit children's number line performance?**
Xinhe Zhang*, Kexin Ren, Elizabeth Gunderson
Temple University

15. **Parents' attitudes and self-efficacy impact children's multiplication fact practice at home.**
Natasha Guy*[1], Lucy Cragg[2], Camilla Gilmore[1]
[1] Loughborough University [2] University of Nottingham

16. **More is better: Language statistics reveal a bias towards addition**
Bodo Winter*[1], Martin Fischer[2], Christoph Scheepers[3], Andriy Myachykov4
[1] University of Birmingham [2] University of Potsdam [3] University of Glasgow [4] Northumbria University

17. **Cross-notation rational number magnitude comparison predicts math college entrance scores**
Lauren Schiller*[1], Roberto Abreu-Mendoza[2], Robert Siegler[1], Clarissa Thompson[3], Miriam Rosenberg-Lee[2]
[1] Columbia University [2] Rutgers University [3] Kent State University

18. **The significance of symbolic gestures and pointing usage in early childhood mathematics instruction**
Melody Mann*[1], Tessa L. Arsenault[2], Sarah R. Powell[2]
[1] University of Hawaii [2] University of Texas, Austin

19. **Frequency-tagging EEG reveals instruction-driven magnitude integration using the numerical distance effect**
Cathy Marlair*[1], Aliette Lochy[2], Virginie Crollen[1]
[1] University of Louvain [2] University of Luxembourg

20. **Place-value understanding in Brazilian children and its relationship to numerical transcoding and arithmetic operations tasks**
Paula Carvalho*[1], Leidiane Caldeira[1], Ricardo Moura[2], Julia Lopes-Silva[1]
[1] Federal University of Minas Gerais (UFMG) [2] University of Brasília (UnB)

21. **Pupil Dilation during a Number Line Estimation Task**
Hanit Galili*, Avigail Langer, Avishai Henik
Ben-Gurion University of the Negev

22. **Categorical syllogistic reasoning longitudinally predicted mathematics achievement in school-aged children**
Charles Chiu Hung Yip*, Terry Tin-Yau Wong
The University of Hong Kong

23. **Validity of the flexible attention to magnitudes task for young children**
Mary Fuhs*, Marissa Brown
University of Dayton

24. **Parental math skills predict children's math skills and the effect is not mediated via home math environment (HME)**
Minna Torppa*, Jenni Salminen, Maria Psyridou, Daria Khanolainen, Tuire Koponen
University of Jyväskylä

25. **Gesture can influence what number you have in mind**
Alexandra Lorson*[1], Vinicius MacUch Silva[1], Christopher Hart[2], Bodo Winter[1]
[1] University of Birmingham [2] University of Lancaster

26. **A categorization of self-reported strategies in human numerosity estimation**
Elisabeth Inge Romijn*[1], Jeremy Hodgen[1,2], Eivind Kaspersen[1], Trygve Solstad[1]
[1] Norwegian University of Science and Technology (NTNU) [2] University College London

27. **Does the math anxiety-performance link depend on paradigm?**
Xinru Yao*[1], Julia Huber[1], Christina Artemenko[1], Yunfeng He[2], Hans-Christoph Nuerk[1]
[1] University of Tübingen [2] Liaoning University

28. **When children with developmental coordination disorder use finger-counting: behavioral and 3D motion analyses**
Maëlle Neveu*, Cédric Schwartz, Laurence Rousselle
Université de Liège

29. **Struggling with single-digit multiplications during primary school. Problem solved?**
Juan Antonio Álvarez-Montesinos, Javier García-Orza, Ismael Rodríguez-Montenegro*, Marina Cuadra Jaime
Universidad de Málaga

30. **Concurrent predictors of toddlers' spontaneous math focusing tendencies during a picture description task**
Jorge Carvalho Pereira*, Heather Bachman, Elizabeth Votruba-Drzal, Melissa Libertus
University of Pittsburgh, Department of Psychology

31. **Finger counting, finger montring and their impact on early mathematical skills**
Stephanie Roesch*[1], Julia Bahnmueller[2], Roberta Barrocas[3], Korbinian Moeller[2]
[1] University of Tübingen [2] Loughborough University [3] Leibniz-Institut für Wissensmedien, Tuebingen

32. **Acquiring the successor function of symbolic numbers: longitudinal comparison of verbal number words and number gestures**
Laurence Rousselle*, Line Vossius, Marie-Pascale Noël
Université de Liège

33. **Impact of home mathematical environment on early numeracy skills in Cuban preschoolers**
Melissa Alomá Bello*[1], Beatriz Hernández Aguilar[1], Lenna María Crespo Díaz[1], Susana Nuñez Raventós[1], Nancy Estévez Pérez[1], Abigail Cahoon[2], Victoria Simms[2]
[1] Cuban Neuroscience Center [2] Ulster University

34. **HRV as an index of regulation and cognitive function to predict numeracy performance**
Sylvia Gattas*, Alex Fraser, Yixin Chen, Gaia Scerif
University of Oxford

35. **Identifying general and maths specific anxiety levels in secondary school pupils in the UK**
Caroline Peters*, Krzysztof Cipora, Kinga Morsanyi
Loughborough University

36. **Students' use of unit coordination when solving school-based place-value tasks (P)**
Moritz Herzog*[1], Helena P. Osana[2], Anne Lafay[3]
[1] University of Wuppertal [2] Concordia University [3] Université Savoie Mont Blanc

37. **Neural representation of discrete and continuous ratios in the visual and parietal cortex: A preregistered report (P)**
Rebekka Lagacé-Cusiac*, Daniel Ansari, Jessica Grahn
University of Western Ontario

38. **Design and evaluation of 'The Mathematical Strategies Development Test' (P)**
Nadir Díaz-Simón*, Jana Menalo, Maya Ghai, Daniel Ansari
Western University

39. **NumRisk: number sense and financial decision making in dyscalculic adolescents (P)**
Maike Renkert*
University of Zürich

40. **Leveraging a visuospatial language to enhance quantitative learning (P)**
Rachel Pizzie, Rachel Sortino*, Christina Kim, Lorna Quandt
Gallaudet University

41. **Studying how ANS numerosity representations are dynamically built (P)**
David Gomez*[1,2], Mario Perez[1], Valentina Giaconi[1,2]
[1] Universidad de O'Higgins [2] Millennium Nucleus for the Study of the Development of Early Math Skills (MEMAT), Chile

POSTER SESSION 4 – Thursday 8 June 2023, 13:00 – 14:00

1. **Development and validity of the QIF-M, a scale assessing children's self-perceptions of their daily numeracy activities**
Anne Lafay*[1], Emeline Gentelet[2]
[1] Université Savoie Mont Blanc [2] Université de Neuchâtel

2. **Is spatial language an important predictor of early math knowledge?**
Carrie Georges*[1], Véronique Cornu[2], Christine Schiltz[1]
[1]University of Luxembourg [2] Centre pour le développement des apprentissages Grande-Duchesse Maria Teresa

3. **Developing and validating a measure of parental knowledge about early math development**
Camille Msall*, Ashli-Ann Douglas, Bethany Rittle-Johnson
Vanderbilt University

4. **Developing a patterning lens to improve early numeracy knowledge: A pilot study**
Bethany Rittle-Johnson*, Jake Kaufman
Vanderbilt University

5. **Integrating dynamic mathematical technology into the classroom: The cases of three teachers teaching geometric similarity**
Ali Simsek*
University College London

6. **The effect of short-term memory and magnitude processing in single-digit multiplication solving**
Mei Ling Soh*[1], Alejandro J. Estudillo[2]
[1] University of Nottingham Malaysia [2] Bournemouth University

7. **Inhibition of the "add zero(s)" heuristic is needed to multiply by 10, 100, 1000 decimal numbers: a developmental conflict adaptation paradigm study**
Maria Ghazi*, Grégoire Borst
Université Paris Cité

8. **Mathematics interventions for secondary students with emotional and behavioral disorders: A research synthesis**
Katie Barnicle*
The University of Texas at Austin

9. **Shared neural resources for math and reading in children and adults**
Aymee Alvarez-Rivero*, Lien Peters, Daniel Ansari
University of Western Ontario

10. **Math anxiety, spatial anxiety, and spatial language experience**
Rachel Pizzie*, Christina Kim, Rachel Sortino, Rachel Inghram
[1] Gallaudet University

11. **Stronger neural response to canonical finger-number configurations in deaf compared to hearing adults revealed by FPVS-EEG**
Margot Buyle*, Aliette Lochy, Valentina Vencato, Virginie Crollen
Université Catholique de Louvain

12. **Functional lateralization of number processing**
Narjes Bahreini*, Christina Artemenko, Hans-Christoph Neurk
University of Tübingen

13. **Young children's understanding of symbolic fractions: Do part-whole labels and active subdividing interventions help?**
Karina Kling*, Susan Levine
The University of Chicago

14. **The development of a math anxiety scale for Chilean kindergarten children**
M. Francisca del Río*[1], M. Inés Susperreguy[1], Christian Peake[1], Macarena Angulo[1,2]
[1] Universidad Diego Portales; Millennium Nucleus for the Study of the Development of Early Math Skills (MEMAT), Chile [2] Universidad Alberto Hurtado

15. **The role of maths anxiety and confidence in understanding performance on both the long and verbal versions of the Cognitive Reflection Test**
Michael Waldron*, Thomas Hunt, Edward Stupple, Paul Staples
University of Derby

16. **Children's number line performance: The impact of directionality and modality**
Ciara Roche*, Sophie Leonard, Mariuche Gomides, Flávia Santos
University College Dublin

17. **Conditionality of adaptiveness: Investigating the relationship between numeracy and adaptive behavior**
Supratik Mondal*
SWPS University of Social Sciences and Humanities

18. **The preschool classroom library: Is there a place for mathematics?**
Michele Stites, Susan Sonnenschein*, Besjane Krasniqi
University of Maryland Baltimore County

19. **Presemantic and semantic processing of digits in adults with developmental dyscalculia**
Samuel Lepoittevin*[1], Michael Andres[1], Alice De Visscher[2]
[1] Université Catholique de Louvain [2] Université Aix-Marseille

20. **Spatial working memory capacity moderates the association between fine motor skills and mathematics in preschoolers**
Ursula Fischer*[1], Stephanie Roesch[2], Julia Bahnmueller[3], Roberta Barrocas[4], Nadine Bollmann[5], Korbinian Moeller[3]
[1] University of Applied Sciences in Special Needs Education, Zurich [2] University of Tübingen [3] Loughborough University [4] Leibniz Institut für Wissensmedien, Tübingen [5] Thurgau University of Teacher Education

21. **How equal are equivalent fractions?**
Georgios Thoma*, Korbinian Moeller, Julia Bahnmueller
Loughborough University

22. **The direction of SNAs is modulated by task demands rather than stimuli rotation and visual perspective taking**
Valter Prpic*[1,2], Darek Costa[3], Patrick Cullen[4], Andrew Stretton[2], Serena Mingolo[3], Mauro Murgia[3]
[1] University of Bologna [2] De Montfort University [3] University of Trieste [4] University of Law

23. **Supporting the development of numerical cognition in preschool children: tablet-based vs. paper-pencil training**
Hoyeon Lee*[1], Sandrine Mejias[2], Margault Sacré[1], Christine Schiltz[1]
[1] University of Luxembourg [2] University of Lille

24. **Evaluating Brazilian children's early numerical concepts development using MARKO-Screening**
Fernanda Freitas*[1], Moritz Herzog[2], Antje Ehlert[3], Annemarie Fritz[4], Vitor Haase[1]
[1] Universidade Federal de Minas Gerais, Belo Horizonte [2] University of Wuppertal [3] University of Potsdam [4] Akademie Wort+Zahl, Germany

25. **The role of cultural support on commutativity at varying levels of abstraction**
Isabelle Boni*, Steven Piantadosi
UC Berkeley

26. **From here to there and beyond: Understanding optional challenge seeking in an educational math game**
Allison Liu, Kirk Vanacore, Alena Egorova, Cindy Trac*, Erin Ottmar
Worcester Polytechnic Institute

27. **The effects of a symbolic number training intervention on children's developing numeracy skills**
Fiona Jelley*
University of Oxford

28. **The influence of phonological processing on children at risk of mathematical learning disability: An intervention study**
Xiujie Yang*, Kiachun Liu
Beijing Normal University

29. **Understanding and assessing young children's mathematical learning potential (P)**
Nathalie Parry*
University of Melbourne & KU Leuven

30. **Neural similarity between children and their mothers for reading and arithmetic (P)**
Lien Peters, Aymee Alvarez*, Daniel Ansari
Western University

31. **Individual differences in mathematical expertise: The effects of cognition, personality and domain-specific creativity (P)**
Rebecca Myers*, Valentin Gulyás, Dénes Szücs
University of Cambridge

32. **Understanding the relationship between procedural complexity in mathematics and spaced retrieval practice (P)**
Ewan Murray*[1], Aidan Horner[1], Silke M. Göbel[1,2]
[1] University of York [2] University of Oslo

33. **The role of estimation strategies in human numerosity estimation (P)**
Trygve Solstad*[1], Eivind Kaspersen[1], Jeremy Hodgen[1,2], Elisabeth Inge Romijn[1]
[1] NTNU-Norwegian University of Science and Technology [2] UCL-University College London

34. **Does math anxiety influence how people process discounts? (P)**
Fernando Ojedo*, Pedro Macizo
University of Granada

35. **The role of home and preschool environment on maths development in the early years: Do differences in quality matter? (P)**
Amy Godfrey*[1], Sylvia Gattas[1], Zachary Hawes[2], Steven Howard[3], Rebecca Merkley[4], Rosie O'Connor[1], Jelena Sučević[1], Gaia Scerif[1]
[1] University of Oxford [2] University of Toronto [3] University of Wollongong [4] Carleton University

36. **Exploring the impact of an intervention on the relationship between the early maths abilities and executive functions: a network analysis approach (P)**
Jelena Sučević*[1], Sylvia Gattas[1], Amy Godfrey[1], Zachary Hawes[2], Steven Howard[3], Rebecca Merkley[4], Rosemary O'Connor[1], Gaia Scerif[1], The ONE Team
[1] University of Oxford [2] University of Toronto [3] University of Wollongong [4] Carleton University

37. **There is 'order' and 'order': Behaviour, electroencephalography, & age-related markers of learning novel symbols via sequential or non-sequential order information (P)**
Bethan Grimes*, Alex Fraser, Sylvia Gattas, Julia Dabrowska, Devanshi Trivedi, Gaia Scerif
University of Oxford

OPEN SUBMISSION TALK SESSION - Wednesday 7 June 2023, 10.45 – 12.00 pm

Group 1: Math attitude/anxiety & gender

1. **Math-attitudes intervention programs for school-age students: A meta-analysis and overview of the literature**
Enrica Donolato*[1], Alice Masi[2], Sara Caviola[2,3], Monica Melby-Lervag[1], Arne Lervag[1]
[1] University of Oslo [2] Psychology University of Padova [3] University of Leeds
2. **Doing well and thinking positively about it: The unbalanced bi-directional relationship between math attitudes and math achievement**
Michael Slipenkyj*[1], Tsz Tan Lau[2], Ian Lyons[1], Daniel Ansari[1]
[1] Georgetown University [2] University of Western Ontario

3. **Field of study and gender modulation of the effect of personality and math anxiety on numeracy**
Maristella Lunardon*[1], Tania Cerni[2], Raffaella Rumiati[1,3]
[1] Scuola Internazionale Superiore di Studi Avanzati [2] University of Padova [3] Tor Vergata University
4. **Gender differences in number line performance for 7- and 8-year-old students**
Shuyuan Yu*, Heather Douglas, Jo-Anne LeFevre
Carleton University

Group 2: Struggling learners & intervention

1. **Patterns of network connectivity associated with phonological memory, language, and numerical processing for multilingual first graders**
Madison Cook*[1], Lina Shanley[1], Eric Wilkey[2], Ben Clarke[1], Fred Sabb[1]
[1] University of Oregon [2] Vanderbilt University
2. **Identifying struggling students from in-game behaviours: A machine learning approach**
Franz Wortha*[1], Korbinian Moeller[1], Kristian Kiili[2], Manuel Ninaus[3]
[1] Loughborough University [2] Tampere University [3] University of Graz
3. **Counting-focused intervention effects for students with mathematics difficulty: A research synthesis**
Syeda Sharjina Akther*
The University of Texas at Austin
4. **Experience with equations in sequence enhances problem-solving performance**
Lauren E. Anthony*, C. Shawn Green, Martha W. Alibali
University of Wisconsin-Madison

Group 3: Numerosity perception & rational numbers

1. **Modeling the effect of color entropy and connectedness on numerosity perception throughout development with the diffusion model**
Chuyan Qu*[1], Francesca Luzzi[1], Ruining Wang[2], Sam Clarke[1], Elizabeth Brannon[1]
[1] University of Pennsylvania [2] Zhejiang University
2. **Examining the concurrent validity of extant measures of approximate number system as measured by the dot comparison paradigm**
Nathan T.T. Lau*[1], Eric D. Wilkey[2], Rebekka Cusiac[1], Daniel Ansari[1]
[1] University of Western Ontario [2] Vanderbilt University
3. **Beyond integers: Understanding the cognitive mechanism and neural bases of rational number development**
Isabella Starling-Alves*, Eric D. Wilkey
Vanderbilt University
4. **Do playful math activities support fraction learning in first graders?**
Eva Redican*[1], Tamara Turski[1], Alexandria A. Viegut[1], Ilyse Resnick[2], Nora S. Newcombe[3], Nancy C. Jordan[1]
[1] University of Delaware [2] University of Canberra [3] Temple University

Group 4: Early math skills & home environment

1. **Examining components of early maths skills and inequalities in mathematical development using large-scale secondary data**
Dominic Kelly*[1], Sam Sims[1,2], Laura Outhwaite[1]
[1] University College London [2] Loughborough University
2. **Methodological considerations in number talk measurement**
Shirley Duong*[1], Alex Silver[1], Leanne Elliott[2], Heather Bachman[1], Elizabeth Votruba-Drzal[1], Melissa Libertus[1]
[1] University of Pittsburgh [2] American Institutes for Research

3. **Parents engage in home mathematics activities the least! Examining the frequency of four home learning environment subdomains**
   Alexa Ellis*[1], Connor O'Rear[2], Jimena Cosso[3], David Purpura[4]
   [1] The University of Alabama [2] University of Notre Dame [3] The Pennsylvania State University [4] Purdue University
4. **Testing the early home environment as a mechanism underlying the effects of paternal education and math and social-emotional outcomes at age nine**
   Tanya Paes*[1], Irem Korucu[2], Lindsey Bryant[3], Yemimah King[4], Robert Duncan[1], Sara Schmitt[5]
   [1] Human Development and Family Science, Purdue University [2] Yale School of Medicine, Connecticut [3] Mathematica [4] Cognition and Temperament Lab, Spelman College [5] The Ballmer Institute for Children's Behavioral Health, University of Oregon

Group 5: Arithmetic & strategies

1. **Eye movements as an indicator of the strategies recruited to solve arithmetic problems: the case of subtraction by additions**
   Nicolas Masson*[1], Christine Schiltz[2], Mauro Pesenti[1]
   [1] Université Catholique de Louvain [2] University of Luxemburg
2. **Inhibition is key: A cognitive approach to successful word problem solving**
   Joshua Jaffe*, Janice Hong, Michaela Brooks, Donald Bolger
   University of Maryland College Park
3. **Encoding and recoding activities for conceptual change**
   Katarina Gvozdic*, Emmanuel Sander
   University of Geneva
4. **Neural correlates of subtraction and multiplication in adolescents.**
   Asya Istomina*[1], Andrei Faber[1], Andrei Manzhurtsev[2], Maxim Ublinskiy[2], Marie Arsalidou[1]
   [1] HSE University, Moscow [2] Clinical and Research Institute of Emergency Pediatric Surgery and Trauma, Moscow

Committees

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