

EPS

Experimental
Psychology
Society

LONDON MEETING

4-6 January 2023



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A scientific meeting will be held at the Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, London, WC1H 0AP, between 4th – 6th January 2023.

The local organiser is Joanne Taylor.

29th EPS Prize Lecture

Wednesday 4th January, 4.45pm

Visual processing and decision-making in autism and dyslexia: Insights from cross-syndrome approaches.

Catherine Manning, University of Reading

51st Bartlett Lecture

Thursday 5th January, 5.45pm

Working Memory: Blending theory and application.

Robert Logie, University of Edinburgh

Psychonomic Society Symposium

Friday 6th January, 9.00am – 12.30pm

A [symposium co-hosted by the Psychonomic Society](#) entitled, ‘Cognition in the “real-world”: How, Why and What next?’ Organized by Seema Prasad (Technical University Dresden, Germany) and Ramesh Kumar Mishra (University of Hyderabad, India). Speakers will include:

Miles Tufft (University College London)

Bernhard Hommel (Technical University Dresden, Germany)

Megan Freeth (University of Sheffield)

Falk Huettig (Max Planck Institute for Psycholinguistics, The Netherlands)

Sonali Nag (University of Oxford)

Gustav Kuhn (Goldsmiths, University of London)

Poster Sessions

There will be two poster sessions, one will be held on Wednesday 4th January between 6pm and 7pm in Room 305 with an accompanying wine reception. The second poster session will be held on Thursday 5th January between 1pm and 2pm in Room 305 with an accompanying lunch. All posters will also be available virtually on the EPS website from Tuesday 3rd January 2023 at 9am.

[EPS Poster Session - Online Posters and Talk Through Videos](#)

Conference Dinner

The conference dinner will be held on Thursday 5th January from 7.30pm at the Tas Bloomsbury restaurant.

For more details on how to book a place at the conference dinner, please see pages 92 - 93.

START OF PARALLEL SESSIONS

Session A - Lower Ground Floor Lecture Theatre

- 09:30** **Dominic Guitard* and Nelson Cowan*** (Cardiff University, University of Missouri-Columbia, United States of America) (Sponsor: Candice Morey) The trade-off between item and order information in short-term memory does not depend on encoding time.
- 09:45** **Shuangke Jiang*, Myles Jones* and Claudia von Bastian** (University of Sheffield) (Sponsor: Claudia von Bastian) Mechanisms of visual working memory training: capacity and efficiency.
- 10:00** **Matthew Mak, Adam Curtis*, Jenni Rodd and Gareth Gaskell** (University of York, University College London) Episodic memory and sleep are involved in the maintenance of context-specific lexical information.
- 10:15** **Rumandeep Hayre*, Madeleine Ingham* and Melissa Colloff** (University of Birmingham) (Sponsor: Melissa Colloff) Confidence judgments and gestures are informative metacognitive monitoring markers of memory accuracy in four- to eight-year-olds.
- 10:30** **Tea / Coffee**
- 11:00** **Anastasia Klimovich-Gray*, Giovanni Di Liberto*, Lucia Amoruso*, Ander Barrena*, Eneko Agirre* and Nicola Molinaro*** (University of Aberdeen, University of Dublin, Ireland, Basque Center on Cognition, Brain and Language, Spain, University of the Basque Country UPV/EHU, Spain) (Sponsor: Mirjana Bozic) Contextual semantic analysis in natural speech linked to better reading in dyslexia.
- 11:15** **Francesca Branzi* and Matthew Lambon-Ralph** (University of Liverpool, University of Cambridge) (Sponsor: Matthew Lambon-Ralph) Revealing task-specific and domain-general neural networks that track coherence and integrate contextual information: evidence from semantic and non-semantic tasks in different perceptual modalities.
- 11:30** **Nina Liu*, Qiancheng Gao*, Xiyuan Li*, Guoli Yan*, Ascensión Pagán and Kevin Paterson** (Tianjin Normal University, Tianjin, China, University of Leicester) (Sponsor: Kevin Paterson) Word length effect in developing Chinese readers during sentence reading.
- 11:45** **Anuenue Kukona and Nabil Hasshim** (University of Greenwich, De Montfort University) Cognitive control underpins spoken language and reading comprehension: Insights from internet-mediated mouse cursor tracking.
- 12:00** **Elizabeth Kirk** (Anglia Ruskin University) Individual differences in responses to infant distress.
- 12:30** **Lunch**

START OF PARALLEL SESSIONS

Session B - Ground Floor Lecture Theatre

- 09:30** **Josef Toon and Anuenue Kukona** (De Montfort University, University of Greenwich)
Linguistic and non-linguistic stimuli activate taxonomic and thematic relations differently.
- 09:45** **Ning Zhu* and Ruth Filik** (University of Nottingham) (Sponsor: Ruth Filik)
The role of social status in sarcasm interpretation: Evidence from the UK and China.
- 10:00** **Katherine Roberts, Benjamin Allen*, Naijie Guan*, Hareth Al-Janabi* and Stephen Badham*** (Nottingham Trent University, University of Birmingham) The role of scenario familiarity on older adults' ability to make financial decisions.
- 10:15** **Eva Rubinova*, Miroslav Brezina*, Eliska Dufkova* and Pia Pennekamp*** (University of Aberdeen, Masaryk University, Czechia, University of Arkansas, United States of America) (Sponsor: Patric Bach) The impact of format of confidence expressions on perceived credibility of eyewitness identification decisions.
- 10:30** **Tea / Coffee**
- 11:00** **Katherine Ellis*, Jo Moss*, Malwina Dziwisz*, Beth Jones*, Beth Webster* and Sarah White** (University of Surrey, University College London) (Sponsor: Sarah White)
Performance on implicit and explicit false belief tasks in children with Cornelia de Lange and fragile X syndromes.
- 11:15** **Bryony Payne*, Geoffrey Bird and Caroline Catmur** (King's College London, University of Oxford) (Sponsor: Caroline Catmur) Are people less prone to consider the minds of out-group members? A new mental state inference task.
- 11:30** **Leora Sevi*, Caroline Catmur and Geoff Bird** (University of Oxford, King's College London) (Sponsor: Geoff Bird) Emotion inference depends on trait inference and trait-emotion models.
- 11:45** **Jelka Stojanov*, Brian Parkinson* and Leor Hackel*** (University of Oxford, University of Southern California) (Sponsor: Geoff Bird) Learning to empathise across group lines: A computational account.
- 12:00** **Paula Wicher*, Eva Krumhuber* and Antonia Hamilton** (University College London) (Sponsor: Antonia Hamilton) I will like you more when you copy my choices, not my moves.
- 12:30** **Lunch**

START OF PARALLEL SESSIONS

Session A - Lower Ground Floor Lecture Theatre

EPS Prize Symposium

Using cross-syndrome comparisons to explore developmental conditions.

Organised by Louisa Thomas.

- 13:00** **Hana D'Souza** (Cardiff University) Early development across genetic syndromes: The case of Down syndrome, fragile X syndrome, and Williams syndrome.
- 13:30** **Joe Bathelt** (Royal Holloway, University of London) Overlap between ADHD and ASD at the neural and behavioural level.
- 14:00** **Ailbhe McKinney** (University of Edinburgh) Understanding camouflaging in neurodivergent (autistic, ADHD, or Dyspraxia) girls aged 11-14 years.
- 14:30** **Tea / Coffee**
- 15:00** **Mary Abena Agyapong** (King's College London) Language, Visual Attention to Faces and Temporal Frequency: A prospective longitudinal study of infants with a family history of Autism and ADHD.
- 15:30** **Gaia Scerif** (University of Oxford) Understanding perceptual decisions by studying dynamics over development and neurodiversity.
- 16:00** **Roundtable Discussion with all speakers.**
- 16:45** **29th EPS Prize Talk** - Zoom Link to join Session A
Catherine Manning, University of Reading
Visual processing and decision-making in autism and dyslexia: Insights from cross-syndrome approaches.
- 18.00** **Poster Session – Room 305 with accompanying wine reception.**

[EPS Poster Session - Online Posters and Talk Through Videos](#)

START OF PARALLEL SESSIONS

Session B - Ground Floor Lecture Theatre

- 13:00** **Connor Keating and Jennifer Cook** (University of Birmingham) The Inside Out Model of Emotion Recognition: How the shape of one's internal emotional landscape influences the recognition of others' emotions.
- 13:30** **Marchella Smith*, Alexandra Dinu*, Maria Alonso Fernández* and Heather Ferguson** (University of Kent) (Sponsor: Heather Ferguson) Neural correlates of self-other distinction in autistic and neurotypical adults.
- 14:00** **Richard O'Connor, Andrew Lucas* and Kevin Riggs*** (University of Hull) Rethinking egocentric bias in adult belief processing: a mouse-tracking paradigm.
- 14:30** **Tea / Coffee**
- 15:00** **Nicole Sin Hang Law*, Elizabeth Wonnacott, Anna Samara and Kate Nation** (University of Oxford, University College London) (Sponsor: Kate Nation) Word Learning: Impacts of explicit awareness on the learning of semantic and graphotactic patterns.
- 15:30** **Sasha Kenjeeva*, Roberto Bottini* and Davide Crepaldi** (International School for Advanced Studies (SISSA), Italy, Center for Mind/Brain Studies (CIMEC), Italy) (Sponsor: Davide Crepaldi) From the concreteness advantage to semantic diversity: Semantic precision as a predictor of word identification.
- 16:00** **Maria Korochkina*, Lyndsey Nickels and Audrey Bürki*** (Royal Holloway, University of London, Macquarie University, Australia, University of Potsdam, Germany) (Sponsor: Kathy Rastle) Behavioural and electrophysiological markers of integration in learning of novel names for novel concepts.
- 16:45** **29th EPS Prize Talk - Zoom Link to join Session A**
Catherine Manning, University of Reading
Visual processing and decision-making in autism and dyslexia: Insights from cross-syndrome approaches.
- 18.00** **Poster Session – Room 305 with accompanying wine reception.**

[EPS Poster Session - Online Posters and Talk Through Videos](#)

Session A - Lower Ground Floor Lecture Theatre

- 09:15** **Anna Sedda***, **Federico Brusa*** and **Mustafa Suphi Erden*** (Heriot-Watt University) (Sponsor: Elisa Ferre) Imagining disgusting hands and feet.
- 09:30** **Alexander Muhl-Richardson**, **Maximilian Parker*** and **Greg Davis*** (University of Cambridge, Royal Military Academy Sandhurst) Visual Saliency at Distance and in Motion: How the Zebra got its Rump Stripes.
- 09:45** **Sarah Salo***, **Matthew Roser*** and **Alastair Smith** (University of Plymouth) (Sponsor: Alastair Smith) Visually-guided foraging in virtual worlds: Domain-general properties of search behaviour.
- 10:00** **Martin Jüttner**, **Kirsty Wilding*** and **Luc Boutsen** (Aston University, University of York) The role of object-selective attention in analytic and holistic object recognition.
- 10:15** **Alex Lloyd***, **Ryan McKay*** and **Nicholas Furl*** (University College London, Royal Holloway, University of London) (Sponsor: Essi Viding) Stochastic decisions support optimal foraging of volatile environments and are disrupted by anxiety.
- 10:30** **Tea / Coffee**
- 11:00** **Simon Liversedge**, **Xuejun Bai***, **Guoli Yan***, **Ying Fu*** and **Chuanli Zang** (University of Central Lancashire, Tianjin Normal University) Visual and linguistic foveal and parafoveal processing during natural reading: Evaluating the Multi-Constituent Unit Hypothesis.
- 11:30** **Jukka Hyönä**, **Lei Cui***, **Timo Heikkilä***, **Birgitta Paranko***, **Yun Gao*** and **Xingzhi Su*** (University of Turku, Finland, Shandong Normal University, China) An eye-tracking study on reading compound words in Finnish and Chinese.
- 12:00** **Shi Hui Wu***, **Fawziah Qahtani***, **Kayleigh Warrington**, **Erik Reichle**, **Kevin Paterson** and **Sarah White** (University of Leicester, Nottingham Trent University, Macquarie University, Australia) (Sponsor: Sarah White) Eye movement control during rapid reading: Evidence from empirical studies and computational modelling.
- 12:30** **Poster Session 2 – Room 305 with accompanying lunch reception.**

[EPS Poster Session - Online Posters and Talk Through Videos](#)

Session B - Ground Floor Lecture Theatre

- 09:15** **Katrina Burrows***, **Abbie Millett**, **Alexander Latinjak*** and **Brian McCook***
(University of Suffolk) (Sponsor: Abbie Millett) Vigilance decrement and the impact of sleepiness and excessive daytime sleepiness.
- 09:30** **Catherine Thompson**, **Lucy Ferrie***, **Brian Highlands***, **Steve Pearson*** and **Martyn Matthews*** (Liverpool Hope University, University of Salford) The impact of extreme temperatures on the cognitive functioning of fire fighters.
- 09:45** **Astrid Priscilla Martinez Cedillo***, **Tom Foulsham**, **Aastha Mishra***, **Carmen Garcia de Soria1***, **Nicoleta Gavrila***, **Lauren Charters*** and **Elena Geangu***
(University of Essex, University of York) (Sponsor: Tom Foulsham) Where is the milk? Effects of cognitive load on the performance of everyday tasks.
- 10:00** **Evan Livesey**, **Illeana Prieto*** and **Dominic Tran*** (University of Sydney, Australia) Planning on autopilot? Associative contributions to proactive control.
- 10:15** **Judith Lowes***, **Peter Hancock** and **Anna Bobak** (University of Stirling) (Sponsor: Peter Hancock) Accounting for speed-accuracy trade-offs in developmental prosopagnosia.
- 10:30** **Tea / Coffee**
- 11:00** **Lydia Hickman***, **Sophie Sowden**, **Dagmar Fraser**, **Bianca Schuster**, **Alicia Rybicki**, **Joseph Galea*** and **Jennifer Cook** (University of Birmingham) (Sponsor: Jennifer Cook) The role of dopamine in speed, speed modulation and speed meta-modulation: evidence from two pharmacological interventions.
- 11:30** **Ruoqi Tang*** and **Charlotte Bonardi** (University of Nottingham) (Sponsor: Charlotte Bonardi) The effect of impulsivity on devaluation in pavlovian instrumental transfer.
- 12:00** **Geoff Cole** and **Paul Skarratt** (University of Essex, University of Hull) The influence of motor inhibition on judgements and preferences.
- 12:30** **Poster Session 2 – Room 305 with accompanying lunch reception.**

[EPS Poster Session - Online Posters and Talk Through Videos](#)

Session A - Lower Ground Floor Lecture Theatre

Bartlett Prize Symposium

Remembering now and remembering later.

Organised by Alicia Forsberg.

- 14:00** **Alicia Forsberg** (University of Sheffield) The relationship between working memory and long-term memory across the lifespan.
- 14:30** **Agnieszka Graham** (Queen's University Belfast) Educating wandering minds: The link between mind wandering and learning in children.
- 15:00** **Sergio Della Sala** (University of Edinburgh)
Temporary memory binding in Alzheimer's disease.
- 15:30** **Tea / Coffee**
- 16:00** **Satoru Saito** (Kyoto University, Japan)
Beyond psychological essentialism in working memory research.
- 16:30** **Valérie Camos** (University of Fribourg, Switzerland) Working memory functioning: Integration of domain-general and domain-specific mechanisms.
- 17:00** **Nelson Cowan** (University of Missouri, United States of America)
Attention versus modularity and the war of the ghosts of theories.
- 17:45** **51st Bartlett Prize Lecture** – Zoom Link to join Session A
Robert Logie, University of Edinburgh
Working Memory: Blending theory and application.

Conference Dinner

Session B - Ground Floor Lecture Theatre

- 14:00** **Daniel Rogers***, **Timothy Andrews** and **Mila Mileva** (University of York, University of Plymouth) (Sponsor: Timothy Andrews) Critical image dimensions for the recognition and learning of faces.
- 14:30** **Elise Kanber*** and **Carolyn McGettigan** (University College London) (Sponsor: Carolyn McGettigan) The effects of training exposure on recognising lab-learned voice identities.
- 15:00** **Kira Noad***, **David Watson*** and **Timothy Andrews** (University of York) (Sponsor: Timothy Andrews) A network of regions in the human brain involved in processing familiar faces.
- 15:30** **Tea / Coffee**
- 16:00** **Marion Coumel***, **Cong Liu***, **Danijela Trenkić*** and **Angela de Bruin** (University of York, Qingdao University, China) (Sponsor: Angela de Bruin) The role of accent when processing language switches in bilingual language comprehension.
- 16:30** **Brontë Graham***, **Stephen Monsell**, **Heike Elchlepp**, and **Aureliu Lavric** (University of Exeter) (Sponsor: Aureliu Lavric) Are there language switch costs in bilingual comprehension? Language switch costs and their modulation in visual comprehension.
- 17:00** **Emmanuel Pothos***, **Agnes Rosner***, **Irina Basieva***, **Albert Barque-Duran***, **Andreas Glöckner***, **Bettina von Helversen*** and **Andrei Khrennikov*** (City, University of London, University of Zurich, Switzerland, University of Cologne, Germany, Bremen University, Germany, Linnaeus University, Sweden) (Sponsor: Andrew Wills) Ambivalence in decision making: An eye tracking study.
- 17:45** **51st Bartlett Prize Lecture** – Zoom Link to join Session A
Robert Logie, University of Edinburgh
Working Memory: Blending theory and application.

Conference Dinner

START OF PARALLEL SESSIONS

Session A - Lower Ground Floor Lecture Theatre

Psychonomic Society Symposium

Cognition in the “real-world”: How, Why and What next?

Organized by Seema Prasad and Ramesh Kumar Mishra.

- 09:00** **Miles Tufft** (University College London) Social Offloading: Evidence for socially embedded distractor suppression.
- 09:30** **Bernhard Hommel** (Technical University Dresden, Germany) Why automatic attention is intentional.
- 10:00** **Megan Freeth** (University of Sheffield) How can face-to-face studies improve understanding of autism?
- 10:30** **Tea / Coffee**
- 11:00** **Falk Huettig** (Max Planck Institute for Psycholinguistics, The Netherlands) Deconstructing the myth of normal reading and its implications.
- 11:30** **Sonali Nag** (University of Oxford) Looking at children’s books to fill gaps in the science of reading.
- 12:00** **Gustav Kuhn** (Goldsmiths, University of London) Stage magic in the “real world”.
- 12:30** **Lunch / Annual General Meeting for EPS Ordinary and Postgraduate Members**
(Please note that lunch is not provided.)

START OF PARALLEL SESSIONS

Session B - Ground Floor Lecture Theatre

- 09:00** **Anna Guttesen***, **Marcus Harrington***, **Gareth Gaskell** and **Scott Cairney** (University of York) (Sponsor: Scott Cairney) Does overnight memory consolidation benefit next-day learning?
- 09:30** **Shaun Boustani***, **Hilary Don***, **Chunliang Yang*** and **David Shanks** (University College London, Beijing Normal University, China) (Sponsor: David Shanks) Grain size effects in retrieval practice.
- 10:00** **Tirso Gonzalez Alam***, **Dominika Varga***, **Zhiyao Gao***, **Aidan Horner**, **Tom Hartley***, **David Pitcher***, **Magdalena Sliwinska**, **Jonathan Smallwood*** and **Elizabeth Jefferies** (University of York, University of Sussex, Stanford University, United States of America, Queens University, Canada) (Sponsor: Elizabeth Jefferies) The interplay between space and meaning involves two separate pathways from default mode to visual subnetworks.
- 10:30** **Tea / Coffee**
- 11:00** **Silvia Zanchi***, **Luigi Felice Cuturi***, **Giulio Sandini**, **Monica Gori** and **Elisa Ferre** (University of Genoa, Italy, Unit of Visually Impaired People, Italian Institute of Technology, Italy, Robotics Brain and Cognitive Sciences, Italian Institute of Technology, Genoa, Italy, Università di Torino, Torino, Italy, Birkbeck, University of London, London) (Sponsor: Elisa Ferre) Vestibular contribution to the encoding of target localisation.
- 11:30** **Tom Beesley** and **David Luque*** (Lancaster University, Universidad de Málaga, Spain) Can contextual cues guide attention automatically during visual search?
- 12:00** **Michel Belyk*** and **Carolyn McGettigan** (Edge Hill University, University College London) (Sponsor: Carolyn McGettigan) Vocal Allometry: Real-time MRI videography of apparent vocal size and the true size of speakers' bodies.
- 12:30** **Lunch / Annual General Meeting for EPS Ordinary and Postgraduate Members** (Please note that lunch is not provided.)

Session A – Lower Ground Floor Lecture Theatre

- 13:30** **Ceci Qing Cai***, **Nadine Lavan**, **Cian Xu***, **Sinead H.Y. Chen***, **Sam Gilbert**, **Sarah White** and **Sophie Scott** (University College London, Queen Mary University of London) (Sponsor: Sophie Scott) Does laughter make things funnier? An fMRI study from a neurodiversity perspective.
- 13:45** **Jade Norris**, **Jessica Farrell***, **Jemma Nicholson***, **Rachel Prosser***, **Anna Remington***, **Laura Crane*** and **Katie Maras*** (Bristol Medical School, University of Bristol, Centre for Research in Autism and Education (CRAE), University College London, Centre for Applied Autism Research, University of Bath, Oxford Health NHS Foundation Trust, University of Oxford) Perceptions of autistic and non-autistic adults in employment interviews: the role of behavioural impression management and interview structure.
- 14:00** **Helio Clemente Cuve***, **Sophie Sowden**, **Rachael Jack*** and **Jennifer Cook** (University of Birmingham, University of Glasgow) (Sponsor: Jennifer Cook) Learning parts from wholes: spatiotemporal motor structure in facial expressions of emotion.
- 14:15** **Mark Haggard**, **Bojana Bukurov*** and **Helen Spencer*** (University of Cambridge, University of Belgrade, Serbia, Multi-centre Otitis Media Study Group) Separating the baby of benefit from the bathwater of bias.
- 14:30** **David Ruttenberg***, **Oonagh Coleman***, **Imogen Krell***, **Joni Holmes**, **Kaska Porayska-Pomsta*** and **Sarah White** (University College London, Kings College, London, University of East Anglia) (Sponsor: Sarah White) Sensory, attention, and mental health interventions for autism: a technological patient and public involvement study.
- 14:45** **End of Meeting**

Session B - Ground Floor Lecture Theatre

- 13:30** **Emma Sullivan***, **Emma James**, **Lisa-Marie Henderson**, **Cade McCall*** and **Scott Cairney** (University of York) (Sponsor: Scott Cairney) The Influence of Emotion Regulation Strategies and Sleep Quality on Mental Health Outcomes during the COVID-19 Pandemic: A Registered Report.
- 13:45** **Alan O'Dowd***, **Rebecca Hirst***, **Annalisa Setti***, **Rose Anne Kenny*** and **Fiona Newell** (Trinity College Dublin, Ireland, The Irish Longitudinal Study on Ageing, Ireland, University College Cork, Ireland, Mercer Institute for Successful Ageing, St. James Hospital, Dublin, Ireland) (Sponsor: Fiona Newell) Seated heart rate and blood pressure are associated with susceptibility to the Sound Induced Flash Illusion in older adults.
- 14:00** **Irene Reppa*** (Swansea University) (Sponsor: Jeremy Tree) Practice makes perfect, especially when learning what we like.
- 14:15** **Kaitlyn Zavaleta*** (De Montfort University) (Sponsor: Nabil Hasshim) The importance of measuring speech production.
- 14:30** **Rachel Hagan***, **David Moore***, **Ralph Pawling** and **Susannah Walker*** (Liverpool John Moores University) (Sponsor: Ralph Pawling) Cognitive mechanisms underlying olfactory mixture perception.
- 14:45** **End of Meeting**

The first poster session will be held in Room 305, 26 Bedford Way, between 6-7pm, with accompanying wine reception.

[EPS Poster Session - Online Posters and Talk Through Videos](#)

1. **David Goldenhaus-Manning***, **Vanessa Loaiza** and **Nicholas Cooper*** (University of Essex) (Sponsor: Vanessa Loaiza) Updating single features in visual working memory.
2. **Delphine Nguyen***, **Nadine Fitzpatrick*** and **Caroline Floccia*** (University of Plymouth) (Sponsor: Peter Jones) Adapting language development research paradigms to online testing: Data from preferential looking, word learning and vocabulary assessment in toddlers.
3. **Hilary Don***, **Chunliang Yang***, **Shaun Boustani** and **David Shanks** (University College London, Beijing Normal University, China) (Sponsor: David Shanks) The influence of partial and distributed tests on learning and retrieval-induced forgetting.
4. **Hui Wah Cheung***, **Nicolas Geeraert*** and **Vanessa Loaiza** (University of Essex) (Sponsor: Vanessa Loaiza) Do cultural differences and prior knowledge influence feature binding in working memory?
5. **Ashley Blake***, **Ewa Dabrowska*** and **Nick Riches*** (University of Birmingham, Friedrich Alexander University, Germany, Newcastle University) (Sponsor: Jennifer Cook) Does the speed of automatization predict differences in linguistic ability in children with developmental language disorder?
6. **Hatice Cinar***, **Richard Allen**, **Amanda Waterman** and **Amy Atkinson** (University of Leeds) (Sponsor: Richard Allen) Exploring prioritisation effects across different forms of binding in working memory.
7. **Gwen Brekelmans*** and **Lena Blott*** (Queen Mary, University of London, University College London) (Sponsor: Elizabeth Wonnacott) Research Plan - How do learners extract statistical information about word-meaning distributions from linguistic input?
8. **Cheng-Yu Hsieh***, **Marco Marelli*** and **Kathy Rastle** (Royal Holloway, University of London, University of Milano-Bicocca, Italy) (Sponsor: Kathy Rastle) Learning and generalisation of the meanings of Chinese characters.
9. **Adam Parker** and **Timothy Slattery** (University College London, Bournemouth University) Frequency and predictability effects for line-final words.
10. **Duncan Bradley***, **Harvey Schneider***, **Boshuo Zhang***, **Caroline Jay*** and **Andrew Stewart** (University of Manchester) (Sponsor: Andrew Stewart) Data framing: Magnitude judgements are influenced by upper bounds in bar charts and choropleth maps.
11. **Kirralise Hansford***, **Catherine Preston**, **Daniel Baker*** and **Kirsten McKenzie*** (University of York, University of Lincoln) (Sponsor: Catherine Preston) Investigating the Neural Signatures Behind Illusory Finger Resizing.

- 12. Kelda Manser-Smith*, Matthew Longo and Luigi Tamè** (Birkbeck, University of London, University of Kent) (Sponsor: Luigi Tamè) Tactile coding on the fingers and toes: insights from double simultaneous stimulation across limbs.
- 13. Santiago Castiello*, Joan Ongchoco*, Brian Scholl* and Philip Corlett** (University of Oxford, Yale University) (Sponsor: Robin Murphy) Perceived animacy in people proneness to delusions.
- 14. Ryan Elson*, Denis Schluppeck* and Alan Johnston** (University of Nottingham) (Sponsor: Alan Johnston) Taking face space to the extreme, but activating object-selective cortex.
- 15. Marie Smith*, Emmanuel Ducrocq*, Emily Fergusson*, Louise Ewing and Ines Mares** (Birkbeck, University of London, University of East Anglia) (Sponsor: Louise Ewing) ERP evidence that fixation location contributes to age-related shifts in neural responses to face inversion.
- 16. Tsvetomila Popova* and Holger Wiese** (Durham University) (Sponsor: Holger Wiese) Neurophysiological correlates of identity learning throughout the first eight months of knowing a person.
- 17. Bartholomew Quinn*, David Watson* and Timothy Andrews** (University of York) (Sponsor: Timothy Andrews) The role of inter-hemispheric connectivity in the perception of faces.
- 18. Inês Mares*, Fraser Smith*, Emily Goddard*, Lianne Keighery*, Louise Ewing and Marie Smith*** (Birkbeck, University of London, Instituto Universitário de Ciências Psicológicas, Portugal, University of East Anglia) (Sponsor: Louise Ewing) Neural and behavioural signals of face categorisation prediction errors and their relationship with expertise.

The second poster session will be held in Room 305, 26 Bedford Way, between 1-2pm, with accompanying lunch.

[EPS Poster Session - Online Posters and Talk Through Videos](#)

1. **Anna Caunt* and Rana Abu-Zhaya*** (University of Plymouth) (Sponsor: Alastair Smith) Contextualised language input during routine activities in multilingual homes.
2. **Amy Canham*, Marion Coumel* and Angela De Bruin** (University of York) (Sponsor: Angela de Bruin) Note taking in a native or non-native language in bilingual students
3. **Ziyun Zhang*** (University College London) (Sponsor: Carolyn McGettigan) Factors affecting speech intelligibility and trait perception in virtual meeting contexts.
4. **Zuzana Nikodemova*, Hannah Kin*, Hannah Partington* and Sarah White** (University College London) (Sponsor: Sarah White) Investigating implicit mentalizing: Do bilinguals have an advantage?
5. **Claudia Lage*, Tim Sandhu*, Duncan Astle and Rebecca Lawson** (University of Cambridge) (Sponsor: Rebecca Lawson) Unsupervised data-driven classification of autistic and neurotypical adults before and during the Covid-19 pandemic.
6. **Anna Plunkett*, Meyrem Tompson*, Sarah Wu*, Sarah White, Kevin Paterson and Victoria McGowan** (University of Leicester) (Sponsor: Sarah White) Should we not use “not”? Investigating the effect of negation and salience on reading and skimming of health-related messages.
7. **Meyrem Tompson*, Anna Plunkett* and Victoria McGowan** (University of Leicester) (Sponsor: Sarah White) Should health messages make ‘not’ more noticeable? Older and younger adults’ processing and comprehension of health statements with salient and non-salient negation.
8. **Abbie Millett, Katrina Burrows, Nicholas Caldwell* and Sarah Richards*** (University of Suffolk) Suffolk Libraries: Facilitating change within the wellbeing of their community.
9. **Hayley Shepherd*, Christopher Brown*, Ellen Poliakoff and Richard Brown*** (University of Manchester, University of Liverpool) (Sponsor: Ellen Poliakoff) Investigating multisensory hypersensitivity and self-reported perceptual ability in Fibromyalgia.
10. **Daniel Graham*, Shaun Dordoy*, Rory Baxter* and Alastair Smith** (University of Plymouth) (Sponsor: Alastair Smith) Research Plan - Elucidating the neural underpinnings of place learning by egocentric and allocentric cues through transcranial magnetic stimulation.
11. **Anna Crossland* and Catherine Preston** (University of York) (Sponsor: Catherine Preston) Using multisensory body illusions to modulate judgements of body size.

- 12. Denise Cadete*, Adrian Alsmith* and Matthew Longo** (Birkbeck, University of London, King's College London) (Sponsor: Matthew Longo) Curved sixth fingers: Flexible representation of the shape of supernumerary body parts.
- 13. Elisa La Chiusa* and Daniel Yon** (Birkbeck, University of London) (Sponsor: Daniel Yon) Sensory (but not decisional) uncertainty controls information seeking.
- 14. Chris Brown and Nazanin Derakshan*** (University of Roehampton, University of Reading) Feature based templates-for-rejection are ineffective at suppressing threat-related distractors in visual search.
- 15. Han Wang*, Rongru Chen*, Yu Yan* and Patti Adank** (University College London) (Sponsor: Patti Adank) Perceptual learning of noise-vocoded speech persists under different types of divided attention: A dual-task paradigm.
- 16. Ziyi Wang* and Anna Grubert** (Durham University) (Sponsor: Anna Grubert) Co-activation of multiple attentional templates in colour versus shape search.
- 17. Teodor Nikolov* and Candice Morey** (Cardiff University) (Sponsor: Candice Morey) Eye movements during verbal and spatial maintenance.
- 18. Molly Delooze* and Candice Morey** (Cardiff University) (Sponsor: Candice Morey) The Compass Task: A contemporary spatial Stroop task.
- 19. Benjamin Griffiths*, Daniel Weinert*, Ole Jensen* and Tobias Staudigl*** (University of Birmingham, Ludwig-Maximilians - Universität München, Germany) (Sponsor: Patricia Lockwood) Enhancing recall with imperceptible sensory stimulation.
- 20. Lily Clark*, Philip Beaman and Catherine Manning** (University of Reading) (Sponsor: Catherine Manning) Perceptual load effect is not replicated online with letter or symbol stimuli.

The trade-off between item and order information in short-term memory does not depend on encoding time.



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Participants can optimize encoding of an immediate verbal memory test for item or for order information, or they can try to be ready for either type of test. Dividing encoding between both kinds of information, however, comes at a cost. Recently, it has been shown that the cost is more severe for order information compared to item information (Guitard et al., 2021, 2022). Here, we evaluated which factor can better account for this asymmetry by contrasting two hypotheses. According to a rate hypothesis, divided attention affects the rate of encoding more for order than for items. According to the asymptote hypothesis, divided attention does not affect the rates but diminishes the endpoint, or asymptotic level, of order encoding more than item encoding. In three experiments to distinguish these hypotheses, participants prepared for an item test, an order test, or both tests, in trials with different duration of presentation (250, 500, 1000, 1500, 2000, or 3000 ms per item). Overall, our results support the asymptote hypothesis and demonstrate that the allocation of attention to item or order processing can be disentangled from the time on task.

Mechanisms of visual working memory training: capacity and efficiency.



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Past research has primarily examined overall performance in training tasks without distinguishing between the quantity and quality of representations in visual working memory (VWM). An increase in the quantity of VWM representations reflect expanded VWM capacity, which may lead to broad transfer. In contrast, an increase that is limited to the quality of VWM representations rather reflects enhanced efficiency, which likely leads to a narrower transfer. Here, we assessed training-induced changes in quantity and quality of VWM representations using continuous-reproduction tasks. In this pre-registered pre-test/post-test study, 82 young healthy adults were randomly assigned to an experimental group and an active control group completing four training sessions. We observed that only the quality but not the quantity of VWM representations in the trained task significantly increased in the experimental group relative to the control group. However, these improvements did not generalise to untrained tasks. Our findings suggest that training gains are not driven by enhanced capacity. Moreover, gains in the quality of VWM representations might reflect more general task-specific abilities (e.g., better orientation discrimination).

Episodic memory and sleep are involved in the maintenance of context-specific lexical information.



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Familiar words come with a wealth of associated knowledge about their variety of usage, accumulated over a lifetime. How do we track and adjust this knowledge as new instances of a word are encountered? A recent study (Gaskell, Cairney & Rodd, 2019, Cognition) found that, for homonyms (e.g., bank), sleep-associated consolidation facilitates the updating of meaning dominance. Here, we tested the generality of this finding by exposing participants to (Experiment 1; N = 125) non-homonyms (e.g., bathtub) in sentences that biased their meanings towards a specific interpretation (e.g., bathtub-slip vs. bathtub-relax), and (Experiment 2; N = 128) word-class ambiguous words (e.g., loan) in sentences where the words were used in their dispreferred word class (e.g., ‘He will loan me money’). Both experiments showed that such sentential experience influenced later interpretation and usage of the words more after a night’s sleep than a day awake. We interpret these results in relation to an episodic context account of language comprehension in which new episodic memories are formed every time a sentence is comprehended, and these memories contribute to lexical processing next time the word is encountered and potentially the fine-tuning of long-term lexical knowledge.

Confidence judgments and gestures are informative metacognitive monitoring markers of memory accuracy in four- to eight-year-olds.



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There is little empirically-based guidance to judge the accuracy of child testimony. We tracked metacognitive development using confidence and implicit (e.g. gestures) measures to assess if children can monitor their memory accuracy. Method: Children aged 4-8 (N=73) watched video-clips and completed a two-alternative forced-choice task. On each trial, they needed to recognise the correct memory-item (e.g. blue vs grey jumper), rate their confidence and show or hide their response from the experimenter. Gestures made during recognition were video-recorded. Results: Linear mixed modelling showed that confidence ($\beta = .59$, $p < .001$), show/hide a response ($\beta = .14$, $p = .004$), response time ($\beta = -.12$, $p = .029$) and head tilts ($\beta = -.10$, $p = .029$) predicted memory accuracy. A confidence x age interaction ($F(2,5) = 16.14$, $p < .001$) showed seven-to-eight-year-olds were better than four-to-six-year-olds at using confidence to inform about their memory accuracy. However, no age-differences were found when memory performance was controlled for using a Bayesian HMeta-d’ framework (Diff = .01 [95% HDI -.34, .30]; Fleming, 2017). Conclusions: Children aged 4-8 can use confidence and implicit indicators of metacognition which could help legal decision-makers determine the accuracy of child testimony. The confidence-accuracy relationship is partially due to age-related differences in memory performance; controlling for this, suggests that metacognitive monitoring has a stable development from early- to mid-childhood.

Linguistic and non-linguistic stimuli activate taxonomic and thematic relations differently.



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Taxonomic and thematic relations are processed differently (Geller et al., 2019). However, the literature is dependent on language-based tasks, which may shape these findings. The aim of this research was to compare the retrieval of taxonomic and thematic relations during the processing of linguistic vs. non-linguistic stimuli. Across four internet-mediated experiments (N=208), participants viewed visual arrays containing a target (dog) and related (cat) or unrelated (banjo) distractor whilst hearing a spoken word (dog) or non-linguistic sound (barking) referring to the target. Participants were tasked with moving their cursor from the lower visual array to the target in one of the upper corners. Analysis of the attraction of participants' cursor trajectories toward related distractors revealed an interaction with auditory stimulus type, such that taxonomic relations showed greater attraction than thematic relations during spoken words, but no such difference was observed during non-linguistic sounds. While prior research reveals differences between taxonomic and thematic relations, these results suggest that such differences may be rooted in language and may not be characteristic of broader semantic memory.

The role of social status in sarcasm interpretation: Evidence from the UK and China.



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This study investigated the effect of characters' cultural background and relative social status on sarcasm interpretation. The study had a 2 (UK vs. China) by 2 (literal vs. sarcastic comment) by 3 (the speaker had equal vs. higher vs. lower status compared to the recipient) mixed design. Two hundred UK participants and 200 Chinese participants read 48 experimental scenarios. After reading each scenario, they were asked to rate (on a 7-point scale) how sarcastic and amusing the comment was, and how aggressive and polite they thought the speaker intended to be. Results showed that speakers' intent when using sarcasm was judged as less aggressive in the UK but more aggressive in China (when compared to literal criticism). When the speaker had higher social status, critical comments were rated as being less amusing and more aggressive in the UK, but less aggressive and more polite in China. Results have theoretical implications; in that theories designed to explain the emotional impact of sarcasm (such as the Tinge Hypothesis suggested by Dews & Winner, 1995) need to be modified to take cultural differences into account, as well as practical implications for successful cross-cultural communication.

Dews, S., & Winner, E. (1995). Muting the meaning: A social function of Irony. *Metaphor and Symbol*, 10, 3-19.

The role of scenario familiarity on older adults' ability to make financial decisions.



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Age-related cognitive decline can mean that older adults perform worse on decision-making tasks than young adults. However, age deficits between young and older adults are sometimes reduced when older adults can draw on their knowledge and experience to complete the task. Increasing the familiarity of the task scenario could therefore improve performance by allowing older adults to use their existing knowledge to scaffold their decision-making. We investigated whether older adults were able to make better financial decisions when the decision-making scenario was familiar, compared with unfamiliar. Young (18-30) and older (65+) adults completed two tasks adapted from the Adult Decision-Making Competence task: Resistance to Framing and Applying Decision Rules. Participants answered matched financial questions within scenarios that were familiar (e.g., decisions about savings accounts, choosing a TV, or buying a car) or unfamiliar (e.g., decisions about commodity markets, choosing an investment fund, or buying a yacht). Older adults had worse decision-making ability than young adults, but neither older nor young adults benefited from the familiar scenarios. Potentially, older adults made more gist-based decisions when faced with familiar scenarios, offsetting any scaffolding provided by the familiarity

The impact of format of confidence expressions on perceived credibility of eyewitness identification decisions.



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Eyewitnesses frequently accompany identification decisions with confidence statements. Some jurisdictions are reluctant to collect such statements because statements other than certainty are difficult to interpret. Confidence can be expressed verbally (e.g., Pretty sure), numerically (e.g., 90% confident), or with the use of an empirically derived visual lexicon which combines verbal expressions with a numeric scale. We presented participants with a mock crime scenario involving three perpetrators, where an eyewitness identified each perpetrator in a line-up. Participants (N = 261) were asked to rate perceived credibility (100% scale) of the eyewitness based on their expression of confidence in each identification decision. Within participants, we manipulated the level of confidence (low; medium; high) and the format of expression (verbal; numeric; lexicon). Credibility ratings reflected levels of confidence, but there were differences across formats. Credibility was highest for verbal expressions but indicated poor differentiation across levels of confidence. Numeric expressions were perceived as least credible but showed good differentiation across levels of confidence. Credibility ratings of lexicon expressions were best aligned with levels of confidence. Our findings suggest that police could maximize the utility of confidence statements by asking eyewitnesses to use a lexicon to express level of confidence in their identification decision.

Contextual semantic analysis in natural speech linked to better reading in dyslexia.



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Dyslexia is linked to poor tracking of the speech signal (1) over-time contributing to poor reading. Interestingly, such deficits do not result in comprehension difficulties, potentially because dyslexics compensate by using contextual information to facilitate lexical access (2). There is, however, no corroborating neuro-cognitive evidence. We explored this with a novel combination of magnetoencephalography (MEG), neural encoding and the grey matter volume analyses. We analysed MEG from 41 adult Spanish native speakers (14 with dyslexic symptoms) listening to naturalistic sentences. We used multivariate encoding to capture cortical tracking of auditory (envelope) and contextual information (Semantic Surprisal derived using a Transformer Neural Network). We related these measures to participants' reading scores and grey matter volumes within the language network. Right hemisphere (RH) envelope tracking was related to better phonological skills and larger grey matter volume in the right temporal and bilateral inferior frontal areas, suggesting a sustained effect of perceptual analysis on the brain's morphology. Critically, for dyslexic readers only, RH Semantic Surprisal tracking was related to better word reading. Previously RH activation in dyslexia was related to inefficient linguistic processing. Here, for the first time, we show a positive dependency between contextual semantic processing in RH and dyslexics' reading skills.

1. Goswami 2011, Trends in Cog Sci

2. Nation, and Snowling 1998, Child Development

Revealing task-specific and domain-general neural networks that track coherence and integrate contextual information: evidence from semantic and non-semantic tasks in different perceptual modalities.



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We have identified the neural networks that support context integration processes during narrative processing (1,2). However, one question left unaddressed refers to the nature of these processes. Does neural activity observed during narrative processing reflect semantic-specific or domain-general processes? What brain regions track “meaning”? We addressed these questions across different fMRI experiments, using a variety of naturalistic stimuli (sentences, numbers, music), delivered in visual and audio modalities. Uni- and multi-variate (ICA) analyses combined with computational linguistic methods, revealed the neural networks that track coherence and integrate contextual information in semantic and non-semantic tasks. In detail, a fronto-parietal network (3) supported context integration in both semantic and non-semantic tasks. Interestingly, this network

was insensitive to whether the integrated content was coherent with the previous contextual support (coherence tracking). Instead, task-specific networks (e.g., ‘language network’) were sensitive to contextual coherence. In semantic tasks, ATL and posterior-cingulate-cortex/precuneus tracked semantic coherence in both audio and visual modalities. Finally, our results provide insights on the debated role of left angular gyrus and ventro-medial-prefrontal-cortex for semantic cognition (4,5). Since these areas supported context integration in semantic and non-semantic tasks alike, we conclude that they may reflect domain-general processes to buffer and maintain contextual content, respectively.

1. Branzi, F. M., Humphreys, G. F., Hoffman, P., & Lambon Ralph, M. A. (2020). Revealing the neural networks that extract conceptual gestalts from continuously evolving or changing semantic contexts. *Neuroimage*, 116802. doi:10.1016/j.neuroimage.2020.116802
2. Branzi, F. M., Pobric, G., Jung, J., & Lambon Ralph, M. A. (2021). The Left Angular Gyrus Is Causally Involved in Context-dependent Integration and Associative Encoding during Narrative Reading. *J Cogn Neurosci*, 1-14. doi:10.1162/jocn_a_01698
3. Duncan, J. (2010). The multiple-demand (MD) system of the primate brain: mental programs for intelligent behaviour. *Trends in Cognitive Sciences*, 14(4), 172-179. doi:10.1016/j.tics.2010.01.00
4. Pykkänen, Liina. "The neural basis of combinatory syntax and semantics." *Science* 366, no. 6461 (2019): 62-66.
5. Humphreys, G. F., Ralph, M. A. L., & Simons, J. S. (2021). A unifying account of angular gyrus contributions to episodic and semantic cognition. *Trends in Neurosciences*.

Word length effect in developing Chinese readers during sentence reading.



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Word length has a fundamental role in determining where and when the eyes move when reading both Chinese and alphabetic scripts. However, surprising little is known about how the influence of word length develops in Chinese reading, as developing readers will have difficulty obtaining word length cues from naturally unspaced Chinese text. Accordingly, to gain insight into the use of this information during development, we assessed the effects of the length of specific (one-, two- or three-character) target words in sentences on the eye movements of both developing readers (Grade 3 and 5 children) and skilled adult readers. The findings reveal that even Grade 3 children can use word length to facilitate the recognition of words and guide their eye movements during reading. Moreover, the use of these cues shows a developmental trajectory, as readers appear to progress from using a predominantly character-based to a predominantly word-based reading strategy. Further analyses shed light on factors affecting this developmental trajectory, by revealing key roles for vocabulary knowledge, character recognition proficiency and reading fluency in supporting the use of word length information by developing Chinese readers. We discuss the implications of these findings in relation to current models of Chinese reading development.

Cognitive control underpins spoken language and reading comprehension: Insights from internet-mediated mouse cursor tracking.



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What are the mechanisms that underpin sentence comprehension, and how do these compare across (i.e., spoken and written) modalities? Two internet-mediated mouse cursor tracking experiments investigated the link between cognitive control and syntactic processing. Participants heard (Experiment 1) or read (Experiment 2) garden path sentences like ‘Put the kiwi on the rectangle on the circle’, in which ‘on the rectangle’ could temporarily reflect either a (i.e., incorrect) destination of ‘Put’ or modifier of ‘kiwi’, as well as unambiguous controls, and viewed visual arrays with a kiwi on a rectangle and an empty rectangle and circle. Interleaved among sentence trials, participants completed either mostly congruent or mostly incongruent Stroop trials, such that the latter was hypothesised to engage cognitive control (e.g., see also Hsu & Novick, 2016). Garden path mouse movements to incorrect destinations (e.g., rectangle) were reduced with mostly incongruent vs. mostly congruent Stroop trials across experiments and reading time effects were also reduced in Experiment 2. These results suggest that comprehension is causally supported by cognitive control across (i.e., spoken and written) modalities.

Individual differences in responses to infant distress.



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Infant crying serves an evolutionary function, signalling distress to caregivers who are physiologically triggered by this sound, thus eliciting caregiving and promoting survival. Unfortunately, infant crying can also trigger abuse by parents who demonstrate physiological hyper-arousal (e.g. Frodi & Lamb, 1980). This research explores individual differences in response to infant distress. Data will be presented from 3 online studies that asked participants to rate infant cries on aversiveness and their intended response. Study 1 tested the impact of increased cognitive load on 93 participants’ infant cry perception, finding an increase in intention to perpetrate abuse. Study 2 collected a bank of cry stimuli from 25 parents, with detailed information on context and subjective ratings of intensity; these form the Anglia Baby Cry Corpus. Study 3 tested the viability of measuring heart rate variability (HRV) using a mobile phone app (n = 35). HRV significantly decreased from baseline to measurements taken during cry 1, indicating physiological reactivity to distress. The extent of this decrease was significantly correlated with aversiveness score. These findings suggest that measuring HRV using an app may be valid. Post-pandemic we are attempting to replicate the HRV findings in the lab using ECG and exploring bio-markers of distress.

Performance on implicit and explicit false belief tasks in children with Cornelia de Lange and fragile X syndromes.

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Atypical social cognition may underlie distinct profiles of autistic traits observed in children with Cornelia de Lange (CdLS) and fragile X syndromes (FXS). However, traditional tasks have high language and executive function demands that may mask social cognitive abilities. We compared performance profiles on an implicit anticipatory-looking false belief (FB) task and a battery of traditional explicit FB tasks in children with CdLS (N=9) and FXS (N=9), and autistic (N=23) and neurotypical (N=34) children. Neurotypical (Median score=.28, $p<.01$) and CdLS groups (Median=.33, $p=.02$) showed more anticipatory-looking towards the target compared to autistic children (Median=-.19). Despite a strong anticipatory-looking time bias (Median=.75, IQR=1.54), large within-group variation led to no differences between the FXS and other groups. Neither chronological age (CA) nor receptive language ability (RL) correlated with anticipatory looking in any group. Neurotypical children had higher explicit FB scores than other groups ($p<.01$). Both CA ($r=.37$, $p<.01$) and RL ($r=.49$, $p<.01$) were correlated with explicit FB scores in neurotypical children. A moderate but non-significant correlation was found between RL and explicit FB scores in autistic children ($r=.32$, $p=.06$). Groups showed different patterns of performance on FB tasks. Dissociation between implicit and explicit performance suggests explicit tasks mask spontaneous FB understanding in the CdLS group.

Are people less prone to consider the minds of out-group members? A new mental state inference task.



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People attribute less sophisticated mental states to out-groups (Demoulin, 2004). Whether this is due to poorer representation of their minds, or a reduced propensity to consider their minds, is currently unknown. In our new mental state inference task, we test whether group status (in-group vs out-group) affects people's propensity to seek further information about others' minds and, further, how group status affects accuracy of - and confidence in - people's mental state inferences. Participants (n=128) made inferences about beliefs held by in- and out-group members, and could then choose whether to seek further information to improve these inferences. Participants were more prone to seek information about out-group members than in-group members. The amount of information sought was correlated with participants' confidence in their ability to make an accurate inference: people were less confident when inferring the minds of out-group members and thus sought further information. In spite of the further information, however, participants' accuracy remained significantly lower for out-group members. This suggests that people can be motivated to consider the minds of out-groups but still remain less accurate in their mental state inferences. This suggests that poorer representation of out-group minds, not reduced propensity to consider them, underpins reduced mentalising for out-groups.

Demoulin, S. et al. Emotional prejudice can lead to infra-humanisation. *European Review of Social Psychology* 15, 259-296 (2004)

Emotion inference depends on trait inference and trait-emotion models.



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Inferring the emotional states of others is a crucial socio-cognitive capacity, yet despite copious research investigating emotion inference from perceptual and contextual cues, the role of information regarding the 'Target' has been overlooked. We hypothesized that emotion inference utilises one's inferences regarding a Target's traits combined with one's model of how those traits relate to the likelihood of experiencing different emotional states. Therefore, accuracy of trait inferences and trait-emotion mapping models should predict emotion inference accuracy. To test this, we developed a naturalistic task requiring participants (N=93) to watch video-recordings of genuine dyadic interactions and make inferences regarding Targets' traits, emotional states and mental states, which were compared to ground-truth data provided by the Targets. We also measured the accuracy of participants' models regarding trait-emotion covariance. Trait inference accuracy and model accuracy explained a substantial amount of variance in emotion inference accuracy, and had a greater effect when Target expressivity was lower. Participants' emotion inferences could be accurately predicted from their trait inferences and idiosyncratic trait-emotion mapping models, and updating of trait inferences across time predicted updating of emotion inferences.

Learning to empathise across group lines: A computational account.



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Although people often feel reduced empathy for outgroups, empathic norms can help increase it. For instance, people empathise more with outgroup members when their in-group members are also empathetic (conformity) or when outgroup members are empathetic towards one's in-group (reciprocity). Past work has looked at these norms one at a time, making it difficult to predict how people would respond when both in-group and outgroup empathic norms are available simultaneously and when conformity and reciprocity promote congruent or incongruent emotional responses. Participants (N = 251) played an online game in which they had to learn about empathic norms by witnessing individual in-group and outgroup members' emotional reactions to each other's outcomes. In this game, conformity and reciprocity were either aligned (e.g., both promoted apathy or empathy) or misaligned (e.g., one promoted apathy, the other one empathy). We found that reciprocity enhanced empathy for outgroup members more than conformity. However, participants formed biased perceptions of empathic norms that erred towards expecting greater intergroup empathy bias than in-group and outgroup members displayed in the game. Together, our findings indicate that unbiased exposure might not suffice to form an accurate representation of even the most impartial intergroup interactions.

I will like you more when you copy my choices, not my moves.



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It is widely believed that being mimicked makes us like the person more (Chartrand and Bargh, 1999). Can we get different benefits depending on what we copy -physical movements or something more abstract like preferences? Here, we compared the social consequences of copying choices and copying hand movements in the context of making art choices. Participants completed an in-lab mimicry task with 3 different ‘confederates’ who either mimicked their hand movements, art choices or did 50/50 of both. They believed the confederates were real people on a Zoom call, when in fact they were pre-recorded videos. Then they completed measures of perceived warmth and competence to assess first impressions. In general, the results showed that participants liked ‘confederates’ who mimicked their choices more than the ones who mimicked their hand movements. Moreover, copying preferences increased social perceptions of warmth and copying hand movements increased competence scores. These results suggest copying choices seem to be a stronger driving factor in likability judgments than copying motor movements.

The Inside Out Model of Emotion Recognition: How the shape of one’s internal emotional landscape influences the recognition of others’ emotions.



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Some people are exceptional at navigating the social world, while others struggle. At present, little is known about why these individual differences exist. Here we asked whether the way we feel “on the inside” influences the way we expect emotions to be expressed in the “outside world” and subsequently our ability to read others’ emotional expressions. In Experiment 1, we used our novel EmoMap paradigm combined with metrics from graph theory to map the shape of individuals’ internal emotional landscapes. Whilst some individuals had modular emotional landscapes, wherein emotional experiences were precise and distinct, others had more random landscapes, wherein experiences were variable and overlapping. In Experiment 2, we used our novel ExpressionMap paradigm to map the shape of individuals’ imagined visual representations of others’ facial expressions. For some people, imagined representations of emotional expressions were precise and distinct, whilst for others, imagined representations were variable and overlapping. Finally, we constructed the Inside Out Model of Emotion Recognition, which demonstrates that the precision and differentiation of emotional experiences and representations contributed to emotion recognition, explaining 61.2% of the variance in emotion recognition accuracy. These findings have critical implications for understanding the aetiology of emotion recognition difficulties in numerous clinical populations.

Neural correlates of self-other distinction in autistic and neurotypical adults.



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People typically show enhanced cognitive processing of self-relevant compared to other-relevant information – i.e., a self-bias. Previous research has suggested that self-bias may be impaired in autism spectrum conditions (ASC), perhaps due to difficulties with self-other distinction. However, empirical evidence for this is inconsistent. Examining the neural associates of self-bias enables us to understand the underlying mechanisms, and should reveal whether autistic people adopt compensation strategies which obscure evidence of impaired self-other distinction under certain task demands. We will present two experiments that used EEG/ERP to investigate self-other distinction in neurotypical (N = 24) and autistic (N = 24) adults using tasks that measure self-biases. Experiment 1 investigated self-bias at the perceptual level, and tested participants' ability to distinguish face/label associations of the self from those of other people of differing levels of *familiarity* (e.g., self vs. friend (familiar-other) vs. stranger (unfamiliar-other)). Experiment 2 investigated self-bias at the motor level, and tested participants' ability to distinguish their own motor repertoire from those displayed by other people of differing levels of *similarity* (self vs. adult (similar-other) vs. child (dissimilar-other)). We consider the importance of self-other distinction and its relevance to neuropsychological conditions such as anxiety and alexithymia.

Rethinking egocentric bias in adult belief processing: a mouse-tracking paradigm.



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Several theories of belief processing assume that processing another's false belief requires overcoming an egocentric bias towards one's current knowledge. Across three experiments computer mouse-tracking was used to measure attraction towards response options reflecting one's current knowledge while reporting a false belief. Participants viewed scenarios in which an agent either had a true belief ('TB-scenarios') or a false belief ('FB-scenarios') about the location of an object. Participants used a mouse to answer questions about the location of the object ('reality') and where the agent thinks it is ('belief'). Response time (RT), and mouse-tracking measures indexing attraction towards response options during decision-making, were measured. Experiment 1 found no evidence, in either RTs or mouse-tracking measures, that participants showed a bias towards their own knowledge when reporting another's false belief. Experiment 2 investigated whether this could be explained by participants prioritising encoding the other's beliefs. Experiment 3 investigated whether differences in event timings between TB- and FB-scenarios masked an egocentric bias. Neither follow-up experiment found evidence supporting the presence of an egocentric bias. Overall, our results suggest that belief processing involves parallel activation of possible belief contents, with no evidence that adults are egocentrically biased towards response options reflecting their own knowledge.

Word Learning: Impacts of explicit awareness on the learning of semantic and graphotactic patterns.



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Written languages are complex. The relationships between the written form of word and their sounds and meanings vary in systematicity. Cues to spelling are quasiregular and can operate at multiple levels which can be conflicting. How do people acquire and integrate cues as they learn new written words? We investigated sensitivity to semantic and graphotactic patterns when learning novel words. Adult participants (N= 37) engaged in an online paradigm where they learned an ‘alien’ language. This ‘alien’ language consists of pseudowords that were created using symbols and English vowels. How symbols associate with English vowels in the pseudowords reflect either the semantic patterns (i.e., part-of-speech) or graphotactic patterns (i.e., legal symbols after particular vowels). We then tested learning and generalisation, and asked whether they were aware of there being cues in the new language. Some participants were aware of semantic but not graphotactic patterns. These participants were able to generalise their knowledge to semantic but not graphotactic test items. In contrast, unaware participants were at chance at post-test. Our study demonstrates the importance of explicit awareness in word learning, particularly when multiple cues are present.

From the concreteness advantage to semantic diversity: Semantic precision as a predictor of word identification.



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Concrete words are easier to process than abstract words, which has been taken as a sign that word meaning involves perceptual information. However, Bottini et al. (2021) showed that blind people also process concrete visual words faster, making an embodied interpretation of the effect entirely unviable. Here we investigate the possibility that abstract words are more difficult to process because their meaning is generally wider-while a ‘chair’ is always an object to sit on, a ‘brave’ individual might be a fireman saving lives or a child giving a presentation to the class for the first time. We quantified this idea of semantic precision through semantic diversity -the dissimilarity of contexts in which a word appears (semD; Hoffman et al., 2013). We refined the computation of semD using more advanced computational models (Mikolov et al., 2013) and separated it from several established predictors (e.g., contextual diversity, valence) using Principal Component Analysis. We then reanalysed Bottini et al.’s (2021) data and assessed the role of semD in a large database (Brysbaert et al., 2019). The results revealed an ambiguous connection between concreteness and semD, but showed that the latter has an independent, statistically solid and inhibitory effect on word processing times.

Bottini, R., Morucci, P., D’Urso, A., Collignon, O., & Crepaldi, D. (2021). The concreteness advantage does not depend on perceptual simulations. *Journal of Experimental Psychology: General*, 151(3), 731-738.

- Brysbaert, M., Mandra, P., McCormick, S. F., & Keuleers, E. (2019). Word prevalence norms for 62,000 English lemmas. *Behavior Research Methods*, 51(2), 467-479.
- Hoffman, P., Lambon Ralph, M. A., & Rogers, T. T. (2013). Semantic diversity: A measure of semantic ambiguity based on variability in the contextual usage of words. *Behavior Research Methods*, 45, 718-730.
- Mikolov, T., Chen, K., Corrado, G., & Dean, J. (2013). Efficient estimation of word representations in vector space. arXiv:1301.3781.

Behavioural and electrophysiological markers of integration in learning of novel names for novel concepts.



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According to the CLS model of word learning, only integrated novel words can interact with familiar words during lexical selection. The present study is the first to examine behavioural and electrophysiological markers of integration in a version of the semantic priming paradigm that supposedly relies primarily on automatic semantic processing. 71 young healthy adults learned novel names for two sets of novel concepts, one set on each of two consecutive days. Learning was followed by a continuous primed lexical decision task with EEG measures. Behavioural data was analysed with Bayesian Linear Mixed Effects models, while, for the EEG data, Bayesian Distributional Regression models were used to analyse mean amplitude in two pre-defined spatiotemporal windows (N400 and LPC) and Mass Univariate analysis to explore other time points and regions. While we found evidence against behavioural or EEG priming effects, ERPs for trained novel words differed depending on the length of consolidation (0-day vs. 1-day). We take these findings to indicate that neither consolidation period sufficed for integration and that, 24 hours after exposure to novel words, the system still relies on episodic memory to distinguish between these novel words, those learned more recently and those that haven't been seen before.

EPS Prize Symposium

Using cross-syndrome comparisons to explore developmental conditions.

Organised by Louisa Thomas

Early development across genetic syndromes: The case of Down syndrome, fragile X syndrome, and Williams syndrome.

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Each genetic syndrome has been described as having its own distinct profile of relative strengths and weaknesses across cognitive and behavioural domains. However, little is known about how these profiles emerge and develop over time. Yet, compared to many neurodevelopmental disorders that are often diagnosed later in childhood based on behaviour, many genetic syndromes are identified in infancy or toddlerhood, and often even prenatally. This provides us with a unique window onto early developmental processes. Thus, this talk will focus on comparing the early emerging cognitive and behavioural profiles of three genetic syndromes which are often reported as having contrasting profiles in older children and adults: Down syndrome (DS), fragile X syndrome (FXS), and Williams syndrome (WS). Understanding how the differences emerge is important in order to provide early, time-sensitive, and syndrome-specific support.

Overlap between ADHD and ASD at the neural and behavioural level.



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The clinical validity of the distinction between ADHD and ASD is a longstanding discussion. While they were exclusionary diagnoses until the introduction of DSM-5, the overlap in clinical presentation has long been recognised. Recent advances in the realm of data-driven analytic techniques now enable us to formally investigate theories aiming to explain the frequent co-occurrence of these neurodevelopmental conditions. In this talk, several studies will be discussed that investigated the overlap between ADHD and ASD using data-driven methods applied to large datasets. These studies incorporated behavioural features and differences in brain structure and function. The results suggest that ASD and ADHD cannot be unambiguously characterised as either two separate clinical entities or opposite ends of a spectrum. The implications of these findings for research on neurodevelopmental disorders will be discussed.

Understanding camouflaging in neurodivergent (autistic, ADHD, or Dyspraxia) girls aged 11-14 years.



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Many neurodivergent people learn to ‘camouflage’ by imitating others and hiding aspects of themselves. Camouflaging has not been examined in teenage girls with ADHD or dyspraxia. Gaining a better understanding of camouflaging in girls with ADHD and dyspraxia is important given its association with poor mental health. This research was co-produced with 15 neurodivergent women and sits within a larger project aimed at understanding the transition into adolescence in neurodivergent girls. Aims: 1) examine if diagnostic label (autistic, ADHD, dyspraxia) can predict camouflaging scores. 2) examine if camouflaging scores are associated with anxiety and depression. An adapted version of the Camouflaging Autistic Traits Questionnaire (CAT-Q) will be used to assess camouflaging. The CAT-Q questions were adapted for this age group by interviewing four teenage girls. Anxiety and depression will be assessed using the Revised Child Anxiety and Depression Scale-25 and the Anxiety Scale for Children – ASD. This study will provide evidence on the extent to which this age group is camouflaging, across different diagnostic groups. Understanding how much young girls are camouflaging and its relationship to mental health will be important for parents, clinicians, and school staff to provide appropriate support.

Language, Visual Attention to Faces and Temporal Frequency: A prospective longitudinal study of infants with a family history of Autism and ADHD



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Infant’s face scanning patterns shapes their processing of social information like language. However, it is unclear how mouths moving at different frequencies influences visual attention, particularly in the development of autism and attention deficit hyperactivity disorder (ADHD). To investigate attention to faces, temporal structure, and language outcomes in infants with and without a family history of autism and/or ADHD. This prospective study included 161 infants (70 females); 29 typical-likelihood (TL) controls, 80 elevated-likelihood (EL) Autism, 31 EL-ADHD and 21 EL-Autism+ADHD. Infants watched short videos of face pairs, with the mouth opening and closing at low, mid or high frequencies. Additionally, language skills were assessed from 5- to 36-months. Temporal frequency did not affect eye-mouth looking. TL and EL infants looked more to the mouth with age. At 14-months, infants who had acquired first words looked more at the mouth than infants without first words. However, 36-months language skills did not predict developmental changes in eye-mouth looking. Infants showed no preference for stimuli presented at the frequency of syllabic speech. The primary developmental shift in visual attention from looking at the eyes towards the mouth was consistent with emerging expressive language, but not later language outcomes.

Understanding perceptual decisions by studying dynamics over development and neurodiversity.



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This seminar is fully inspired by the collaboration with Cathy on investigating the temporal dynamics of perceptual decision making for neurotypical and neurodivergent children and adults. We reasoned that a cornerstone of human information processing is how we make decisions about incoming sensory percepts and that much of psychological science has focused on understanding how these judgements operate in skilled adult observers. Our collaboration brought us to reflect on complementary computational modelling, electrophysiological data, eye-tracking and longitudinal approaches to the study of perceptual decisions across neurotypical development and in neurodivergent individuals. These data highlight how it is crucial to study the multiple parameters and temporal dynamics feeding into how we become skilled adult perceptual decision makers. These dynamics in turn which may help explain converging and diverging ways in which we differ in how we make perceptual decisions.

29th EPS Prize Talk

Visual processing and decision-making in autism and dyslexia: Insights from cross-syndrome approaches.

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Atypical visual processing has been reported in a range of developmental conditions, including autism and dyslexia. Few studies make direct comparisons between conditions, or use sensitive-enough methods, so that it is hard to say whether atypical visual processing tells us anything specific about these conditions, or whether it is a more general marker of atypical development. I will present findings from two computational modelling approaches and related EEG data which can inform on the component processes involved in processing visual information and making decisions about it, which we have applied to autistic, dyslexic and typically developing children. The results identify both areas of convergence and divergence in autistic and dyslexic children's visual processing and decision-making, with implications for theories.

Imagining disgusting hands and feet.



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The hand laterality task (HLT) and the foot laterality task (FLT) are used to explore motor imagery (MI), the ability to imagine an action without executing it. With our limbs, we interact with our body, with others, and with the environment. These contacts might cause negative feelings, such as disgust. Disgust is elicited by different drivers. For instance, body products and body envelope violations provoke disgust to avoid contaminations and to avoid damaging our bodies. However, not much is known about how disgust changes our MI processes. In this study, we examined whether there is any difference in the ability to imagine hands and feet when these are emotionally-charged with reminders of disgust. Thirty-six participants completed an online version of a classic (neutral) HLT and FLT and two emotionally-charged (disgust) versions. Our findings show that when body parts are modified so that they elicit an emotional processing, disgust is salient overall, rather than being the saliency greater for actions. This is true for both our hands and our feet.

Zebra rump stripes control predator exogenous attention.



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High-contrast dynamic striped patterns can cause observers to perceive confusing and illusory motion that can impact speed perception and it has been suggested that zebra stripes are a naturalistic example of such an effect, generating motion signals that correspond to the wagon-wheel and barber-pole illusions¹. However, current consensus is that the narrow vertical stripes on zebras' head, neck, limbs and flanks deter biting flies². We observed that thick horizontal rump stripes retain high visual salience relative to other stripes when viewed in motion or at distance and speculate that, rather than generating illusory motion, these stripes capture and control predator exogenous attention to benefit the prey. To study this striking effect, we filtered images of zebra with different striping patterns to simulate distance, motion and acuity limitations in lion and hyena photopic and mesopic vision. For mountain zebra and some plains zebra, rump stripes were the most salient image regions according to computational salience models and human participants' ($N_{total}=52$) judgements of maximally attention-capturing image locations. Zebra stripes do not 'dazzle' or confuse predator motion perception, rather they specifically capture and control predator exogenous attention to confer benefits which we estimated here in pursuit simulations.

1. How, J. T. & Zanker, J. M. (2014). Motion camouflage induced by zebra stripes. *Zoology*, 117(3), 163-170.
2. Caro, T. (2020). Zebra stripes. *Current Biology*, 30, R973–R974.

Visually-guided foraging in virtual worlds: Domain-general properties of search behaviour.



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Psychological assays of human search behaviour primarily focus on the visual search paradigm. Despite suggestions that it represents a simple and controlled model of naturalistic foraging behaviour, relatively few studies have addressed search in large-scale space. Here we present a novel hybrid of visual search and foraging in a large fully immersive virtual environment. Participants freely explored an array of containers, collecting as many hidden targets as possible. In single-feature search, targets were hidden beneath containers of a particular colour, and in conjunction search, they were beneath containers of a particular colour and shape. Across four experiments, the distribution of targets and the instructions provided were manipulated. Participants gathered more targets when search was guided by a single feature, irrespective of explicit instruction. The distribution of targets also reliably affected the trade-off between patch exploitation and exploration, regardless of instruction. This suggests that visual attention drives search strategy, even when exploration requires a complex organisation of movements. Analyses of individual difference revealed that executive function was associated with inspection of uncued items, whilst spatial working memory predicted erroneous revisits. A relationship between verbal working memory and search strategy further implicated a potential verbal underpinning for aspects of optimal foraging behaviour.

The role of object-selective attention in analytic and holistic object recognition.



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Four experiments tested the generality of Hummel's (2001) dual-route model of human object recognition with regard to the concept of object-selective attention (Duncan, 1984). The experiments used a sequential-matching paradigm involving compound stimuli consisting of a picture (a line drawing of an everyday object) and a superimposed line segment. In each trial a centrally presented reference stimulus was followed by two lateral stimuli, a target and a distracter. Depending on matching condition observers either attended (i.e., matched) the line (thus ignoring the picture) or attended the picture (thus ignoring the line) within the compound stimulus. For the picture stimulus, visual similarity of target and distracter relative to the reference was manipulated by either using an identical image, its mirror-reflection, a split-image, or an inverted version. The task always was to semantically match the reference stimulus to the target. Performance was assessed in terms of accuracy and response latency. The results showed significant visual facilitation effects in the matching task, which were significantly larger for attended than ignored objects. Furthermore, the facilitation was reduced in the mirror, split and inverted relative to the identical condition, with the effects of attention and manipulation being strictly additive. Implications for theories of object recognition are discussed.

Duncan, J. (1984). Selective attention and the organization of visual information. *Journal of Experimental Psychology: General*, 113, 501-517.

Hummel, J. E. (2001). Complementary solutions to the binding problem in vision: Implications for shape perception and object recognition. *Visual Cognition*, 8, 489-517.

Stochastic decisions support optimal foraging of volatile environments and are disrupted by anxiety.



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Sensitivity to environmental volatility is important for survival, particularly whilst foraging, a near-ubiquitous behaviour across species. As adolescents are adept at adjusting their goal-directed behaviour, we first hypothesised that they would adapt to prevailing environmental volatility more flexibly than adults. Second, we predicted that anxiety would impair computational mechanisms that facilitate adjustment to environmental volatility. Adolescents aged 16-17 (N=91) and adults aged 24+ (N=90) decided in a foraging paradigm to exploit familiar options or explore novel ones. Like the optimal foraging agent, participants exhibited more stochastic (i.e., variable) decision-making in the volatile environment, meaning they more often trialled different responses that facilitated discovery of changes to the environment. Further, adolescents exhibited more stochastic choices than adults, though anxiety impaired the ability to adjust stochasticity between environments in both age groups. Stochasticity may act as a strategy to adapt explore/exploit choices to environmental volatility and might explain increased novelty-seeking during adolescence.

Vigilance Decrement and the impact of sleepiness and excessive daytime sleepiness.



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Vigilance decrement can be defined as a decline in accurate responses (Whittaker & Johnston, 2022, Grier et al, 2003), which can be used to measure vigilance. This study investigated the impact of vigilance decrement during static, prolonged, and excessive sleepiness. A total of 62 participants completed the Epworth Sleepiness Scale (ESS), Stanford Sleepiness Scale (SSS) and were given an SART experiment to complete online. A multiple linear regression was used to assess whether excessive sleepiness or sleepiness predicted the number of errors on the SART task. No significant effect was found between the predictor variables and error or reaction time within the SART task. This research provides evidence to suggest that participants experiencing static and prolonged sleepiness are not vulnerable to increased vigilance decrement. However, future research should investigate individual characteristics that may mediate the ability of participants remaining alert during the experience of sleepiness.

The impact of extreme temperatures on the cognitive functioning of fire fighters.

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Environmental temperatures of 30°C and above have been shown to impair cognitive functioning and fire fighters routinely work in temperatures that exceed 100°C. Currently there are no established guidelines for how long fire fighters can be exposed to extreme temperatures, and no consistency in how long fire fighters should spend resting and cooling. This experiment measured the effects of extreme temperatures on the cognitive performance of fire fighters, and the cooling period required for recovery. Forty fire fighters completed three computer-based tasks to measure attentional vigilance, working memory, and cognitive flexibility. Together the tasks took a maximum of ten minutes. The fire fighters then took part in a live-fire training exercise during which they were exposed to temperatures up to 300°C and participated in standard tasks such as locating and rescuing 'bodies' and extinguishing fires. They completed the same cognitive tasks on exiting the fire, and at 20-minutes and 40-minutes post-fire. Core body temperature was measured throughout using a telemetric pill. The results show how extreme heat can impact cognition, and how basic cognitive processes change as core body temperature returns to normal. The research informs safety practices associated with heat exposure, cooling, and re-entry judgements.

Where is the milk? Effects of cognitive load on the performance of everyday tasks.



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In everyday tasks, gaze is actively used to gather information for the actions we perform. In a series of experiments, we investigated how different types of cognitive load would affect gaze during tea- and sandwich-making, everyday tasks which involve sequences of object-related actions (Hayhoe 2000 & Land et al, 1999). Participants performed these tasks with a mobile eye-tracker, while also counting backwards by threes (high cognitive load) or by ones (low cognitive load). If gaze and actions require cognitive resources then there should be evidence of increased distraction in high load trials (vs low load), such as increased looking at non-relevant objects i.e., a knife when making tea. We also investigate the effects of reduced capacity in high load on sub-tasks' performance in which the correct object needs to be located and attended at the right time. In particular, we investigate disruption in 'look ahead fixations' which - it has been proposed - involve remembering object locations across sub-tasks. These findings shed light on the control of visual attention in naturalistic tasks and the memory representations involved.

Planning on autopilot? Associative contributions to proactive control.



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Proactive cognitive control is thought to rely heavily on the active maintenance of goals or contextual information in working memory, and is often measured using the AX-CPT, in which antecedent cues (A/B) are used to proactively prepare a response to a subsequently-presented probe (X/Y). Here we tested the hypothesis that proactive preparation in the AX-CPT is at least partly controlled by learning history, guided by the prevailing contingencies between cues and probes. We used a version of the AX-CPT in which a set of new rules (test phase) for responding changed the control operations required for some previously trained cues, while keeping the operations the same for others, allowing us to measure associative interference. Across several experiments, we found robust evidence of interference after the rule change based on previously learnt contingencies, suggesting that learnt contingencies come to influence proactive planning, even when they are task-irrelevant. This associative interference had no relationship with working memory capacity and was not affected by working memory load. The findings suggest that proactive control does not always require active maintenance in working memory, particularly if the individual can rely upon stable relationships in the environment to trigger planning and preparation.

Accounting for speed-accuracy trade-offs in developmental prosopagnosia.

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Despite severe everyday problems recognising faces, some individuals with developmental prosopagnosia (DP) can nevertheless achieve typical accuracy on objective face recognition tests leading to calls to also examine response time (RT) since this is often extended in DP. Here we present face and object processing data from 24 DPs and 94 age-matched controls assessed using three measures; accuracy, RT, and balanced integration score (BIS) (Liesefeld & Janczyk, 2019) - a measure that adjusts accuracy to account for RT and, unlike Inverse Efficiency Score, is suitable for accuracy levels typical in individual differences research. Surprisingly, DPs were more accurate (though slower) than controls on the Cambridge Bicycle Memory Test (BF10 = 9.51) but group differences disappeared when inspecting BIS (BF10 = .246) suggesting that higher DP accuracy was achieved by trading speed for accuracy. On some face tasks where no group accuracy differences were observed data showed moderate to strong evidence of group differences once RT was accounted for (face detection BF10 = 0.368Acc vs 5.04BIS; face configural / featural task BF10 = 0.641Acc vs 6.94BIS; old new faces BF10 = .096Acc vs 5000000BIS). BIS appears to be a useful measure for attenuating speed-accuracy trade-offs that may otherwise mask accuracy impairment in DP.

Liesefeld, H. R., & Janczyk, M. (2019). Combining speed and accuracy to control for speed-accuracy trade-offs(?). *Behaviour Research Methods*, 51(1), 40-60. <https://doi.org/10.3758/s13428-018-1076-x>

Visual and linguistic foveal and parafoveal processing during natural reading: Evaluating the Multi-Constituent Unit Hypothesis.



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I will summarise results from 18 eye movement experiments that have investigated preview benefit effects in Chinese reading to examine the Multi-Constituent Unit (MCU) Hypothesis (Zang, 2020). These experiments consistently demonstrate clear preview benefit effects for words beyond the immediate upcoming word but only when those words form a MCU. The results suggest that MCUs are lexicalised and processed as single elements such that foveal and parafoveal visual and linguistic processes are operationalised over the entire unit comprised of multiple words. This holds for unspaced languages (e.g., Chinese), as well as (non-agglutinate) spaced languages (e.g., English) and may also offer an account of processing in agglutinate languages (e.g., Finnish). The MCU hypothesis, lexicalised units, and licensed parafoveal processing might offer a route to theoretical progression beyond the current serial/parallel impasse within models of eye movement control. Additionally, and relatedly, I will suggest that current models of lexical processing do not adequately map onto natural reading circumstances. At a minimum, ecologically valid models of lexical identification during natural reading require processing mechanisms to support successive episodic (fixation-by-fixation) delivery of visual information modulated by acuity limitations based on (launch and landing) fixation sites and text characteristics.

An eye-tracking study on reading compound words in Finnish and Chinese.



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Four eye-tracking experiments investigated the recognition of two-constituent compound words in alphabetic Finnish and logographic Chinese. In both languages, the majority of dictionary entries are compound words comprising multiple morphemes. In Finnish, two-constituent compound words vary greatly in length, whereas in Chinese they are identical in length. We tested predictions derived from the visual acuity principle (Bertram & Hyönä, 2003), according to which two-character compound words fitting in the fovea are recognized holistically, whereas the recognition of longer compound words is initiated by access to the first component. The results of Experiment 1 (Finnish) and Experiment 2 (Chinese) were in line with the predictions. In Finnish, the effect of first-constituent frequency in gaze duration indexing processing via components was significant for long but not for short compounds. Also as predicted, in Chinese the first-constituent frequency effect remained non-significant. In Experiment 3, half of the Chinese compound words were presented in larger font. Contrary to the prediction, the first-constituent frequency effect remained non-significant. The Chinese results are compatible with the view that Chinese compound words are recognized holistically. In Experiment 4, we will put the visual acuity principle to a final test by presenting long Finnish compounds in a condensed font.

Eye movement control during rapid reading: Evidence from empirical studies and computational modelling.



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Empirical research and modelling of eye-movement control during reading has focused on reading for comprehension. Little is known about the mechanisms underlying rapid reading (skimming/scanning). Crucially, understanding how the reading task modulates behaviour reveals flexibility in the component processes (visual, oculomotor, lexical, post-lexical) and how they are co-ordinated. Here we provide an overview of seven empirical studies that examine the effects of reading task, and new model simulations (E-Z Reader, Veldre et al., 2022) of rapid reading behaviour. The results demonstrate that visual, lexical, and post-lexical processes are modulated by readers' goals. Compared to long words, short words are especially likely to be skipped during skimming (Expt. 1). Lexical processing (word frequency effects, Expts. 2 & 3) and sentence integration processes (semantic plausibility, Expts. 4 & 5; syntactic ambiguity, Expt. 6; sentence wrap-up, Expt. 7) occur during rapid reading. However, there are interactions between task and lexical/post-lexical manipulations, with smaller effects during rapid reading. Our simulations further reveal how the underlying mechanisms may be modulated by task, e.g. ignoring short words and limiting lexical processing during rapid reading. Crucially, limiting lexical and post-lexical processing may explain poorer comprehension during skimming compared to reading for comprehension.

The role of dopamine in speed, speed modulation and speed meta-modulation: evidence from two pharmacological interventions.



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Dopamine is robustly associated with the speed, or "vigour", of movements. But naturalistic fluid movements, like handwriting, don't proceed at a single speed. Rather we are continuously modulating our speed according to the trajectory of our movement: speeding up along straights and slowing down for corners. Furthermore, there is a level of "meta-modulation of movement speed" such that the extent to which we slow down for corners compared to straights is dependent on the global shape of our movements. Here we disentangle the role of dopamine in speed, speed modulation and speed meta-modulation. We do so by testing Parkinson's Disease (PD) participants (N=32) ON versus OFF dopaminergic medication and general population participants (N=43) on a D2 receptor blocker haloperidol versus placebo. Movements were recorded whilst tracing 4 shapes on a touch-screen device. Speed and speed-modulation were extracted, and the variation in speed-modulation across the different shapes was calculated as a measure of speed meta-modulation. In low dopamine conditions (PD OFF-medication, haloperidol), both movement speed and speed modulation were reduced. Haloperidol also reduced the meta-modulation of speed. Thus, we confirm the link between dopamine and vigour, and propose a role for dopamine in the control of speed during fluid, naturalistic movements.

The effect of impulsivity on devaluation in pavlovian instrumental transfer.



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Addictive behaviours can be studied in Pavlovian instrumental transfer (PIT) tasks, in which a conditioned stimulus (CS), previously paired with a specific outcome, can influence the performance of an instrumental response (R). PIT effects can be specific (the CS selectively elevates responses paired with the same outcome as the CS) or general (the CS elevates responses paired with any outcome of the same motivational value). Addictive behaviours may persist because individuals fail to adjust responses to changes in outcome value. Moreover, highly impulsive people may be insensitive to reward devaluation and continue responding to devalued outcomes. The present experiments explored whether outcome devaluation influences the stimulus control of responding in specific and general PIT (cf. Hinojosa-Aguayo & Gonzalez, 2020) and whether these effects are related to impulsivity. We employed a novel appetitive PIT task; outcome devaluation occurred either after (Experiment 1) or before (Experiment 2) transfer test. In the devaluation condition response rates were lower for the devalued outcome; devaluation abolished general PIT but left specific PIT intact. Although outcome devaluation did not influence the magnitude of specific PIT, negative urgency (a sub-scale of the UPPS-P impulsivity scale) was negatively correlated with the devaluation effect in the specific PIT test.

Hinojosa-Aguayo, I., & Gonzalez, F. (2020). Affect-driven impulsivity impairs human action control and selection, as measured through Pavlovian instrumental transfer and outcome devaluation. *Quarterly Journal of Experimental Psychology*, 73(4), 537-554.

The influence of motor inhibition on judgements and preferences.



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Response Inhibition, as measured with procedures such as the Stop-Signal task, most often manifests as an increase in reaction time and error rates. In a series of six experiments we describe a novel paradigm revealing that a participant's specific motor responses can influence subsequent choices. When making a relative judgement between two stimuli (e.g., which is the largest or most appealing), participants are less likely to choose an item if the choice requires a response that has just been made. After describing the basic phenomenon, we show that the effect is relatively short lived (<1250 ms) and is not due to attentional orienting or inhibition of return. We also find that it is localised to a specific response (i.e., the effector that induces the inhibition is also used to indicate the choice). We conclude that an individual's own motor responses can induce a form of motor inhibition that affects a variety of decision-making.

Critical image dimensions for the recognition and learning of faces.



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A key theoretical challenge in human face recognition is to determine what information is critical for judgements of identity. To address this question, we used principal components analysis to reveal the image dimensions from a large set of naturally varying faces images. First, we asked how recognition of familiar faces is impacted when you systematically remove image dimensions from faces. We found that recognition increased when the early image dimensions were removed, decreased when intermediate dimensions were removed and then returned to baseline recognition when later dimensions were removed. We then asked the related question of what image information is important when learning new faces. Again, we found that removing early image dimensions had a minimal effect on learning new faces, but that removing intermediate image dimensions significantly impaired the subsequent recognition of learnt faces. Finally, we asked how the recognition and learning of faces is affected when different image dimensions are caricatured. A prediction based on norm-based coding is that caricaturing critical image dimensions should increase the ability to learn and recognize faces. These findings suggest a narrow band of image dimensions are critical for learning and the subsequent recognition of face identity.

The effects of training exposure on recognising lab-learned voice identities.



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To fully learn to identify a speaker's voice, a listener must be able to recognise it in all its variations. Previous studies have shown that the mental representations of lab-learned voices are unstable, and easily disrupted by changes in speaking style (Saslove & Yarmey, 1980), linguistic information (Zarate et al., 2015) as well as by acoustic modulations (Kanber et al., 2021). In a behavioural study, we investigated how the amount of training exposure affects the stability of such newly learned voice identity representations. Participants were given either 20 or 80 items of training exposure to three novel voices, followed by a recognition test in which these voices had been acoustically modulated via adjustments to glottal pulse rate and apparent vocal tract length. We found that greater training exposure improves overall recognition accuracy for acoustically modulated voices - a further exploratory analysis indicating reduced reliance on low-level acoustic cues in the group who had experienced longer training. However, a comparison with previous findings (Kanber et al., 2021) shows that even with 80 items of exposure, mental representations of lab-trained voices remain far inferior to those for personally familiar identities.

A network of regions in the human brain involved in processing familiar faces.

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The difference between familiar and unfamiliar faces is central to understanding face recognition. However, the neural correlates of this difference remain uncertain. Here, we used a natural viewing paradigm in which participants viewed clips from Game of Thrones while brain activity was measured using fMRI. The similarity of the time-course of response between participants was compared in corresponding regions of the brain. Regions involved in familiarity were defined as having a more similar time-course of response between participants who were familiar with the faces compared to participants who were unfamiliar with the faces. This analysis revealed a network of regions across the brain that were associated with familiar faces. We also found higher functional connectivity between the regions in this network and between face-selective regions in familiar participants. Next, we used this paradigm to measure neural responses in participants with developmental prosopagnosia (DP), in which face recognition is impaired. In contrast to controls, participants with DP showed a significantly reduced network of regions associated with familiarity and no effect of familiarity on functional connectivity. Together, these findings show that familiar faces are represented by a network of regions in the brain that extend beyond the core face-selective regions.

The role of accent when processing language switches in bilingual language comprehension.



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We examine how bilinguals process language switches between their first (L1) and second language (L2). Language switching costs (slower responses to language switch than non-switch trials) arise more systematically in production than in comprehension, possibly because the latter elicits less language co-activation (Declerck et al., 2019). Some research suggests that phonetic information such as accents can influence the amount of language co-activation (e.g., Lewendon, 2020). Therefore, in two experiments, we test the effect of accents on processing of language switches. Experiment 1 tested 57 Mandarin-English bilinguals performing animacy judgments during an auditory comprehension switching task. Participants showed switching costs, but only from English to Mandarin. The English words were pronounced with a Mandarin accent, which could have increased Mandarin co-activation. This might have required more Mandarin suppression and increased costs when switching back to Mandarin. To test this hypothesis, Experiment 2 (N=100) manipulates whether the L2-English words have a Mandarin or an English accent. Preliminary results (N=50) show similar findings to Experiment 1 when English words have a Mandarin accent. However, the switching cost is not present when they are produced with an English accent. Together, these experiments shed more light on lexical co-activation when processing language switches during comprehension.

Are there language switch costs in bilingual comprehension? Language switch costs and their modulation in visual comprehension.

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Whether bilinguals can, or need to, exert endogenous control over language during comprehension is unclear. Contrary to robust language switch costs in bilingual production, switch costs in reading comprehension are often absent or numerically small. And whether bilinguals can prepare to read in a particular language is unknown. French-English bilinguals performed a semantic categorisation task. The need/opportunity for control was manipulated by (a) pre-cueing (or not) the to-be-read language, and (b) interspersing (or not) interlingual homographs (one spelling with different meanings in the two languages). Performance on non-homographs was examined in three conditions: (1) accompanied by homographs and cues (2) language cued/no homographs, and (3) no cues/no homographs. In a second experiment, conditions 1&2 were replicated in Swedish-English bilinguals with the language pre-cued at 150 or 1000ms. Contrary to recent findings, in both experiments significant switch costs were observed even without homographs and cues. Interspersing homographs amplified the switch cost but cueing the language had little effect. Increasing preparation time did not significantly decrease the switch cost. This suggests that an endogenous language selection mode can be adopted by bilinguals for single word comprehension if needed but mere foreknowledge of the language is not used for top-down selection.

Ambivalence in decision making: An eye tracking study.

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An intuition of ambivalence in cognition is particularly strong for complex decisions, for which the merits and demerits of different options are roughly equal but hard to compare. We examined information search in an experimental paradigm which tasked participants with an ambivalent question, while monitoring attentional dynamics concerning the information relevant to each option in different Areas of Interest (AOIs). We developed two dynamical models for describing eye tracking curves, for each response separately. The models incorporated a drift mechanism towards the various options, as in standard drift diffusion theory. In addition, they included a mechanism for intrinsic oscillation, which competed with the drift process and undermined eventual stabilization of the dynamics. The two models varied in the range of drift processes postulated. Higher support was observed for the simpler model, which only included drifts from an uncertainty state to either of two certainty states. In addition, model parameters could be weakly related to the eventual decision, complementing our knowledge of the way eye tracking structure relates to decision (notably the gaze cascade effect).

Bartlett Prize Symposium
Remembering now and remembering later.
Organised by Alicia Forsberg.

The relationship between working memory and long-term memory across the lifespan.

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Many aspects of the relationship between working (or short-term) memory and long-term memory are controversial. I will present research exploring 1) how individual differences in working memory capacity may constrain long-term memory across the lifespan, and 2) the effect of encoding conditions on short-term and long-term memory success, including serial position (i.e., primacy and recency effects) and distraction. Paradoxically, my research suggests that while working memory capacity constrains what is encoded into long-term memory, encoding conditions may have different effects on short-term and long-term memory success. I will discuss implications for understanding real-world consequences of working memory limitations in everyday learning.

Educating wandering minds: The link between mind wandering and learning in children.

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Mind wandering poses a serious threat to children's learning. Failing to attend to instruction because of task-unrelated thoughts may impede children's chances of acquiring crucial skills or knowledge. In the last two decades, the link between mind wandering and learning has been studied extensively in adult student populations. This research has demonstrated that mind-wandering can profoundly undermine adults' learning and has generated important evidence for instructional strategies that can reduce mind wandering in authentic educational settings. Yet, despite its clear educational significance, there are extremely few studies examining mind wandering in the childhood period before adolescence. In this talk I will describe the findings of two studies establishing a robust link between mind wandering and memory in children. I will argue that exploring the causes and consequences of mind wandering in the foundational years of schooling could provide the necessary empirical foundation for the development of practical interventions geared toward detecting and refocusing lapses of attention in educational contexts.

Temporary memory binding in Alzheimer's disease.

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Clinical neuropsychology capitalises on findings from cognitive psychology to develop assessments for brain-damaged individuals. In turn, this exercise consents to test and refine the theoretical models. Temporary memory binding is a good example of this interaction. Alzheimer's disease (AD) is a degenerative disease of the brain that impairs mental skills and abilities and undermines independent living. Currently accurate diagnosis in primary care is hampered by a lack of widely available, reliable and specific forms of assessment. Biomarker are invasive, expensive, require specialist knowledge and are not available in primary care. Dementia severity scales, such as the Mini-Mental State Examination (MMSE) are widely used but are not reliable for repeated retesting and assess the severity of general cognitive impairment rather than being specific to AD. I will argue that temporary memory binding tests, which assess the ability to temporarily hold conjunctions between surface features such as objects and their colours, represent good cognitive markers of AD. Temporary memory binding is not affected by age, literacy or depression, making it the ideal tool to assess AD. However, properly powered longitudinal studies are still needed.

Beyond psychological essentialism in working memory research.

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Humans have an ability to find an unseen hidden entity as an essence behind observable phenomena. This psychological essentialism is a basis for our thoughts and behaviours while biasing our scientific thinking and reasoning even in the realm of experimental psychology - working memory research is no exception. An example can be found in our belief on the presence of the essential nature of a psychological construct that might be just a statistical property. In this talk, I will first point to potential psychological essentialism in working memory research and examine its resultant influences on debatable topics, e. g., working memory training. It is then argued that recent studies (e.g., Logie, Belletier, & Doherty, 2021) have indicated possible approaches to this issue, emphasizing dynamic interactions of multiple factors. The approaches can be seen as exemplary cases of research strategies that have been suggested by Brick, Hood, Ekroll, and de-Wit (2022) for developing non-essentialistic theories in psychology.

Brick, C., Hood, B., Ekroll, V., & de-Wit, L. (2022). Illusory essences: A bias holding back theorizing in psychological science. *Perspectives on Psychological Science*, 17(2).

<https://doi.org/10.1177/1745691621991838>

Logie, R. H., Belletier, C., & Doherty, J. M. (2021). Integrating theories of working memory. In Logie, R. H., Camos, V., & Cowan, N. (Eds.), *Working memory: State of the science* (pp. 389-439). Oxford, UK: Oxford University Press.

Working memory functioning: Integration of domain-general and domain-specific mechanisms.

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Working memory is recognized as the center of human cognition. This makes WM an ideal topic of study to examine the question of the domain-general vs. -specificity of cognitive processes, and their potential co-operation. In this talk, I will present how the Time-Based Resource-Sharing model (Barrouillet & Camos, 2015, 2021) integrates both domain-general and domain-specific mechanisms to account for performance in cognitive tasks. This will be exemplified through verbal recall tasks, the impact of social presence on recall and the production of false memories at short- and long-term.

Attention versus modularity and the war of the ghosts of theories.

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Bartlett's 1932 story entitled *the War of the Ghosts* was used with other stories to show that, upon retelling, the memory of a story becomes more stereotyped. The same happens with psychological concepts. *Attention* is a concept developed partly to explain why ideas that are very different generally still interfere with each other to some extent. *Modularity* is a concept developed partly to explain why ideas that are very similar generally interfere with each other more. These concepts in the extreme may be warring ghosts of what is needed, which is an understanding of how much interference occurs with how much similarity between items, why, and under what task demands. I will describe a conception of processing in which attention can be used to select relevant items, putting them in the arena to be either distinctly remembered or confused with one another, more so if they share features. Evidence for this conception comes from various dual-set working memory tasks and their life span development.

EPS Bartlett Prize Lecture.

Working Memory: Blending theory and application.

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A century before the current emphasis on ‘making knowledge useful’ Frederic Bartlett championed the blending of laboratory and applied research, focusing on the interaction between accumulated knowledge and the remembering of event details. In the spirit of Bartlett, but focused on working memory, I will describe both applied research driven by theory, and laboratory research motivated by everyday cognition. Examples of the former will highlight (a) the importance of incorporating both working memory and forgetting in design of digital storage systems, and (b) the development of cognitive assessments for Alzheimer’s disease. In lab-based research, I have assumed that adults have a range of cognitive functions, evolved for everyday life, that are engaged selectively for laboratory tasks. I will present evidence showing that how these functions are deployed may differ between and within individuals for the same task and across experimental conditions. Reliance on aggregate data, while treating inter- and intra-participant variability as statistical noise, may lead to misleading conclusions about theoretical principles of cognition, and of working memory in particular. I will go on to argue that the selection of which cognitive functions might be engaged can arise from local interactions between those functions, without the concept of centralised control. Finally, I will emphasise the importance of adversarial collaboration in attempting to resolve scientific debate to allow for scientific advance.

Psychonomic Society Symposium

Cognition in the “real-world”: How, Why and What next?

Organized by Seema Prasad and Ramesh Kumar Mishra.

Social Offloading: Evidence for socially embedded distractor suppression.

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Attention mechanisms do not exist in isolation but in a world rich in context. With evidence from our joint picture word interference (PWI) paradigm, we demonstrate how meaningful social contexts have the power to facilitate distractor suppression in ways that are sensitive to the social dynamics of dyadic interactions. In the PWI paradigm, participants respond to target pictures while ignoring distractor words. If pictures and words are semantically related, then interference slows responses. We consistently find that this distractor interference is removed when participants believe they are working with another person, but only when that person engages with the distractor word, and is perceived as having particular social traits, such as high status or competency. We conclude that social environments afford the offloading of task-irrelevant distraction in a socially sophisticated manner (social offloading), and we highlight the importance of re-worlding participants in meaningful contexts to reveal the embeddedness of behaviour.

Why automatic attention is intentional.

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Traditional research on the control of human attention relies on a simple logic: Instruct the individual to attend to stimuli of category A and ignore stimuli of category B, and consider every piece of evidence that stimuli belonging to B have been processed as a limitation or breakdown of attentional control. However, this logic rests on the unrealistic assumption that the intentionality of people working on an arbitrary task in a lab is restricted to whatever they have been instructed by the experimenter to do. Once we consider that people do have a life outside of the lab, have goals and intentions related to this life, and do not switch them off when entering the lab, our research logic no longer works. In fact, many, if not all apparent evidence for limitations of attentional control might be due to processes subserving such real-life goals and intentions, and should thus not be taken as evidence for non-intentional processing.

How can face-to-face studies improve understanding of autism?

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Experiencing social interaction and social communication difficulties is core to a diagnosis on the autism spectrum. Understanding how and why social interaction differences occur between autistic and non-autistic people will facilitate understanding of how difficulties can be reduced. In order to create good models of social interaction and communication processes it is important to study behaviour in real-world contexts. In this talk, I will consider evidence from a range of different paradigms that aim to assess key processes and constructs involved in face-to-face interactions including consideration of how these can be isolated and investigated. Evidence will be drawn from paradigms that involve structured interactions measuring behavioural responses and tracking of eye movements, using both desk-mounted and mobile eye-trackers. Overall, the evidence presented will demonstrate the potential that face-to-face interaction studies afford in furthering our understanding of the processes underlying social interaction and social communication.

Deconstructing the myth of normal reading and its implications.

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We argue that the educational and psychological sciences must embrace the diversity of reading rather than chase the phantom of normal reading behaviour. This leads to certain implications. First, there are important lessons for how to conduct psycholinguistic experiments. Second, we need to move beyond Anglo-centric reading research and produce theoretical and computational models of reading that reflect the large cross-cultural diversity of languages and types of writing systems. Third, we must acknowledge that there are multiple ways of reading and reasons for reading, and none of them is normal or better or a “gold standard”. Finally, we must stop stigmatizing individuals who read differently and for different reasons, and there should be increased focus on teaching the ability to extract information relevant to the person’s goals. What is important is not how well and how fast people read but what people comprehend given their own stated goals.

Looking at children's books to fill gaps in the science of reading.

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The science of reading is rightly rooted in a cognitive-linguistic view of literacy learning. Even so, current theorising about learning to read is skewed because the evidence base is yet to be informed by most of the world's languages. Two practical propositions could be a starting point to broaden the evidence base: first, the setting up of child-directed print corpora in these languages and second, the mapping of the psycholinguistic properties of such corpora. The opportunity comes from the growing numbers of book titles in languages traditionally underrepresented in the publishing industry. We find that when such child-directed print corpora are mindful of the coverage statistics of book levels and book types, a developmental catalogue of real-world print encounters can be drawn up. These include under-theorised architectural principles of writing systems and language features at the level of phonology, morphology and syntax. We conclude that the boost needed to identify and fill the gaps in current accounts of literacy development could come from local children's books.

Stage magic in the "real world".

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Magic is an artform that allows us to experience things that we believe to be impossible. Stage magicians have developed powerful psychological tricks to manipulate our conscious experience of the world, and many of these tricks rely on carefully orchestrated social interactions. In this talk I will examine evidence from a wide range of empirical studies that explore how the nature of the social interaction (i.e., real or simulated) impacts the deceptive nature of the magic trick (i.e., the method) and the way in which the tricks are experienced (i.e., the effect). Misdirection, in which the magician uses social cues to orchestrate people's overt and covert attention appears just as effective when experienced live, as opposed to on video. Likewise, studies in which the magician uses gestures to influence a person's decision (i.e., forcing) reveal only minor differences when the tricks are performed live as opposed to video recordings of the same trick. In the final part I will examine studies that focus on the emotions that magic can elicit. Participants who watch magic performances on video report strong emotions, which were comparable to when the effects are experienced live. Magicians are remarkably effective at manipulating people's conscious experiences and many of these principles, as well as the emotions that they elicit, don't seem to rely on genuine social interactions.

End of Symposium.

Does overnight memory consolidation benefit next-day learning?



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Sleep supports memory consolidation and next-day learning. Contemporary models of memory consolidation posit that sleep drives a redistribution of memories from hippocampus to neocortex for long-term storage. Accordingly, overnight consolidation may pave the way for efficient next-day learning by preparing the hippocampus for the acquisition of new information. We tested this hypothesis across two preregistered behavioural experiments. In both experiments, participants learned a set of word pairs, and recall was assessed before and after a 12-hour delay containing overnight sleep or daytime wakefulness. Participants then learned and were immediately tested on a new set of word pairs. As expected, word-pair retention was better after sleep than wakefulness, suggesting a benefit of sleep for memory consolidation. However, sleep did not affect subsequent word-pair learning, and there was no evidence of a relationship between overnight consolidation and next-day learning. Unexpectedly, there was a significantly negative relationship between retention and subsequent learning in the wake condition. Taken together, these findings suggest that new learning is not contingent on consolidation achieved during the preceding night, but might instead be associated with wakeful forgetting.

Grain size effects in retrieval practice.



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Testing can enhance memory, but what is the optimal placement of tests during a learning episode? Retrieval success during retrieval practice has been recognised as an important factor to enhancing long-term memory. The grain size hypothesis therefore proposes that several interim tests of smaller amounts of information interspersed throughout learning should result in better retention than a single test at the end of learning, as retrieval success during practice is expected to be higher. However, previous research has found that although interim tests result in better practice performance than end tests, this does not translate into an advantage at cumulative assessment when using complex materials. We evaluated the grain size hypothesis using lists of related (Experiment 1) and unrelated (Experiment 2) words and found that interim tests enhanced both practice and cumulative assessment performance. However, we still observed considerable forgetting of successfully recalled items in the interim test group in the cumulative test. Experiment 3 therefore investigated whether desirable difficulty during practice is important for long term retention. The results will be discussed in light of theories of retrieval practice.

The interplay between space and meaning involves two separate pathways from default mode to visual subnetworks.



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In an fMRI experiment (n=27) and a resting-state study (n=191) we investigated the neural basis of semantic and spatial memory when these features were consistent (i.e., the items within a location were semantically related) and inconsistent. Both of these tasks draw on visual and Default Mode (DMN) networks (1, 2), yet show dissociations that might relate to variants of these large-scale connectivity patterns. We asked if activation in DMN and/or visual networks reflects consistency across aspects of experience or alternatively the type of information (spatial/semantic) needed to support the task. The results suggest that spatial and semantic cognition might be organised in two distinct visual-to-DMN pathways which also interact, behaviourally and neurally. An object task engaged DMN regions associated with semantic cognition and visual central regions associated with object perception, which are strongly connected amongst themselves, whilst a spatial task engaged DMN regions associated with navigation and scene construction, and visual peripheral regions associated with place perception, also strongly interconnected. These pathways interact in right parietal regions when the object and spatial information is aligned. These results are compatible with a fractionation of these networks into two convergent subsystems that support domain-specific representations of space and objects (3, 4, 5).

1. Chiou, R., Humphreys, G. F., & Lambon Ralph, M. A. (2020). Bipartite functional fractionation within the default network supports disparate forms of internally oriented cognition. *Cerebral Cortex*, 30(10), 5484-5501. <https://doi.org/10.1093/cercor/bhaa130>
2. Deen, B., & Freiwald, W. A. (2021). Parallel systems for social and spatial reasoning within the cortical apex. *BioRxiv*. <https://doi.org/10.1101/2021.09.23.461550>
3. Lambon Ralph, M. A., Jefferies, E., Patterson, K., & Rogers, T. T. (2017). The neural and computational bases of semantic cognition. *Nature Reviews Neuroscience*, 18(1), 42-55. <https://doi.org/10.1038/nrn.2016.150>
4. Moscovitch, M., Nadel, L., Winocur, G., Gilboa, A., & Rosenbaum, R. S. (2006). The cognitive neuroscience of remote episodic, semantic and spatial memory. *Current Opinion in Neurobiology*, 16(2), 179-190. <https://doi.org/10.1016/j.conb.2006.03.013>
5. Zhang, M., Bernhardt, B. C., Wang, X., Varga, D., Krieger-Redwood, K., Royer, J., Rodríguez-Cruces, R., de Wael, R. V., Margulies, D. S., Smallwood, J., & Jefferies, E. (2022). Perceptual coupling and decoupling of the default mode network during mind-wandering and reading. *ELife*, 11, 1-29. <https://doi.org/10.7554/eLife.74011>

Vestibular contribution to the encoding of target localisation.

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Estimating the spatial distance between our position and external objects in the environment is essential for survival. Distance information is provided by visual, acoustic and vestibular cues. The vestibular system constantly detects the movement of our head in space and contributes to many cognitive functions. However, its involvement in target localisation remains unclear. We investigated how stochastic Galvanic Vestibular Stimulation (sGVS) affects the encoding of the distance of environmental targets. GVS is a safe technique that stimulates the vestibular nerve with current. Healthy participants received sGVS or sham stimulation while encoding the position of LED lights placed on the floor. Participants encoded targets' distance and walked toward them. Comparing the experimental conditions, we observed a significant decrease in accuracy and precision in localisation when the encoding was associated with sGVS compared to sham. In a second experiment, participants performed the same task but encoded the position of acoustic targets. No difference between sGVS and sham emerged. Our results indicate that the vestibular system significantly contributes to visual but not acoustic targets' localisation. Our findings suggest an early interaction between vestibular and visual inputs for spatial navigation.

Can contextual cues guide attention automatically during visual search?



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When a set configuration of distractors repeats across trials, it will guide attention towards a known target location. This effect is known as 'contextual cuing of visual search' (Chun & Jiang, 1998). It has been suggested that the contextual cuing effect may reflect a low-level scene learning mechanism that operates outside of conscious awareness and outside of cognitive control processes. The current study explores this latter claim - the controllability of attention - by superimposing an instructional cue over the display, which is intended to engage top-down attentional control. Across three experiments we show that the contextual cuing effect persists in the presence of this cue, and also that the presence of the cue does not impair learning about the search configuration. We show that top-down control of attention works in tandem with the information provided by the background configuration of stimuli, and that this context refines the search process as it nears the location of the target object, utilising local context associations which speed target identification and response.

Vocal Allometry: Real-time MRI videography of apparent vocal size and the true size of speakers' bodies.



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The voice carries a wealth of social information beyond its more obvious functions as a carrier for the signals of speech. Listeners readily make judgements about speakers from their voices, for instance in judging how tall someone sounds. Taller speakers have longer vocal tracts which in turn can be heard in the acoustic properties of their voice. However, speakers are able to lengthen and shorten their vocal tracts to appear larger or smaller in different social contexts. This vocal flexibility creates a disconnect between the body size communicated by speakers and the true size of their bodies. We model the relationship between apparent vocal size as measured from vocal acoustics, the size of the vocal tract as measured by real-time Magnetic Resonance Imaging, and the size of the body that houses it - i.e., the underlying signal which is of interest to the listener. Measurements were taken while listeners spoke using their habitual voices, while sounding as large as possible, or while sounding as small as possible. Our model describes the extent to which human vocal flexibility breaks the allometric relationship between the body and the voice, as well as the limits on vocal modulation that preserve its relevance to listeners.

Does laughter make things funnier? An fMRI study from a neurodiversity perspective.



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Laughter serves as social signals in human interaction. A previous neuroimaging study found that neurotypical adults engages mentalizing ability to understand the meaning behind laughter. Intriguingly, the social meaning of laughter is processed implicitly by participants: genuine laughter has been found to amplify the funniness of jokes more than posed laughter amongst both neurotypical and autistic adults. However, there were no studies researching whether autistic adults have a different neural mechanism of implicit laughter processing relative to neurotypical adults and how does it relate to mentalizing ability. Therefore, we asked autistic and neurotypical adults (comparable for age, gender and IQ) to passively listen to funny words paired with genuine laughter, social laughter or non-emotional non-contagious human vocalizations in a fMRI study. In a preliminary analysis (16 Autism and 16 NTs; sample size to increase), NT participants showed greater activation in the subregions in medial prefrontal cortex than autistic adults when perceived words paired with social laughter versus with genuine laughter. We will apply a region of interest analysis to further explore how implicit laughter processing relates to mentalizing ability. Overall, our preliminary results show neural differences between autistic adults with high IQs and neurotypical controls during implicit laughter processing.

Perceptions of autistic and non-autistic adults in employment interviews: the role of behavioural impression management and interview structure.



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Unless appropriate adaptations are made, social communication and interaction differences mean that employment interviews can be particularly challenging for autistic people. To examine the extent to which Impression Management (IM; verbal, non-verbal, and para-verbal behaviours) influence perceptions of candidates, two experimental studies are reported. In each study, rater participants with employment interviewing experience provided overall impressions of autistic and non-autistic candidates undergoing a mock employment interview (blind to diagnosis). In the first study, behavioural cues were manipulated such that participants rated videos (behavioural cues present) and transcripts (behavioural cues absent; within-subjects) of two interviewees. In the second study, participants rated videos of autistic candidates undergoing either standard (unadapted) questioning, or questioning adapted to be more supportive (between-subjects; see Maras et al., 2020). Study 1 results demonstrated that non-autistic, but not autistic, interviewees gained a ‘video advantage’; receiving higher confidence and communication skills ratings when assessed by video compared to transcripts. Study 2 found that autistic candidates received higher ratings for conscientiousness and intelligence when undergoing adapted compared to unadapted questioning. The findings highlight the importance of IM on employer perceptions, the conditions that may relatively disadvantage some candidates (i.e., in video/real-world interviews), and how these differences may be alleviated by adapting interview questions.

Maras, K., Norris, J. E., Nicholson, J., Heasman, B., Remington, A., & Crane, L. (2020). Ameliorating the disadvantage for autistic job seekers: An initial evaluation of adapted employment interview questions. *Autism*, 1362361320981319. <https://doi.org/10.1177/1362361320981319>

Learning parts from wholes: spatiotemporal motor structure in facial expressions of emotion.



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From a motor perspective, the transmission of social non-verbal signals like facial expressions entails coordinating precise spatiotemporal patterns of motor activity in complex musculoskeletal organs like the human face. Like other movements, facial signals could in principle be broken down to a number of more basic motor action modules that combine to create the diversity of meanings such as facial expression categories of emotion. However, the optimal spatiotemporal structure of emotion communication through facial remains unknown. The current study used a motion tracking paradigm to capture facial expression production when participants communicated different emotions through simple facial expressions and spoken expressions of anger, sadness and happiness.

A data-driven unsupervised dimensionality reduction approach based on non-negative matrix factorisation (NMF), was used to learn the fundamental spatiotemporal structure that describe motor actions used to communicate emotions (e.g. eye opening, mouth widen, etc). The results show a NMF-compressed model of facial activity in space and time, where each component encodes local spatiotemporal structure. In other words, facial expressions were defined as components of local spatiotemporal activity that can be synergistically combined and recombined to produce variation in their meaning. The resulting spatiotemporal components accurately discriminate emotional expressions above other models (e.g. PCA, or unreduced movement). These results are consistent with modular and synergistic views of motor control theories and models of facial expression grounded on information theories of communication.

Separating the baby of benefit from the bathwater of bias.



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Treatment optimism bias (placebo) pervades health questionnaire responses, exaggerating treatment effectiveness, even within supposedly blinded placebo-controlled designs. Such biases can be reduced by using individual-level covariates in multiple regression (1). Generic measures might be expected (A) to adjust treatment effect sizes (TESs, as Cohen's d) more than specific ones would. Accordingly, defining appropriate degree of adjustment (B) is needed, to avoid 'over-adjustment' (avoiding throwing baby out with bathwater). In an RCT dataset (N=376), we optimally stratified non-outcome health-related items into three potential adjuster scores, differing in specificity (F=55.89; p<0.0001). For 16 factorial combinations of adjuster (3 strata, plus none) with four outcome measures, we next modelled outcomes with treatment term, pre-treatment baseline and adjuster. The TES reductions differed substantially with outcome measure modelled (8% reduction on objective hearing measures versus 40% reduction on heterogeneous development questions.) However, adjuster specificity had little overall influence, not confirming expectation (A). To avoid circular TES-based interpretation, we defined 'appropriateness' (B) impartially: adjusters chosen for greatest residual error reduction, or for highest $p_{1/2\mu}^2$ for pre-treatment value of the outcome measure, never gave the largest TES reductions. Such impartial model-performance criteria apparently avoid over-adjustment (B), adding credibility for bias-adjusted TESs as minimising placebo effects.

Gains in Quality of Life in Chronic Otitis Media Patients after Surgery, Adjusted for Placebo Bias. Bojana Bukurov, Mark Haggard, Helen Spencer, Nenad Arsovic, Snezana Jesic, Zoran Dudvarski, Otolaryngology and Neuro-otology 2022. PMID: 360

The Influence of Emotion Regulation Strategies and Sleep Quality on Mental Health Outcomes during the COVID-19 Pandemic: A Registered Report.



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Adaptive cognitive emotion regulation (CER) strategies can help to prevent psychiatric disturbance when enduring stressful experiences, but little is known about the inter-individual factors that govern their success. Sleep plays an important role in mental health, and may moderate the effectiveness of adaptive CER strategies by maintaining the executive functions on which they rely. In this registered report, we carried out a secondary analysis of mental health and sleep data acquired during the COVID-19 pandemic to firstly test the hypothesis that adaptive CER strategy use is associated with positive mental health outcomes and secondly, to determine whether the benefits of adaptive CER strategy use for mental health are contingent on high-quality sleep. Using established self-report measures, participants estimated their depression (N=562) and anxiety (N=604) levels, sleep quality and tendency to engage in CER strategies. Using a linear mixed modelling approach, we found that greater use of adaptive CER strategies and higher sleep quality were independently associated with lower self-reported depression and anxiety. However, the positive influences of adaptive CER strategy use on depression and anxiety outcomes were not affected by sleep quality. These findings shed new light on the neurocognitive and environmental mechanisms underpinning mental health and its disorders.

Sensory, attention, and mental health interventions for autism: a technological patient and public involvement study.



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The use of digital mediations among autistic individuals has grown dramatically but there is a paucity of studies targeting sensory-sensitivity, anxiety, and distraction. We conducted a Personal & Public Involvement (PPI) study to better understand autistic individuals' daily experience, and their potential desire for and tolerance of technological aids. Data was gathered from focus groups with autistic individuals (N=14) and online questionnaires with both autistic (N=187) and non-autistic individuals (N=174). Focus groups produced six themes ranging from sensitivity cues to technology use. From these, 103 autistic-voiced and 48 non-autistic-voiced questionnaire items were created. Word cloud metadata confirmed that language resonated with autistic individuals. From the questionnaires, autistic adults reported greater visual and physiological sensitivity, combined with increased anxiety. Sensory sensitivity predicted distractibility, with anxiety facilitating the association between the two, indicating that a focus on sensory sensitivity might have downstream benefits. Technology was already a big part of autistic adults' lives, and the vast majority said they would welcome smart devices that responded to their personal preferences and helped reduce anxiety and distraction, especially in sensory environments. Creating sensory-alleviating technologies that adapt to individual needs and environmental variability is likely to have significant and widespread benefits.

Seated heart rate and blood pressure are associated with susceptibility to the Sound Induced Flash Illusion in older adults.

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The precision of temporal multisensory integration declines in healthy ageing, a process shaped by both bottom-up (e.g., sensory function) and top-down (e.g., cognition) mechanisms. There are known links between the autonomic and central branches of the nervous system; for example, cardiovascular function can influence sensory processing and cognition. However, it is unknown to what extent cardiovascular function is associated with multisensory integration in ageing. A large sample of older adults (N = 3,224), drawn from The Irish Longitudinal Study on Ageing (TILDA), partook in assessments of unimodal visual and auditory temporal discrimination as well as the Sound Induced Flash Illusion. Seated heart rate (HR) and blood pressure were recorded before these tasks. Faster seated HR or higher mean arterial pressure (MAP) were independently associated with improved ability to discriminate two flashes but not two beeps. A faster HR or higher MAP were also associated with increased SIFI susceptibility when the audio-visual stimuli were presented close together in time (70 ms), but not at longer asynchronies. Our findings suggest a significant association between cardiovascular activity and both visual temporal discrimination and audio-visual temporal integration in older adults, thereby providing evidence for a link between cardiovascular function and sensory perception in ageing.

Practice makes perfect, especially when learning what we like.



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Previous research has found that appeal can facilitate performance under difficult conditions and positive affect from appeal has been suggested as explanation for appeal effect on performance (e.g., Moshagen et al., 2009; Reppa & McDougall, 2015; Reppa et al., 2021). Here we examined the effect of experience on performance with appealing and unappealing stimuli. In Exp. 1, half of the participants (N=70) searched for appealing icons first, followed by unappealing icons, and the order was reversed for the other half (N=70). Task experience benefited appealing icons more than unappealing icons, suggesting that appeal can facilitate learning. In Exp.2 the study was replicated with a new set of icons (N=120), yielding the same pattern of results as Exp.1. Overall, the findings show that appeal can facilitate learning of new material and suggest reward as the mechanism by which appeal leads to improved performance and learning.

The importance of measuring speech production.



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The process of learning a new language for an adult speaker is a complicated process: whether this take place in a classroom, in a social environment, or even in a computer-based application. In most cases, however, researchers rely on measuring how well an individual learnt new items using comprehension measures that explore the participants' receptive knowledge of the language items (e.g., Kaushanskaya and Marian, 2009; Bisson et al., 2013). Given the complexity involved with transcribing and coding production responses, it is unsurprising to find fewer research studies that include measures that require a participant to generate the novel items. 22 individuals were taught 20 nouns paired with their determiners in Spanish, took a comprehension test, and were then taught two contrastive adjectives (grande 'large', pequeño/pequeña 'small'), followed by a second comprehension test to measure participants' adjective knowledge. They then completed a production test in which they were presented with the image and asked to type the appropriate label. The average accuracy for the comprehension tests were 97% and 96%, respectively. Unsurprisingly, the production items averaged at 71% accuracy. This presentation will explore the differences in response accuracy to consider how to better incorporate production responses in novel language learning studies.

Cognitive mechanisms underlying olfactory mixture perception.



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Most familiar odours are complex mixtures of volatile molecules, which the olfactory system automatically synthesizes into a perceptual whole. However, odours are rarely encountered in isolation and thus, the brain must also separate distinct odour objects from complex and variable backgrounds. While to date little attention has been paid to the cognitive processes underlying this olfactory ability, in vision, individual differences in perceptual scene analysis have been widely reported. The aim of the present study was to determine whether local processing performance, in visual tasks, would predict participants' ability to identify component odours in multicomponent mixtures. 59 participants (female=39), aged 16-55 (M=26.07, SD=8.48), first completed the Navon and Block Design tasks, two tests of visual perceptual style. We used a 4-alternative forced choice task to test participants' ability to identify 6 blended fragrances, representing food-related odours, when presented individually and combined within binary or ternary mixtures. Performance on the Block Design Task was not significantly associated with odour mixture task performance. On the NAVON, faster reaction times and lower accuracy on global incongruent trials, suggestive of local interference, was significantly predictive of binary odour mixture performance. These results give novel insight into the cognitive processes required for olfactory scene analysis.

Updating single features in visual working memory.



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Working memory updating (WMU) refers to the ability to alter and change information in working memory. In the current experiment, we investigated two accounts of what happens to irrelevant information once it has been updated: Either it is removed and replaced entirely and therefore inaccessible, or it is suppressed but still accessible in working memory. Prior work showed that partially-updating a memory set (i.e., 1/6, 2/6, 4/6 items) and probing a repeated item rather than an updated item, improved recall accuracy, but fully-updating a memory set (i.e., 6/6 items update) decreased recall accuracy (Kessler et al., 2015; Experiment 1). Building on Kessler and colleagues paradigm, we investigated whether one of the aforementioned WMU processes best explain single feature updating. We applied two hierarchical Bayesian three-parameter mixture models simulating suppression (inclusive of the old memory set) and removal and replacement (only the new memory set), to participant recall error, with particular interest in their respective binding errors. Our preliminary results indicate that in both models fitted, binding errors are low regardless of the condition and probe-type. This suggests that participant task performance may not be affected by partially- or fully-updating a memory set, or the nature of the probe during recall.

Adapting language development research paradigms to online testing: Data from preferential looking, word learning and vocabulary assessment in toddlers.



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Little research has been done to investigate looking behaviour in infants when testing in an online modality. We chose three paradigms which are widely used in infant research: a word recognition task, a word learning task using the Switch task, and a language assessment tool relying on children identifying a target word amongst a set of picture cards. Our 3 experiments support the use of online data collection methods in developmental science. Experiment 1 involved 20 toddlers aged 24 months old and adapted the Inter-modal Preferential Looking task into an online modality for a validation of the general testing paradigm. The results showed that infants looked at a picture on screen longer when the picture was named, compared to a picture that was unnamed. In Experiment 2, 19 infants of 17 months old successfully learned the association between a new object and a new label via the Zoom application. Finally, in Experiment 3, children aged 19 to 26 months who did the standardised language test online (n=32) outperformed those who did the test face-to-face (n=30). The findings from our experiments indicate that with some modifications to lab-based procedures, an online version of infant methodologies can indeed be run successfully.

The influence of partial and distributed tests on learning and retrieval-induced forgetting.



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Testing facilitates subsequent learning of new information, a phenomenon known as the forward testing effect. The effect is often investigated in multilist procedures, where studied lists are followed by a retrieval test, or a control task such as restudying, and learning is compared on the final list. In most studies of the effect, tests include all material from the preceding list. Across four experiments, we assessed whether tests that are partial (not including all studied items) and distributed (including retrieval of items from earlier lists) are effective in enhancing new learning. The results show that testing of all studied material is not necessary to produce beneficial effects on new learning or to reduce intrusions. The beneficial effects of testing were substantially mediated by reduced proactive interference. Importantly, there was minimal evidence that the forward learning benefits of partial and distributed tests are offset by a cost to untested items via retrieval-induced forgetting.

Do cultural differences and prior knowledge influence feature binding in working memory?



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A persistent question in the literature concerning whether feature binding (e.g., integrating colour and shape into object representations) is an automatic or resource-demanding process may depend on unitization, that is, whether the to-be-bound information is intrinsic (belonging to) or extrinsic (contextual). Given extensive evidence showing that Easterners may process information more holistically than Westerners, such cultural differences may be useful to understand the fundamental processes of feature binding in visual working memory (WM). Accordingly, we recruited British and Chinese participants to complete a visual WM task wherein to-be-remembered colours were integrated within (i.e., intrinsic binding) or as backgrounds (i.e., extrinsic binding) of to-be-remembered shapes (Experiments 1 and 2). Experiment 2 further investigated the role of prior knowledge in long-term memory to facilitate feature binding in WM. During retrieval, participants decided among three probes: a target, a lure (i.e., recombination of the presented features), and a new colour/shape. Hierarchical Bayesian multinomial processing tree models were fit to the data to estimate parameters representing binding and item memory. The current results suggest that intrinsic and extrinsic binding memory are similar between two cultural groups and no prior knowledge benefits for either intrinsic or extrinsic binding for either cultural group.

Does the speed of automatization predict differences in linguistic ability in children with developmental language disorder?



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Children with developmental language disorder (DLD) form a heterogenous group with strengths and difficulties in language and cognition, but we are still learning as to how these processes are related and how various aspects of cognition support language development. In our study, we investigate whether there are non-linguistic cognitive differences between language typical children and children with DLD. 97 children (73 language typical children and 24 children with DLD), aged between 6;9 and 10;8 years took part in our online study. We used the Multiple-trial Tower of Hanoi task (MToH) as a measure of automatization, together with cognitive tasks measuring non-verbal intelligence, working memory, and implicit learning. These results were compared with performance on a battery of language tasks. Logistic regression showed that cognitive predictors of non-verbal intelligence, working memory and the coefficient of variation (as a measure of the speed of automatization) are strong predictors of language outcomes. Our results showed a higher coefficient of variation in children with DLD, indicating slower automatization on the MToH task. Implicit learning did not predict performance on linguistic tasks.

Exploring prioritisation effects across different forms of binding in working memory.



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In the limited capacity system of working memory (WM) certain methods can be used to direct attention to a specific item like prioritisation. Prioritisation aims to direct attention and improve recall for certain items. Binding between features of items can be another function of working memory. The binding types investigated in this study are unitised (coloured shape), and spatially separated binding (shape and colour presented simultaneously in separate, vertically adjacent locations). Across three experiments, we investigated whether prioritisation has a differential effect on different types of binding. Participants were presented with four shape-colour pairs sequentially and asked to recall the colour of one shape following a delay. While the priority effect was not observed in the first two experiments, which were online and did not use articulatory suppression (repeating one syllable continuously throughout the experiment to prevent verbal rehearsal). In the third in-person experiment with articulatory suppression, there was a main effect of serial position and binding and a significant interaction between serial position and priority. Throughout the three experiments, it is observed that individuals can prioritise items in visual WM when rehearsal is prevented. Participants significantly better in unitised condition than spatially separated thus binding between features require attention.

Research Plan - How do learners extract statistical information about word-meaning distributions from linguistic input?



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Statistical learning has been proposed as a central mechanism in language learning (Saffran et al., 1996), including learning word meanings (Yu and Smith, 2011). Although input statistics play a key role in heuristics for on-line disambiguation of word meanings (Rodd, 2020; Twilley and Dixon, 2000), there have been no attempts investigating the development of these heuristics from a statistical learning perspective. We propose to investigate how learners extract statistical information about word meaning from the input, by testing their learning of novel word forms with multiple meanings. Crucially, these meanings will have differing input distributions. We hypothesise that people will be able to learn the statistical distributions of the ambiguous meanings. Adults will be exposed to sentences embedding novel word forms with two unrelated existing meanings. The distribution of the meanings within training will be manipulated from a 50:50 distribution to more biased distributions, mimicking dominance in existing ambiguous words. This will inform us about meaning competition during learning, and minimum relative exposure frequency for successfully learning subordinate meanings. A pre-/post-test design will assess incidental meaning learning. Competition between the meanings of ambiguous words is expected to hinder learning in balanced distributions, while biased distributions could facilitate learning.

Learning and generalisation of the meanings of Chinese characters.



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Most Chinese words are compounds, embedding two or more constituent characters. Unlike English readers who know the exact meaning of the constituent, Chinese readers have to extract the meanings of individual characters through their experience with whole words. We analysed how properties of individual characters' influence how readers process words and non-words in a mega-study of Chinese word recognition. We focused on the family size of individual characters (the number of distinct words in which a character occurs) and the semantic consistency of such families (the average semantic relatedness between an individual character and all words containing it). Our analyses revealed that both variables influence recognition of Chinese two-character words. Words are recognized more quickly when they contain characters that combine with many different words and that make consistent meaningful contributions to those words. In addition, non-words that contain these same types of characters are rejected more slowly than non-words comprising characters that occur infrequently across different words or that behave in a less-consistent manner. These findings suggest that readers have assimilated information about individual characters through their text experience, and that they generalise this character knowledge to their daily encounters of both familiar and unfamiliar words.

Frequency and predictability effects for line-final words.

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Computational models of eye movement control during reading have revolutionised the study of visual, perceptual, and linguistic processes underlying reading. However, these models can only simulate and test predictions about the reading of single lines of text. Here we report two studies that examined how placeholders for lexical processing (frequency and predictability) influence the processing of line-final words. The first study was a linear mixed-effects analysis of the Provo Corpus, which included data for 84 readers reading 55 multi-line texts. The second study was a pre-registered eye movement experiment, where 32 participants read 128 items where frequency, predictability, and position (intra-line vs line-final) were orthogonally manipulated. Both studies were consistent in showing that reading times were shorter on line-final words. While there was mixed evidence for frequency and predictability effects in the Provo Corpus, our experimental data confirmed additive effects of frequency and predictability effects for line-final words which did not differ from those for intra-line words. We conclude that while models that make additive assumptions about the role of frequency and predictability may be better suited to modelling the current findings, additional assumptions are required if models can model shorter reading times on line-final words.

Data framing: Magnitude judgements are influenced by upper bounds in bar charts and choropleth maps.



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Data visualisations ideally display data accurately and honestly, but design choices create the potential for misleading graphics. One such design choice concerns the upper bound of a bar chart's axis or a choropleth map's colour legend. Default settings in visualisation software (such as ggplot2 in R) often terminate axes and colour legends at or near the maximum plotted value. In two experiments (combined N = 250), we explored how this practice affects interpretations of the magnitude of plotted data. In both experiments, participants indicated their assessments of the data using visual analogue scales. For bar charts depicting fictitious study data, participants provided ratings capturing each study's outcome; for choropleth maps depicting fictitious pollution levels, participants rated the urgency of addressing pollution levels in the geographic regions displayed. In both types of visualisation, ratings reflecting the magnitude of plotted data were lower when the visualisation's upper bound extended well beyond the maximum plotted value, compared to when the upper bound was near the maximum plotted value. This provides evidence for a framing effect in data visualisation, where bounds provide context affecting impressions of magnitude. The range of values within which data are presented should be used to convey values appropriately.

Investigating the Neural Signatures Behind Illusory Finger Resizing.



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Illusory body resizing typically uses multisensory integration to change the perceived size of a body part. Previous studies associated multisensory body illusions with frontal theta oscillations and parietal gamma oscillations for dis-integration and integration of multisensory signals, respectively. However, recent studies support illusory changes of embodiment from visual-only stimuli. Multisensory resizing illusions can also reduce chronic pain potentially through modulation of cortical body representations. This preregistered study (N=48) investigated differences between multisensory visuotactile and uni-modal visual resizing illusions using EEG. We hypothesised (1) stronger illusion in multisensory compared to uni-modal, and uni-modal compared to asynchronous (dis-integration) conditions, (2) greater parietal gamma during multisensory compared to uni-modal, and (3) greater frontal theta during asynchronous compared to baseline conditions. Results supported EEG hypotheses and also demonstrated that 41% of participants experienced the illusion with visual-only stimuli. Further analysis suggested that those who experience visual-only illusions demonstrate a different neural signature to those who do not. Our results support the importance of multisensory integration for illusory changes in perceived body size. However, we also suggest that visual-only illusions can influence cortical body representations for a significant proportion of participants, which may have implications for the development of accessible visual-only chronic pain treatments.

Tactile coding on the fingers and toes: insights from double simultaneous stimulation across limbs.



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It has been shown the existence of representational stages of touch that distinguish between body-regions more than body-sides with different interactions between homologous compared to non-homologous fingers of the two sides of the body. However, it is unknown whether such interactions are also present across different limbs that are morphologically similar such as hands and feet. Here, we investigated the effect of tactile double simultaneous stimulation (DSS) between the fingers and toes to explore the within between limbs interactions of touch. Participants were instructed to perform a go/no-go task to detect a tactile stimulus on a target digit (e.g., left index) in isolation or with a simultaneous stimulus distractor on a non-target digit, either on the hand (e.g., left middle) or on another limb (e.g., left big toe = homologous; left second toe = non-homologous). In different blocks the target digit could be a digit on the left hand (i.e., index finger, middle finger) or on the left foot (i.e., big toe, second toe). Results show that the DSS interference is reduced when homologous digits are stimulated on different limbs. However, this pattern is more prominent when the target is presented on the hand compared to the foot.

Perceived animacy in people prone to delusions.



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Perceived animacy (PA) is a visual and cognitive phenomenon in which people attribute intentions to inanimate shapes. PA can be studied with psychophysical methods by presenting videos with multiple random moving dots. Half of the videos contain a chase (a dot following another) and in the other half there is none. People are asked to detect chase and no-chase videos and correctly discriminate between them. Although the moving randomness of the dots make some videos harder. In this study we hypothesised that people with an elevated score the Revised Green Paranoid Thoughts Scale will false alarm (i.e., detecting a chase when there is none) more than people with an average paranoia score. We conducted a PA online experiment (n = 150) and measure paranoia. In addition, we developed a Distance Window Integration Model (DWIM). This model has a temporal integration window parameter, which describe how many frames a person needs to detect a chase where there are two dots relatively close; we hypothesized that it would be associated with paranoia. We found that people with elevated paranoia false alarmed more, are less sensitive to chase discrimination, but the integration parameter was not associated with Paranoia. Finally, we discussed improvements for future experiments and developments of the computational model.

Taking face space to the extreme, but activating object-selective cortex.



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The concept of ‘Face space’ (Valentine, 1991) suggests that we process faces relative to average in a high dimensional space. fMRI responses to stimuli very different from average, i.e., caricatures, have not been much explored. Increasing distance from average could increase neural responses, an idea supported by results in macaques (Chang and Tsao, 2017). In the fMRI study here, we used computer-generated faces ranging from average to heavily caricatured from a PCA-based face space. An independent localiser scan first defined face-, object- and scene-selective areas, in which we then measured responses to our range of caricatures, some of which were also presented inverted. While we found no clear, graded effect of caricature level or orientation in the fusiform face area (FFA) nor face-selective areas more generally, we did find a significant effect in object selective cortex, with a near-linear increase in fMRI response with caricature level. This suggests face-selective regions do not respond differently to images outside the range of natural variability. Instead, caricatured faces may either be processed more like objects, or recruit assistance from object-processing areas due to their novelty. The effect in object-selective areas could also possibly reflect a shift in representation in object space (Bao et al., 2020).

ERP evidence that fixation location contributes to age-related shifts in neural responses to face inversion.

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Despite evidence of adult-like specialised neural response to faces from early in development, these processes continue to develop across childhood. ERP markers of the classic face inversion effect (FIE, larger N170 response to inverted cf. upright faces) are not reliably present in children under 11 years (potentially reversed in 4-9 year olds) and multivariate pattern analysis of EEG further supports prolonged maturation of orientation decoding across childhood (Mares et al., 2020). Given that young children may preferentially attend to, and rely upon, information around the mouth in upright faces (cf. eyes in adults, Ewing et al, 2017), here we ask whether developmental differences in feature use might contribute to the distinct neural FIE profiles. Participants (19 8-9 year-olds, 21 adults) passively viewed upright and inverted faces presented such that different vertical positions were at fixation to systematically force participants to foveate the eyes, nose and mouth region at each orientation. Results indicate a significant interaction between fixation location, orientation and group. In children fixation location significantly impacts the presence of a FIE, while the FIE in adults was not modulated by fixation location. In all groups the FIE is largest for eye fixation.

Ewing, L., Karmiloff-Smith, A., Farran, E. K., and Smith, M. L. (2017). Distinct profiles of information-use characterize identity judgments in children and low-expertise adults. *Journal of Experimental Psychology: Human Perception and Performance*, 43(12), 1937.

Mares, I., Ewing, L., Farran, E. K., Smith, F. W., and Smith, M. L. (2020). Developmental changes in the processing of faces as revealed by EEG decoding. *NeuroImage*, 211, 116660.

Neurophysiological correlates of identity learning throughout the first eight months of knowing a person.



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It is well-established that familiar and unfamiliar faces are processed differently, but surprisingly little is known about how familiarity builds up over time and how novel faces gradually become represented in the brain. To address this question, we used event-related brain potentials (ERPs) to examine the neural processes accompanying face learning throughout the first eight months of knowing a person. We examined how increasing real-life familiarity affects ERP correlates of visual recognition (N250 Familiarity Effect) and the integration of person-related knowledge (Sustained Familiarity Effect, SFE). Sixteen first-year undergraduates were tested in three sessions, approximately one, five, and eight months after the start of the academic year, with images of a new friend they had met at university and of an unfamiliar identity. We observed clear ERP familiarity effects for the new friend after one month of familiarity. While there was a significant increase in the N250 after five months, no change in the SFE was observed over the course of the study. These results demonstrate that visual face representations develop fully within five months of knowing a person while the integration of identity-specific knowledge takes longer to get fully refined.

The role of inter-hemispheric connectivity in the perception of faces.



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Neuroimaging studies have revealed a number of functionally connected regions in the brain that respond selectively to faces. For example, regions in the occipital and temporal lobe form a core network that interacts with an extended network across the brain for processing faces. Models suggest that connections within each hemisphere (e.g. rOFA - rFFA) underpin specific types of face processing. However, the role of inter-hemispheric connectivity in face perception is less well understood. In this study, participants viewed dynamic faces in natural settings while brain activity was measured using fMRI. We compared functional connectivity between regions within each hemisphere with functional connectivity between corresponding regions across hemispheres (e.g. lFFA - rFFA or lOFA - rOFA). Within individual participants, we found that inter-hemispheric connectivity was significantly higher than intra-hemispheric connectivity in face-selective regions, but not in early visual regions. Next, we compared functional connectivity between participants to determine whether the inter-hemispheric connectivity reflected processing that is common across participants. Our results show that, although we find common patterns of intra-hemispheric connectivity across participants, the patterns of inter-hemispheric connectivity were more idiosyncratic. This suggests that inter-hemispheric connectivity may underlie individual differences in the perception and recognition of faces.

Neural and behavioural signals of face categorisation prediction errors and their relationship with expertise.

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If context and expectations shape perceptual processes - as proposed by the predictive coding framework - then any such effects should be modulated by high-level expertise. Here, we test directly whether neural and behavioural indices of prediction errors are more pronounced (at the group and individual level) when faces are expected compared to cars: a category with which participants have relatively less expertise. Fifty-eight adults learned to associate consistent colour cues with faces and cars, then completed a speeded detection task where those colour cues preceded to-be-categorised face and car stimuli embedded within visual noise (sometimes validly, sometimes invalidly). Participants then completed an identical procedure while their EEG signal was recorded. To ensure neural responses were not contaminated by behavioural responses, participants passively viewed the stimuli and responded only to catch trials indexing attention. Findings with traditional univariate ERP and multivariate pattern analysis of the EEG signal suggest clear differences in participants' behavioural and neural responses as a function of our experimental manipulation. The neural and behavioural findings align to suggest a neural preparatory effect of face prediction supporting superior face perception. Interestingly ERP analysis also indicates an effect of face-expertise tied to prediction when car stimuli were viewed.

Contextualised language input during routine activities in multilingual homes.



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The types of activities families engage with influence the language input that infants receive (Tamis-LeMonda et al., 2019) – e.g., at meal-time infants are more likely to hear ‘cup’ (Roy et al., 2015). However, little is known about language input in multilingual environments, and it is unclear whether activities are structured around specific languages, or if infants are exposed to language-specific context-dependent words. Each of these possibilities will significantly influence linguistic outcomes (Byers-Heinlein, 2013). This study examined language input across daily activities in 14 multilingual families raising infants in London. Families audio-recorded their home language environments for two days. We then annotated 60mins of data per family to examine if certain activities are more language- and speaker-specific than others, and if switching between languages is more frequent during certain activities. Results showed that meals and play interactions with two caregivers included high proportions of two languages. However, even when one speaker was present, the speech input was more likely to include two languages than one, suggesting that one speaker switches between languages. We observed more language-switching in meal times compared to play, highlighting that certain activities provide multilingual infants with an opportunity to learn vocabulary in a variety of languages.

Byers-Heinlein, K., and Lew-Williams, C. (2013). Bilingualism in the early years: What the science says. *LEARNING landscapes*, 7(1), 95.

Roy, B. C., Frank, M. C., DeCamp, P., Miller, M., and Roy, D. (2015). Predicting the birth of a spoken word. *Proceedings of the National Academy of Sciences*, 112(41), 12663-12668.

Tamis-LeMonda, C. S., Custode, S., Kuchirko, Y., Escobar, K., and Lo, T. (2019). Routine language: Speech directed to infants during home activities. *Child development*, 90(6), 2135-2152.

Note taking in a native or non-native language in bilingual students.



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Students studying in a non-native language can take notes in their native or non-native language. This choice may influence note-taking quality and memory of new content, with note quality and memory performance correlating (Peeverly and Sumowski, 2012). A previous study showed that note-taking quality is higher in a native than non-native language (Zetawi and Lipka, 2019) but assessed this by comparing two groups of students. In this study, we examined how native language versus non-native language note-taking within bilinguals affects note quality and memory of new content. One hundred bilinguals, who were studying in their non-native language (English), watched three ten-minute English TED talks while taking notes in either English, their native language, or using their languages freely. One week later they completed a memory test that included knowledge-based questions asking about detailed information and inference-based questions requiring them to apply the new knowledge. Preliminary analyses showed that knowledge questions were answered worse than inference questions, possibly because of the detailed information assessed in those questions. Test scores did not differ between the native, non-native, and free note-taking conditions. Further analyses will assess note-taking quality in the different conditions and the relation to test performance.

Factors affecting speech intelligibility and trait perception in virtual meeting contexts.



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We frequently use virtual meeting platforms as a replacement for in-person interaction. However, the nature of virtual meetings, especially under bad connections, brings challenges to interactive communication. While previous studies have reported the interactive effects of auditory and visual signal degradation on speech intelligibility (McGettigan et al., 2012) and the relative weighting of audio and visual cues for speech perception (Hazan et al., 2010), there is a surprising gap in our understanding of the effects of audiovisual synchrony on perception during spoken interactions. The current study (N=160 participants) designed a laboratory-based audio-visual sentence perception experiment to simulate typical challenges of online meeting environments, including drops in audio intensity and variable temporal lags between the talker's voice and face. The results showed that sentence report performance was significantly higher for synchronous than asynchronous stimuli, and for shorter vs longer (500ms vs 1000ms) audiovisual lags. A pilot experiment using the same stimuli investigated effects of asynchrony on perceived talker traits - while the talker tended to be perceived as less likeable in the presence of asynchrony, no significant effect was found. A follow-up experiment will investigate effects of asynchrony on perception using mismatches in audio and video presentation speed.

Hazan, V., Kim, J., and Chen, Y. (2010). Audiovisual perception in adverse conditions: Language, speaker and listener effects. *Speech Communication*, 52(11), 996-1009.

McGettigan, C., Faulkner, A., Altarelli, I., Obleser, J., Baverstock, H., and Scott, S. (2012). Speech comprehension aided by multiple modalities: Behavioural and neural interactions. *Neuropsychologia*, 50, 762-776.

Investigating implicit mentalizing: Do bilinguals have an advantage?



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Mentalizing is a crucial part of social cognition which allows people to better adapt to social situations. Evidence indicates that mentalizing abilities are modulated by the linguistic environment, with bilinguals outperforming monolinguals. However, existing evidence comes from explicit mentalizing measures which are susceptible to compensation. We investigated the impact of bilingualism on implicit as well as explicit mentalizing. We expected subtle mentalizing differences between bilingual and monolingual neurotypical adults, reflecting better mentalizing by bilingual adults. 99 participants completed a standardized language background questionnaire, the Frith-Happe animations task (a more explicit measure of mentalizing), and a multi-trial spontaneous mentalizing eye-tracking paradigm (a more implicit measure of mentalizing). Contrary to predictions, there were no significant differences in implicit or explicit mentalizing between monolinguals and bilinguals. Failing to observe a bilingual advantage in explicit mentalizing could stem from discrepant definitions of monolingualism and bilingualism between our and previous studies. Failing to observe a bilingual advantage in implicit mentalizing could be due to the online administration of the eye-tracking task. Future studies should use the implicit mentalizing paradigm in lab-based testing to determine whether the current results are an artefact of the methodology or whether there indeed is no bilingual advantage in implicit mentalizing.

Unsupervised data-driven classification of autistic and neurotypical adults before and during the Covid-19 pandemic.



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The Covid-19 pandemic was an unprecedented global situation with a profound impact on people's wellbeing, however little is known about how it may have affected autistic and neurotypical individuals differently. Our aim was to investigate the existence of distinct subgroups of difficulty in terms of restricted and repetitive behaviours and intolerance of uncertainty and explore how these potential subgroups might differ in mental health before and during the pandemic. We collected online data during the first UK lockdown and 314 autistic and 284 neurotypical adults participated. Each questionnaire item included a before and during lockdown measure. C-means clustering was used to identify potential subgroups. A two-cluster solution was obtained, with cluster 1 and 2 predominantly autistic and neurotypical, respectively. Cluster 1 showed significantly higher difficulties across all measures before and during lockdown. However, we found that for some individuals their cluster membership did not align with their formal diagnostic status and their mental health was aligned with their cluster membership rather than diagnosis. Cluster membership was relatively stable over time with few changes during lockdown. Data-driven classification was able to capture distinct stable groups of difficulty and the variation across individuals with a shared diagnosis, thus highlighting different support needs.

Should we not use “not”? Investigating the effect of negation and salience on reading and skimming of health-related messages.



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Health statements often include negations (words such as “no” or “not”), e.g. “This drug should not be taken on an empty stomach.” (Burgers et al., 2015). Previous work suggests that, compared to statements with no negation, negated statements result in greater processing difficulties (Just & Carpenter 1976, Grodzinsky et al, 2021) and reduced accuracy (Wilson & Park, 2008). However, little is understood about how negation affects comprehension during skimming, and whether making the negation visually more salient improves comprehension. Two online experiments investigated the effects of negation on the processing of health messages. Participants read (Experiment 1, N=48) or skimmed (Experiment 2, N=48) fictional health messages in three conditions: no negation, standard (“not”) or salient negation (“not” bolded and underlined). Linear mixed-effects models demonstrated that comprehension questions for messages with standard negation, compared to no negation, were evaluated more slowly during both reading and skimming, and were answered less accurately during skimming. Increasing the salience of negations did not affect evaluation times, but improved comprehension to the level of messages with no negation. Overall, these results have important implications in healthcare: negations should be avoided in health materials likely to be skimmed. If negations are necessary, salience must be increased.

Should health messages make ‘not’ more noticeable? Older and younger adults’ processing and comprehension of health statements with salient and non-salient negation.



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Inadequate health literacy is associated with poorer health and economic cost, with older adults at particular risk (Bostock and Steptoe, 2012). Health advice often includes ‘no’ or ‘not’, such as: ‘This medication is not harmful in pregnancy’. Yet, this device, termed ‘negation’, is generally associated with processing cost and comprehension error (e.g., Just and Carpenter, 1976; Grodzinsky et al., 2021; Margolin and Brackins, 2021). This online quasi-experiment investigated the processing and understanding of health statements with ‘no’ and ‘not’, and assessed performance when ‘no’ and ‘not’ were made highly salient (bold and underlined type). Sixty older (aged 65-90) and sixty younger (aged 18-25) adults read fictional statements in three conditions (no negation, standard negation, salient negation) before completing comprehension tasks. Comprehension accuracy was similar between no negation and standard negation but statements with standard negation took longer to read. Older adults achieved similar understanding to younger adults but, across negation conditions, required significantly longer reading and evaluation time. Across older and younger adults, salient (versus standard) negation saw a small but significant improvement in comprehension accuracy. Salience may thus help improve readers’ understanding of health statements with ‘no’ and ‘not’.

Bostock, S. and Steptoe, A. (2012). Association between low functional health literacy and mortality in older adults: longitudinal cohort study. *BMJ*, 344. Article: e1602.

Grodzinsky, Y., Behrent, K., Agmon, G., Bittner, N., Jockwitz, C., Caspers, S., Amunts, K. and Heim, S., 2021. A linguistic complexity pattern that defies aging: the processing of multiple negations. *Journal of Neurolinguistics*, 58. Article: 100982.

Just, M.A. and Carpenter, P.A., (1976). The role of eye-fixation research in cognitive psychology. *Behavior Research Methods and Instrumentation*, 8, 139-143.

Margolin, S. J. and Brackins, T. (2021). I’m not crying, you’re crying: an evaluation of the impact of emotional text on negation comprehension. *Reading Psychology*, 42(2), 131-149.

Suffolk Libraries: Facilitating change within the wellbeing of their community.



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Suffolk Libraries provide neutral, non-stigmatised, non-clinical community spaces with the ethos to expand knowledge, stimulate creativity, connect individuals, and foster a sense of community. Yet, the evidence of the efficiency of this service is lacking. Together with Suffolk Libraries the current work evaluated the impact that Suffolk Libraries facilitated activity groups have upon the wellbeing of its users. Measurements for mental wellbeing, satisfaction with life, happiness as well as a series of open questions were asked prior to and after a library group had taken place. A significant increase in life satisfaction and mental well-being was reported after attending a Suffolk Library activity, yet there was no significant difference for happiness. It is suggested that COVID-19 impacts the results of this work, as the data was recorded between the first and second national lockdown,

during a time of enhanced social distancing measures. As Suffolk Library users were returning to a different version of their routine activity groups, the authors conclude that a nostalgia effect was captured, which impacted the happiness findings. Consequently, further exploration in terms of wellbeing after social distancing measure have been lifted for activity users is suggested.

Investigating multisensory hypersensitivity and self-reported perceptual ability in Fibromyalgia.



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Fibromyalgia has predominantly been classified as a condition of disturbed pain processing associated with impaired perceptual ability (detection and discrimination of painful and tactile stimuli) and hypersensitivity (reduced tolerance) to pain (Borchers and Gershwin, 2015). Beyond disturbed pain processing, emerging evidence suggests that fibromyalgia sufferers experience multisensory hypersensitivity (Wilbarger and Cook, 2011). Limited research, however, has investigated how discrimination and detection are affected across sensory modalities. Understanding how basic perception is affected, is crucial for informing the potential treatment of the condition through perceptual training. This study investigated how different aspects of sensory processing in fibromyalgia, including detection / discrimination and tolerance, are affected across modalities via self-report methods. 188 people with fibromyalgia and 121 controls completed the sensory hypersensitivity scale (tolerance) (Dixon et al., 2016) and the sensory perception quotient (discrimination / detection) (Tavassoli, Hoekstra, and Baron-Cohen, 2014). Group comparisons revealed that the fibromyalgia group reported hypersensitivity (reduced tolerance) across all measured sensory modalities and an increased perceptual ability (discrimination/detection) on all modalities except smell and taste. Exploratory cluster analysis identified two fibromyalgia subgroups who primarily differed in reported perceptual ability suggesting within-group differences in perceptual self-awareness. Results are discussed in relation to perceptual training as a treatment.

Borchers, A. T., and Gershwin, M. E. (2015). Fibromyalgia: A Critical and Comprehensive Review. *Clinical Reviews in Allergy and Immunology*, 49(2), 100-151. <https://doi.org/10.1007/s12016-015-8509-4>

Dixon, E. A., Benham, G., Sturgeon, J. A., Mackey, S., Johnson, K. A., and Younger, J. (2016). Development of the Sensory Hypersensitivity Scale (SHS): a self-report tool for assessing sensitivity to sensory stimuli. *Journal of Behavioral Medicine*, 39(3), 537-550. <https://doi.org/10.1007/s10865-016-9720-3>

Tavassoli, T., Hoekstra, R. A., and Baron-Cohen, S. (2014). The Sensory Perception Quotient (SPQ): Development and validation of a new sensory questionnaire for adults with and without autism. *Molecular Autism*, 5(1), 1-10. <https://doi.org/10.1186/2040-2392-5-29>

Wilbarger, J. L., and Cook, D. B. (2011). Multisensory hypersensitivity in women with fibromyalgia: Implications for wellbeing and intervention. *Archives of Physical Medicine and Rehabilitation*, 92(4), 653-656. <https://doi.org/10.1016/j.apmr.2010.10.029>

Research Plan - Elucidating the neural underpinnings of place learning by egocentric and allocentric cues through transcranial magnetic stimulation.



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Introduction: Successful everyday navigation depends upon spatial reference frames that compute egocentric (viewer-centred) and allocentric (environment-centred) information. There is, however, some equivocality over the underlying neural mechanisms. The current literature indicates a role for the Precuneus in navigation reliant upon both allocentric and egocentric information. Furthermore, the occipital place area (OPA) is implicated in visually-guided navigational processes, which may underpin the use of egocentric information. This experiment will employ a TMS design to understand the respective roles of these areas in the same place learning task. **Methods:** We will use a repeated measures design in which participants will take part in three sessions separated by at least a week. In each session participants will receive Theta Burst Stimulation to either the OPA, Precuneus, or a control site (targeted using neuronavigation). Following stimulation participants will complete a desktop place learning task that directly dissociates sensitivity to egocentric and allocentric spatial cues. **Analysis:** A Three-way within-subjects ANVOA will be conducted to look at the effects of task condition (egocentric, allocentric, combined egocentric and allocentric), and stimulation (OPA, Precuneus, control), on location error and path data.

Using multisensory body illusions to modulate judgements of body size.



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Anorexia Nervosa (AN) is an eating disorder typically characterised by an overestimation of body size. Allocentric Lock hypothesis (Riva, 2012) explains that AN patients base their bodily experience on inaccurate allocentric memories of their appearance (view of the body from the perspective of another person). This study (N=20 females) therefore examined the effect of modulating perspective of the body on experience of body size. We implemented a multisensory body swap illusion adapted from Petkova and Ehrsson (2008), during which healthy participants were given the illusion of shaking hands with themselves whilst viewing their body from an allocentric perspective. Body size estimations were taken before and after the illusion, as were quantitative and qualitative measures of the illusion experience. Participants reported changes in body size estimations, such that those with lower BMIs estimated their waist and shoulders to be smaller after experiencing the illusion. Overall participants affirmed the experience of the illusion, with greater changes in body size judgements associated with those reporting experiencing stronger illusions. The results suggest that the paradigm could be effective at updating participants' allocentric view and therefore may be useful for developing future treatments for body size overestimation in AN.

Petkova, V. I., and Ehrsson, H. H. (2008). If I were you: perceptual illusion of body swapping. *PloS one*, 3(12), e3832.

Riva, G. (2012). Neuroscience and eating disorders: The allocentric lock hypothesis. *Medical Hypotheses*, 78(2), 254-257.

Curved sixth fingers: Flexible representation of the shape of supernumerary body parts.



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A recent perceptual illusion induces the feeling of having a sixth finger on one's hand. In a previous study we successfully induced a sixth finger with varied lengths. As we develop throughout childhood, flexibility in mental representation of body part length is useful for an accurate representation of our growing bodies. Body shape, however, is more stable throughout our development, and thus may be less susceptible to alteration. To test whether we can embody a sixth finger with a different shape from our own fingers, we induced a sixth finger which curved laterally through 180°. Participants reported feeling both curved and straight sixth fingers, depending on the stimulation pattern. Visual comparative judgements of the felt curvature of the supernumerary finger, showed means of 182° in the curved condition, and 35 in the straight condition. Our results show we can feel a supernumerary finger with different shape from our actual fingers, indicating that shape is represented flexibly in the perception of our hands. This study also adds evidence to the independence of the supernumerary finger from the actual fingers, showing we can represent the sixth finger with its own shape.

Sensory (but not decisional) uncertainty controls information seeking.



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Humans and other animals perform actions to elicit information from the outside world. Metacognitive theories suggest this behaviour depends on introspection about our decisions - such that we seek information when we think a choice is likely incorrect. However, here we investigated whether information seeking is truly driven by uncertainty about our decisions, or by uncertainty about the evidence provided by our senses. Our participants judged the direction of moving dot clouds, and could opt for another 'clearer look' at the stimulus before making their choices. Critically, we independently manipulated sensory uncertainty (motion strength) and decision uncertainty (decision boundary): creating conditions where signals could be weak but accuracy could be high, or signals strong but accuracy low. Results revealed that while objective accuracy was mostly affected by decision difficulty, information seeking was only affected by signal strength. That is, observers were likely to 'look again' when motion clouds were weak - even if decisions were easy - but would rarely seek information when motion clouds were clear - even for difficult choices. Thus, information seeking seems driven by computations of signal quality rather than estimates of choice accuracy. This questions the idea that information seeking depends on metacognitive introspection.

Feature based templates-for-rejection are ineffective at suppressing threat-related distractors in visual search.



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Models of attention have proposed there is evidence for flexible templates-for-rejection, whereby distractor features are retained in working memory to suppress matching features in the environment. Much of the research has, however, explored this phenomenon using abstract neutral shapes, meaning that it is unclear whether this generalises to real-world stimuli, in particular, emotionally distressing stimuli which individuals would be motivated to ignore. We therefore instructed 40 participants to detect a varying 45° rotated real-world object amongst other upright and horizontal objects. Three distractor conditions varied randomly within the block, these comprising no distractor trials (non-object placeholder), neutral distractors (healthy hand image), and threat-related distractors (injured hand image). Trials began with either an exact target template cue, distractor template cue, or a non-informative cue. Bayesian pairwise comparisons of neutral and threat-related distractor costs, between cueing conditions, revealed strong evidence against a reduction in distractor costs when participants were cued with the distractor template, versus no template information. Additionally, for threat-related distractors there was strong evidence of increased distractor costs when attempting to use a template-for-rejection, especially for highly anxious individuals. Conversely, target templates reduced the neutral distractor costs, though not threat-related distractor costs. The findings suggest that templates-for-rejection are ineffective at suppressing real-world distractors which individuals may be motivated to avoid, and may actually heighten attentional biases for individuals with trait anxiety. These results are discussed in terms of attentional biases to threat, and whether templates-for-rejection effects are limited to novel non-affective stimuli.

Perceptual learning of noise-vocoded speech persists under different types of divided attention: A dual-task paradigm.



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Despite current theories suggesting a key role of attention in supporting perceptual learning of degraded speech, our recent finding suggests that speech perceptual learning persists under a concurrent visuospatial task, even under the hardest condition. However, as a visuospatial task is not directly involved in speech processing, it is unclear whether speech perceptual learning persists when attention is diverted by a secondary task that requires a process intrinsic to sentence recognition, such as phonological or lexical processes. Here, we discuss results of an online dual-task paradigm in which participants in a between-group design recognized noise-vocoded sentences together with a dual task aiming to recruit domain-specific (lexical or phonological), or domain-general (visuospatial) processes. The design also included a baseline group who completed the primary speech task only. We first found similar secondary task performance for all three tasks. Perceptual learning of speech under all secondary tasks was intact and comparable to that in the single task. Our results demonstrate that the impact of divided attention on perceptual learning depends on domain-general processes and speech perceptual learning persists under different types of divided attention.

Co-activation of multiple attentional templates in colour versus shape search.



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During visual search, attentional selection is guided by attentional templates - target representations held in visual working memory (WM). It is observed that multiple colour templates can be activated simultaneously to guide attention in parallel. However, it is unclear whether template co-activation can also be found for feature dimensions with lesser guiding efficiencies, such as shape, and whether multiple feature conjunctions (colour and shape) can be co-activated simultaneously. To answer this question, we measured the N2pc component of the event-related potential under low and high WM load conditions in colour, shape, and conjunction search. Participants searched for a colour- or shape-defined, or a conjunctive target among four differently coloured shapes presented in circular search arrays, which were preceded by cue displays indicating the one upcoming target-defining feature (low load) or two features (high load). Multiple-template search was less efficient than single-template search, reflecting mutual inhibition of two simultaneously activated templates. Colour and conjunction search were similar, while shape search was less efficient. Importantly, load costs in behaviour and N2pc were comparable in colour, shape, and conjunction search. These results suggest that, even for lesser guiding feature dimensions (e.g., shape) and conjunctions, multiple templates can be co-activated simultaneously to guide attentional selection.

Eye movements during verbal and spatial maintenance.



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It is still largely unclear to what extent and how we use our eyes during maintenance of memory for verbal and spatial features, and whether looking back at memorised locations of items is associated with a memory benefit. We investigated oculomotor behaviour during encoding and maintenance of verbal or spatial features by using a retro-cue paradigm. The task involved sequentially presenting letters in different locations and recalling either the letters or the locations of the letters, with the correct order for recall (forward or shuffled) of all items indicated by digit retro cues referring to the each of the serial positions of the presented letters. Fixation probability to to-be-remembered items was found to be higher during verbal compared to spatial encoding, while fixation probability to empty locations of memorised items was lower during verbal compared to spatial maintenance. The highest fixation probability to an empty memorized location during spatial maintenance was observed after the final retro cue and was directed to the location of the first cued item. Fixations during encoding and maintenance were not associated with a clear memory benefit or cost. These findings suggest that the type of features to be recalled modulates oculomotor behaviour during memory maintenance.

The Compass Task: A contemporary spatial Stroop task.



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For approximately a century, we have studied how that which we are not attending to influences our behaviour. The Stroop phenomenon has been explored extensively, but usually with vocal responses. This is potentially problematic according to the Translational Hypothesis because interference depends on response method, and vocal responses arguably favour verbal information over colour or spatial information. I was interested in whether manual responses with verbal associations could sufficiently emulate vocal responses. Thus, a spatial Stroop task was conducted, manipulating task focus (whether participants respond to the meaning of letters depicting directions [NESW] or their positions around a compass diagram) and response type (pressing letter or arrow keys on a keyboard). The results match previous findings: interference is greater in the two conditions where task focus and response type are contradictory than when they are complementary. This contemporary, within-subjects experiment corroborates previous research (Virzi and Egeth, 1985) confirming that this anticipated pattern can be obtained using only manual responses. This implies that how participants think about a response determines its alignment with the proposed spatial and verbal processing systems. Given the ease of conducting this experiment online, I hope that interest in this area will be renewed for further study.

Virzi, R. A., and Egeth, H. E. (1985). Toward a translational model of Stroop interference. *Memory and cognition*, 13(4), 304-319.

Enhancing recall with imperceptible sensory stimulation.



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While transient increases in gamma-band activity have long been associated with successful memory retrieval, it remains unknown whether gamma-band activity exerts causal influence over recall in humans. Here, we explore this idea using high-frequency visual sensory stimulation during associative memory retrieval. Thirty-five participants completed a paired-associates task in which the luminance of the retrieval cue rhythmically fluctuated at either 65Hz, 43Hz, or 33Hz, or did not fluctuate at all. Sensory stimulation at 65Hz led to an improvement in memory performance relative to (1) the condition where no stimulation was applied, and (2) when slower stimulation frequencies were applied. Applying 65Hz sensory stimulation during encoding, however, did not impact performance, suggesting stimulation impacts retrieval-specific processes rather than more general perceptual/attentional processes. Importantly, participants could not distinguish the 65Hz stimulation condition from the condition without stimulation, suggesting that this memory enhancing protocol is invisible to the naked eye. We replicated all these findings in a second, independent sample of twenty-eight participants. Altogether, this suggests that imperceptible gamma-band sensory stimulation is an effective method to enhance our recall of associative memories and may hint at a causal link between gamma-band activity and human memory retrieval.

Perceptual load effect is not replicated online with letter or symbol stimuli.



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Selectively attending to relevant information while ignoring distractions is crucial for everyday life. The perceptual load theory suggests that distractor processing is reduced in tasks with high compared to low perceptual load, supported primarily by in-person tasks using letters as stimuli. These tasks limit recruitment of large sample sizes and dyslexic individuals. The present study extended a previous unsuccessful attempt to create and validate an online perceptual capacity task using letter-like symbol stimuli[1]. Here we evaluated whether the perceptual load effect could be replicated using two online tasks based on [2], one with letters and one letter-like symbols. Neurotypical participants each completed both tasks, indicating which of two targets was in a display of variable perceptual load while ignoring an incompatible or neutral distractor. Reaction times (RTs) and accuracy were measured. Participants also completed the Autism-Spectrum Quotient (AQ) to relate performance to autism-like traits. Surprisingly, frequentist and Bayesian analyses provided no substantial evidence either in favour or against reduced distractor interference effects at high load in either task, and no evidence of AQ group differences in these effects. The limitations of online research and symbol stimuli are considered, resulting in discussion of future directions and the perceptual load effect's robustness.

1. Clark, L. B. R. (2021). Distractor interference effects are consistent across low and high perceptual loads in an online task [Unpublished dissertation]. University of Oxford.
2. Remington, A. M., Swettenham, J. G., Campbell, R., and Coleman, M. (2009). Selective attention and perceptual load in autism spectrum disorder. *Psychological Science*, 20(11), 1388-1393.
<https://doi.org/10.1111/j.1467-9280.2009.02454.x>

EPS

Experimental
Psychology
Society

51st Bartlett Prize Lecture



will be delivered by

Professor Robert Logie

University of Edinburgh

Working Memory:
Blending theory and application.



5.45pm, Thursday 5th January 2023

Lower Ground Lecture Theatre.

No registration is required to attend in person.

EPS

Experimental
Psychology
Society

29th EPS Prize Lecture



will be delivered by

Dr Catherine Manning

University of Reading

Visual processing and decision-making
in autism and dyslexia: Insights from
cross-syndrome approaches.



4.45pm, Wednesday 4th January 2023

Lower Ground Lecture Theatre.

No registration is required to attend in person.



**APPLYING TO JOIN THE
EXPERIMENTAL PSYCHOLOGY SOCIETY**

To apply for membership to the Experimental Psychology Society please go to the EPS website: <https://eps.ac.uk/applying-for-membership/> and fill in the form, ensuring all boxes are completed (Entries should be made in clear black type) before signing and returning to the EPS Administrator: expsychsoc@kent.ac.uk or sending to:

Sam Hurn
EPS Administrator
School of Psychology
Keynes College
University of Kent
Canterbury
CT2 7NP

Application forms should be sent to the EPS Administrator by one of the application deadlines, 1st March or 1st September.

All information should be included on the form, not on additional sheets.

Under "Publications", only articles that have appeared in print by the time of nomination, in peer-reviewed psychological or cognate journals, should be listed. Because of space limitations, a complete publication list is not required; *two* recent examples, where the nominee is in a prominent authorship position (e.g. sole, first or last), are sufficient.

Applicants must be nominated by one EPS Ordinary Member.

These forms should be returned by 1st March or 1st September.

See Criteria and Procedures on following page.

CRITERIA AND PROCEDURES TO JOIN

Soon after the closing date of 1st September, brief details of all candidates will be circulated to members of the Society, who may request further information if they wish. The nomination forms will be considered by the Committee at their Spring and Autumn meetings. The EPS Administrator will check whether each candidate is eligible for admission to Ordinary Membership, i.e. those candidates who have:

- a) secured a PhD
- b) published at least two independent accounts of their work in a reputable, peer-reviewed psychological journals
- c) personally delivered an oral paper or research study poster to the Society at one of the three EPS meetings held each year

Candidates who do not meet all these criteria can be considered only in exceptional circumstances. Those who are resident outside Europe will be asked for assurance that they can attend meetings reasonably often.

Any candidate not selected as eligible by the EPS Administrator will be informed of this and will be advised whether he/she may again be proposed for membership in a future year and if so subject to what conditions. The list of those selected as eligible will be put to the Annual General Meeting in January or the Summer Business meeting for approval.

Meeting Accommodation.

Below is a selection of London hotels, some of which are close to the venue. PLEASE NOTE these are not recommendations, and you should check the website and prices before making your booking:

[The Academy Hotel](#)

[Holiday Inn](#)

[Ibis Accor](#)

[LSE Passfield Hall \(Student Accommodation\)](#)

[Premier Inn](#)

[Travelodge](#)

[Wardonia Hotel](#)

Other alternatives and prices are available on booking sites such as [booking.com](#) etc.

Travel

London is well served by transport links, both for travelling to and from London from the UK, Europe and the wider world, and for getting round the city.

[Full details of travel to UCL](#)

[UCL Online Campus Map](#)

Conference Dinner.

The conference dinner will be held on Thursday 5th January at 7:30pm (arrival from 7:15pm) at TAS Bloomsbury, which is just a 10 - 15 minute walk from the meeting. The restaurant address is 22 Bloomsbury Street, London, WC1B 3QJ.

This year, dinner bookings and payment will be exclusively online. Payments must be made electronically using a credit or debit card (PayPal is not currently supported). Please complete all required information to ensure your place and menu choices at the dinner. Once booked, the system will generate an automatic receipt to your email address.

The standard dinner cost for EPS members is £35.00 this year. Please note that postgraduates can book at a reduced fee of £17.50, but must provide evidence of their postgraduate status by emailing a letter from their supervisor (or a direct email from the supervisor) to expsychsoc@kent.ac.uk.

[Please click here to make an online booking.](#)

There are limited places available and this online store will close at midday on Wednesday 14th December or when all available places have been booked.

Starter: (No choice required as all will be available)

Assorted meze served with homemade bread.

HUMUS (V)

Pureed chickpeas with tahini, garlic, olive oil and lemon Juice

ISPANAKLI YOGURT (V)

Thick and creamy Anatolian yogurt blended with spinach and garlic

MAYDANOZ SALATASI (Tabbouleh) (V)

Finely chopped parsley and mint tossed with tomatoes, onions, bulgur, olive oil and lemon juice

ZEYTINYAGLI PATLICAN (V)

Aubergine cooked in olive oil with tomatoes, garlic, peppers and chickpeas

FALAFEL (V)

Deep-fried Mediterranean style chickpea and broad bean patties

BOREK (V)

Filo pastry triangles stuffed with feta cheese and spinach

MANTAR (V)

Sauteed mushrooms in garlic, onions, peppers, leeks and tomatoes, topped with cheddar cheese

Main Course: (Choice Required)

TAVUK GUVEC

Chicken casserole with mushrooms, onions, tomatoes, ginger and fresh coriander

DOMATES SOSLU KOFTE

Lamb meatballs cooked with fresh tomatoes, potatoes, parsley, leeks, onions and peppers

MUSAKKA

Tas style Mediterranean layered bake of aubergine, lamb mince and potatoes topped with bechamel sauce

TAVUK SIS

Charcoal grilled skewer of marinated chicken cubes, served with couscous

KARISIK IZGARA

Mixed grill of chicken cubes, lamb cubes and kofte, served with couscous

ISPANAKLI PATATES (V)

Potatoes cooked with spinach, tomatoes and onions in soya sauce, served with yours

TURLU (V)

Anatolian village style stew of potatoes, aubergines, courgettes, mushrooms, peppers, carrots, tomatoes, served with couscous and yogurt

KALAMAR TAVA

Lightly battered squid rings, served with a rose infused sweet and sour sauce and salad

KARIOES GUVEC

Prawn casserole with tomatoes, coriander, mushrooms, double cream and garlic in white wine sauce

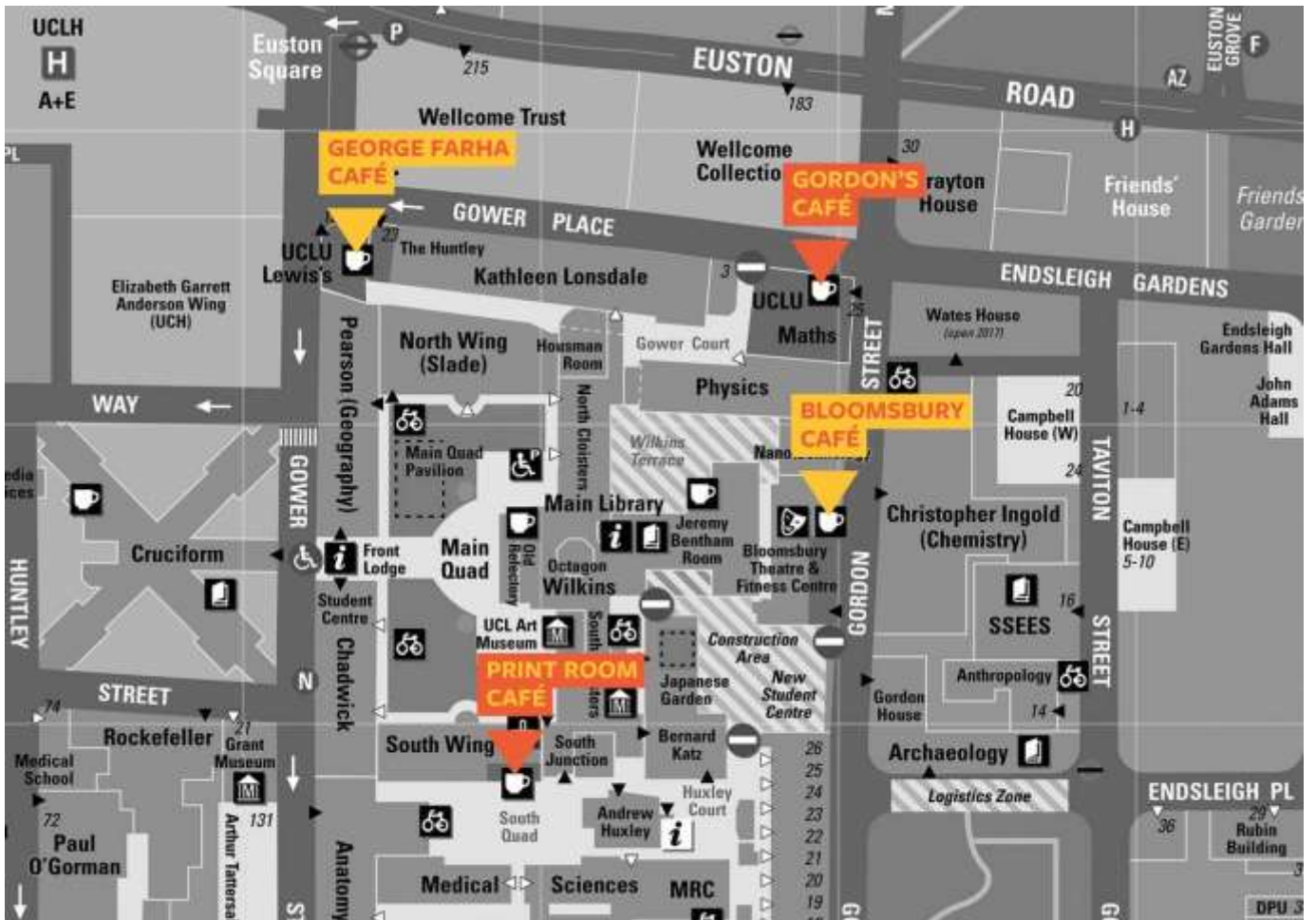
Dessert: (No choice required as will be provided to share)

Apricot and Turkish Baklava pieces.

Food Options

During the conference, there are plenty of off-site shops and restaurants near to the venue offering a range of food.

There are also many options to eat and drink around UCL locations, [for full information please follow this link.](#)



Annual General Meeting

The 75th Annual General Meeting will be held on Friday 6th January 2023 from 12:30pm in the Lower Ground Lecture Theatre at the Department of Cognitive, Perceptual & Brain Sciences, University College London, 26 Bedford Way, London, WC1H 0AP.

AGENDA

23/01 Minutes of the Annual General Meeting, held online on Wednesday 5th January 2022

See Attachment 1.

23/02 Matters Arising

23/03 Secretary's Report

23/03.1 Annual Report of the Society

23/04 Treasurer's Report

23/04.1 Treasurer's Report

23/05 QJEP Editor's Report

23/05.1 Editor's Report

23/06 Confirmation of the Fifty-Second Bartlett Lecturer

23/07 Confirmation of the Twenty-Second EPS Mid-Career Award

23/08 Confirmation of the Thirty-First EPS Prize Lecturer

23/09 Confirmation of the Twelfth Frith Prize

23/10 Election of Officers and Committee Members

23/11 Admission of Ordinary Members

23/12 Arrangements for Future Meetings

23/13 Any Other Business

23/14 Date, Time and Place of Next Meeting

Confirmation of the Fifty-Second Bartlett Lecturer

The Committee seeks approval for the following nomination:

Professor Marlene Behrmann

Confirmation of the Twenty-Second EPS Mid-Career Award Lecturer

The Committee seeks approval for the following nomination:

Professor Geoffrey Bird

Confirmation of the Thirty-First EPS Prize Lecturer

The Committee seeks approval for the following nomination:

Dr Nadine Lavan

Confirmation of the Twelfth Frith Prize Award Lecturers

The Committee seeks approval for the following nomination:

Tom Arthur

Election of Officers and Committee Members 2022

The Committee submits the following nominations:

Honorary President Elect Professor Rob Honey

Conference Secretary Elect Professor Jeremy Tree

London Organiser Elect TBC

Admission of Ordinary Members

Under Rule 7 the list of applicants for Ordinary Membership was earlier circulated electronically in the December newsletter. These applications were provisionally approved at the Autumn Committee meeting.

Arrangements for Future Meetings

A call for meetings in 2026 will be made in summer 2023. Those wishing to submit a proposal can contact the EPS Administrator to receive a costings form that will need to be filled out and sent back alongside a narrative on the benefits of hosting a meeting at the proposed institution, including walking distances from the venue to food outlets, accommodation and transport links.

Annual General Meeting

The 74th Annual General Meeting was held on Wednesday 5th January 2022 at 3:15pm via Zoom.

MINUTES

22/01 Minutes of the Annual General Meeting held online on Wednesday 6th January 2021

The minutes were approved without changes.

22/02 Matters Arising

22/03 Secretary's Report

22/03.1 Annual Report of the Society

The Hon. Secretary outlined some of the achievements of the EPS during 2021.

- Highly successful online meetings in January, April and July
 - Awarded numerous research grants (N=25), student bursaries (N=13) and workshops (N=2), and recognized scientific excellence through prizes
 - Increased the value of all grants
 - Launched new EPS Fellowship scheme (35 applications and 2 awarded)
 - Launched new Final Year Undergraduate Research Bursary scheme (6 applications and 4 awarded)
 - Celebrated EPS's 75th anniversary in June
 - Continued social media engagement @ExpPsychSoc
1. Proposal to monitor EDI data on membership, awards etc.
 2. Proposal to launch new ECR Pairing Scheme.
 3. Proposal to increase prize money awarded.

All proposals were approved.

22/04 Treasurer's Report

22/04.1 Treasurer's Report

Accounts are in very good health, with increased income and reduced outgoings between 2019 and 2020 caused by Covid-19 pandemic continuing between 2020 and 2021, most notably due to the cancellation of in-person meetings, though more grants have been awarded.

Society reserves are slightly higher than last year. The Charity Commission suggest charities such as the EPS should hold in reserve 1-2x annual expenditure, the EPS holds slightly more than this but has plans to use this to fund the Fellowship Scheme, Final Year Undergraduate Research Bursary and update the levels on current schemes. The EPS has not invested in the stock market during the last year because of the wider economic landscape caused by the pandemic.

22/05 QJEP Editor's Report

22/05.1 Editor's Report

- 493 manuscript submissions in 2020, a 2.9% increase from 2019
- 42% acceptance rate in 2020
- 2020 Impact Factor is 2.143
- Call for Special Issues will open Feb 2021
- Active twitter with 802 followers & growing - @SageQJEP

22/06 Confirmation of Fifty-first Bartlett Lecturer

Committee sought approval for the following nomination: Professor Robert Logie

22/07 Confirmation of Twenty-first EPS Mid-Career Award Lecturer

Committee sought approval for the following nomination: Professor Gareth Gaskell

22/08 Confirmation of Thirtieth EPS Prize Lecturer

Committee sought approval for the following nomination: Dr Clare Sutherland

22/09 Confirmation of Joint eleventh Frith Prize Award Lecturers

Committee sought approval for the following nomination: Moataz Assem and Matthew Mak

All nominations were approved.

22/10 Election of Officers and Committee Members 2022

The Committee submits the following nominations:

Early Career Representative Dr Emma James

Ordinary Committee Member Dr Jennifer Cook

Ordinary Committee Member Dr Nura Sidarus

All nominations were approved.

22/11 Admission of Ordinary Members

Under Rule 7 the list of applicants for Ordinary Membership was earlier circulated electronically. These applications were provisionally approved at the Autumn Committee meeting.

All applications were approved.

22/12 Arrangements for Future Meetings

30th March to 1st April 2022, Keele University

Local organiser: Jim Grange

July 2022, University Stirling

Local organizer: Peter Hancock

January 2023, UCL

Local Organiser: Jo Taylor

Attachment 1.

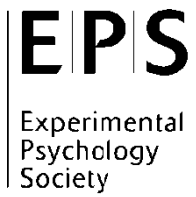
April 2023, University of Plymouth
Local Organiser: Alastair Smith

July 2023, Swansea University
Local Organiser: Jeremy Tree

22/13 Any Other Business

Thanks were given to outgoing ordinary committee member Antje Meyer, outgoing ECR Representative Daniel Yon and outgoing EPS President John Duncan.

22/14 Date, Time and Place of Next Meeting

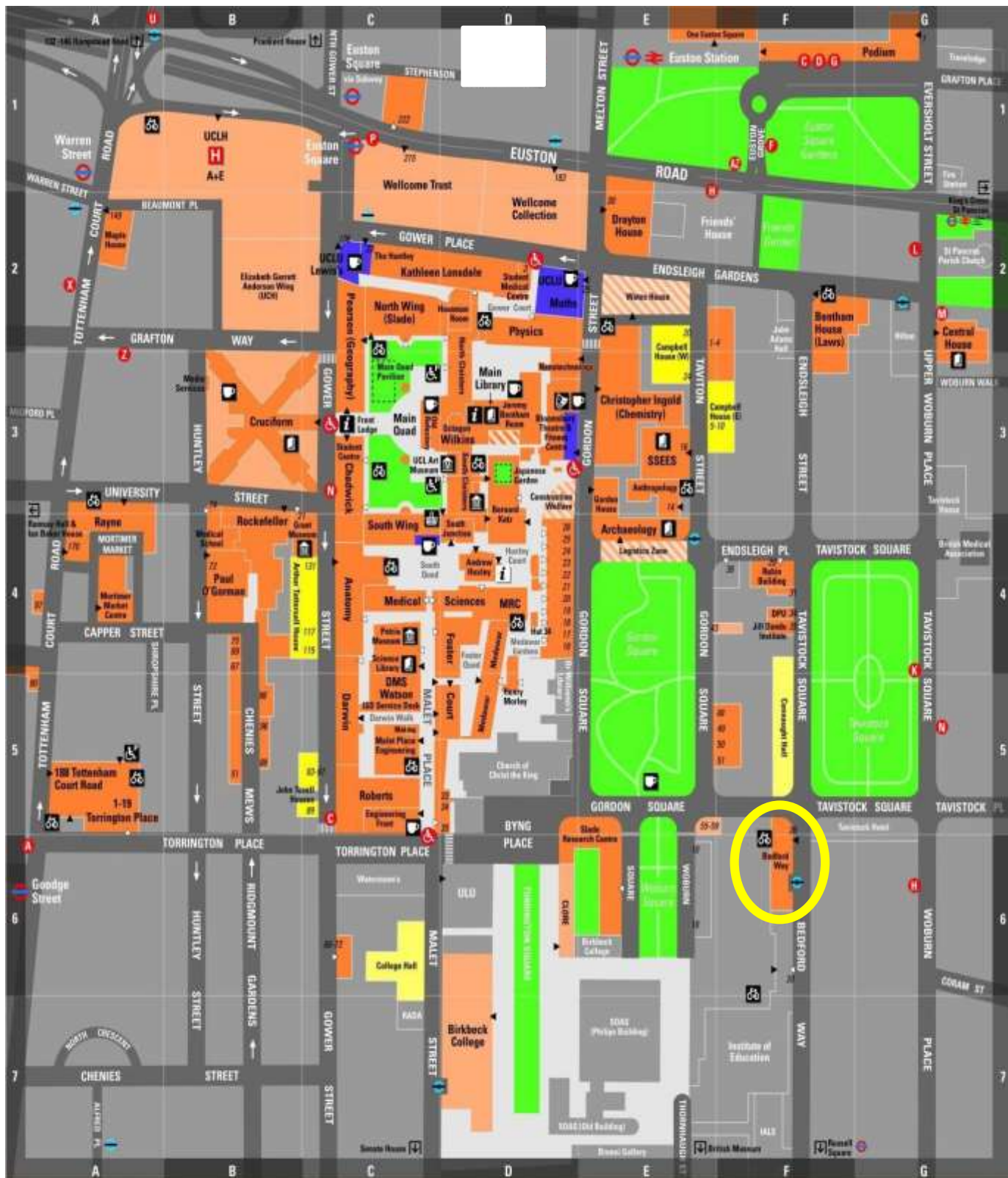


Next Meeting: University of Plymouth. 19th – 21st April 2023.

This meeting will include 30th EPS Prize Lecture by Clare Sutherland (with an accompanying symposium organised by Mila Mileva).

In addition, we will be opening a portal in early January 2023 for members and their guests to submit abstracts for oral and poster presentations.

Local Organiser: Alastair Smith



Main UCL Buildings	UCL Library Sites	Cafés	Underground Station	Street number
Student Accommodation	UCL Shop	Cycle Parking	Railway Station	Main Accessible Entrance
UCL Union Buildings	Information Point	Museums & Collections	Cycle Hire Station	Accessible Route
Pedestrian Area	Security and Access	Theatre	Bus stop	Pedestrian Access
	Hospital	Accessible Parking	One-Way Streets	Pedestrian Crossing

